Charleston County SCHOOL DISTRICT
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DESIGN REQUIREMENTS

For New Construction and
Major Renovations of CCSD Facilities

Rev: 09 – January 2023 Release

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PART I: OVERVIEW & REQUIREMENTS BY PROJECT PHASE

1 EXECUTIVE SUMMARY

CCSD Design Requirements provide direction to design professionals (architects and engineers, "AE") providing design services for new construction and major renovations for the Charleston County School District. The District's intent is to construct high performance school facilities with superior indoor environmental quality that are energy efficient and cost effective to operate and maintain. These Design Requirements include specific requirements for the Key Stakeholders and Project Team Members that inform Design, Performance, Process, Systems Integration, Construction and Post Occupancy activities.

The Design Requirements provide direction to the AEs for inclusion in contract documents so that Project delivery is consistent and meets CCSD standards. They are intended to improve communication and project planning so that Capital Programs and Facilities Maintenance & Asset Management deliver the highest quality facilities possible. The Requirements do not supersede any specific contractual agreement for an individual Project between CCSD referred to herein as "Owner", the AE, Contractor and/or other participants. Should an AE wish to deviate from these requirements, or the requirements call for a request for approval, the AE shall submit a written request to the CCSD Associate of Facilities Maintenance or Designee with appropriate supporting backup documentation. AE shall obtain written approval to proceed with the request. Conflicts between the Requirements themselves or between the Requirements and the Owner/Architect Agreement during the course of an individual Project shall be brought to the attention of CCSD and Program Management. Time sensitive updates to these Design Requirements are at the discretion of the District and will be distributed as standalone Owner's Project Requirements documents see Appendix I. Substantive additions to the text from the previous version are underlined herein.

1.1 Guiding Principles

- CCSD strives to provide aesthetically pleasing and structurally functional schools that are comfortable, healthy, safe, secure and meet the needs of students, teachers and staff.
- CCSD strives to build facilities that are cost efficient to construct and operate and are easy to maintain.
- CCSD strives to build sustainable, high-performance facilities that provide superior indoor environmental quality.
- CCSD expects school facilities to be designed and constructed so that they are able to be operated for a minimum of 50 years prior to major renovation activities (excluding mechanical systems).
- CCSD strives to provide consistent and informed direction on building requirements and performance requirements to improve Project delivery and reduce lifecycle costs.
- CCSD strives to continually improve performance through incorporating learning into its processes and thus encourages transparency, open communication and thorough documentation among all Stakeholders and Project Team Members.

- CCSD believes clear communication and collaboration among Stakeholders, Project Team Members and other participants in the building/renovation process is critical to a Project's success and requires all participants to make decisions based on the best outcome for the Project.

1.2 Regulatory Requirements

1.2.1 Codes

The South Carolina School Facilities Planning and Construction Guide (SC P&C Guide) issued by the South Carolina Department of Education Office of School Facilities (OSF), shall provide the minimum requirements for school construction. The SC P&C Guide may be obtained by writing or calling the OSF at 1429 Senate Street, Suite 1114, Columbia SC 29204, (803) 734-4839 FAX (803) 734-4857. It may also be downloaded for free at the following https://ed.sc.gov/districts-schools/school-planning-building/south-carolina-school-facilities-planning-construction-guides-forms/. In the event there are discrepancies between the SC P&C Guide and this document, Program Management shall be notified for clarification or resolution.

Building design shall comply with the currently adopted building codes, statutes, regulations and referenced standards specified in the SC P&C Guide applicable to the Project and all other applicable codes, statutes and regulations. Adopted building codes in SC may be viewed for free by going to https://codes.iccsafe.org/category/South%20Carolina?year[]=Current+Adoption&page=1 on the South Carolina Building Codes council website. The version of the SC P&C Guide used shall be shown on the code analysis drawing for the project.

1.2.2 Building Permits

In accordance with South Carolina Bill 236, Section 6-9-110, local building permits are not required.

1.2.3 Zoning Requirements

All projects shall comply with local zoning ordinances. If it is determined during the course of design that a variance is desired or necessary, the AE shall coordinate the effort to obtain it. The process to obtain rights-of-way and encroachment permits shall also be coordinated by the AE. When Projects are located in historic districts or work is being done on a historic building, the Project shall comply with local, state and federal historic preservation laws and policies.

1.2.4 Project Review

The South Carolina Department of Education, Office of School Facilities (OSF), South Carolina Department of Transportation (SCDOT), South Carolina Educational Television and the South Carolina Department of Health and Environmental Control (DHEC) shall review projects. The State Fire Marshal shall review the life safety aspects of the Project as part of the OSF review. The AE shall review documents as they are developed with local fire code officials who perform the construction phase inspections on behalf of the State. The local fire district shall review and approve the drawings to verify site access for firefighting apparatus.

1.2.5 Fire and Safety Guideline ACT 256 Guidance

CCSD is now required to comply with SC Code of Laws 59-17-160 (2018 ACT NO. 256). This act put new guidelines in place that requires certain certifications from the contractors and various documents from the A/E. See Appendix K

1.3 Special Inspections

Refer to the South Carolina School Facilities Planning and Construction Guide (SC P&C Guide).

1.4 Performance Requirements

CCSD uses the following criteria to evaluate project performance, including but not limited to:

- Compliance with CCSD Design Requirements (this document)
- Compliance with CCSD Standard Drawing Requirements
- Budget and Cost Control
- Program
- Function
- Durability
- Construction Cost Per Square Foot
- Facilities Management (FM) & Asset Management (AM) cost per square foot
- Energy and Sustainability goals

1.5 Project Participants

- **Owner**: Charleston County School District (CCSD)
  - Associate of Facilities Maintenance
  - Executive Director for Capital Programs
  - Executive Directive of Food Services
  - Director of Security
- **Key Stakeholders:** Defined as the Owner (CCSD) and Principals/Senior Management of firms working on the Project (Program Management, AE, Contractors, CxA, etc.)
- **Project Team Members:** Defined as employees of CCSD and firms working on the Project
- **Program Management**: Program Management - firm(s) hired by the CCSD
- **AE**: Primary Architect/Engineer- Design Professionals of Record
- **Contractor**: Prime General Contractor – firm hired by Program Management
- **Subcontractors**: Firms hired by the General Contractor
- **CxA**: Commissioning Authority – firm hired by CCSD
- **SI**: Special Inspectors, employees of firms providing Special Inspections

2 PROJECT PHASES

The scope of services for each phase is enumerated in detail in the Agreement between CCSD and AE, and as modified in the Supplementary Conditions of Agreement between CCSD and AE, issued by the Charleston County School District. This section outlines the process for each phase of design. CCSD has adopted the United State National CAD Standard-V6 for execution of drawings. The standard format shall be "F" size for all projects. The title sheet will include the schools 4-digit building number on it. The project title must be approved by the CCSD FM Engineer in Charge or Capital Projects. The title shall describe the project scope succinctly and should be less than 40 letters including spaces. The PDF and DWG base line files can be pulled from the CCSD web site.

2.1 Project Feasibility and Conceptual Design (FCD)

2.1.1 FCD Overview

FCD is the Project phase that establishes the financial, time, and CCSD Program requirements. During the FCD phase, the scope of the Project is defined and includes, but is not limited to, site selection and expansion feasibility, programming, schematic space planning diagrams, and existing facility surveys. These Design Requirements shall be distributed to Key Stakeholders during the FCD Phase for review.

2.1.2 FCD Submittals

1. **Project Schedule, Budget and Owner Requirements**: Owner and Program Management shall provide facility completion deadline, budget, and Design Requirements to Project Team.
2. **Design Phase Schedule and Review Plans:** The AE shall submit a Schedule and Review Plan to Program Management for approval. The schedule shall contain anticipated dates and major milestones for this Phase of the Work, to include deliverable due dates, zoning and Board of Architectural Review meetings and deadlines, interdisciplinary coordination reviews, quality assurance reviews, OSF reviews and approvals, and other agency and AHJ reviews and approvals as identified herein and in the Agreement between Owner and AE. The Review Plan shall outline the steps to be taken by the AE to review for technical accuracy, errors, omissions, discrepancies and constructability. AE shall state which tool (Redi-Check, AIA D200, or equivalent methodology) will be used.
3. **Project Feasibility and Conceptual Design Documents:** The FCD Submittal is required to obtain the Office of School Facilities' (OSF) approval allowing the Project to proceed. This submittal focuses on several site considerations outlined in Division 3 of the South Carolina School Facilities Planning and Construction Guide (SC P&C Guide). SCDOT submittals for applicable schools shall be started in this phase to attain timely SCDOT approval. AE shall perform an evaluation of applicable code issues and coordinate the review effort with code and regulatory officials.
4. **Cost Estimates:** Cost estimates are provided by Program Management. Submittal shall be for all building systems and benchmarked to market rates. The cost estimation process shall include identifying and planning for long lead time items.
5. **Sustainability:** AE shall design with LEED and Green Globes guidance.

6. Owner shall review and comment on all submittals from FCD Phase including cost estimate from Program Management, Design Phase Schedule and Review Plan from AE Schematic Design (SD)

2.2 Schematic Design

2.2.1 SD Overview

The AE shall perform an evaluation of and finalize the scope, form, adjacencies and spatial relationships. Major systems selection shall be finalized, and more detailed cost estimates shall be produced. Any changes to the schedule or budget during the SD phase shall be reviewed and agreed upon by the Owner and Program Project Manager. The AE shall produce the Basis of Design (BOD) narratives. Owner and Program Management shall review and approve the Basis of Design (BOD). AE shall submit a letter stating that the Project has been reviewed and approved by OSF and SCDOT and other AHJs as necessary. Owner retains services of CxA.

2.2.2 Schematic Design Documents

1. SD Basis of Design (BOD) shall be provided by AE. The BOD shall include a written scope that demonstrates the AE's understanding of the requested facility based on the Design Requirements. AE shall outline materials and systems from Appendix A – Basis of Design Manufacturers such that manufacturers of products, systems, and equipment shall bid the project using their standard processes.
2. The Program Manager shall provide the updated Construction Cost Estimate.
3. The AE shall provide code analysis reports and drawings required by OSF.
4. The AE shall provide an updated Design Schedule.
5. Site Plans: Shall be submitted at appropriate scale, showing:
    - The footprint of all structures (existing and new, including those to be demolished) with finished floor elevations
    - Proposed finish floor elevations, proposed storm piping routes, and proposed general drainage patterns
    - Site boundary (showing adjoining roadways with rights-of-way indicated)
    - Site acreage
    - Site orientation
    - Site location map
    - All setbacks
    - Easements and any other site utilization restrictions
    - Site master plan
    - All utilities
    - Curb cuts
    - Drives
    - Walks and parking areas (existing and proposed denoting the separation of buses and cars)
    - The building service entrance/area

- Proposed storm water detention
- Wooded areas with proposed tree save areas indicated
- Playfields
- Fire hydrants
- Fire Department access around the building perimeter

6. Reasonable efforts shall be made to balance earthwork cut and fill on site. These efforts shall be demonstrated as a cut and fill summary chart on the grading plan. When site conditions or projects require phasing, a phasing plan shall be developed depicting how school and construction activities shall be conducted during the construction process. This shall include, but not limited to, lay down space, construction material storage, construction vehicle parking, building access for student drop-off and pick-up, deliveries of supplies, trash removal, emergency vehicle access to the building equivalent to pre-construction conditions, (re-) location of staff, faculty and visitor parking, (re-) location of portable classrooms, and (re-) location of play areas and equipment.
7. Floor Plans: Provide an overall plan for each level at a minimum scale of 1/16" = 1'-0' showing overall dimensions, building code analysis information and all program spaces labeled including the square footage for each shown. Group restroom layout shall be Male on the right and Female on the left, if side by side. The scheme shall be the same on both floors of the building. Elementary classrooms shall also show the grade designation. Additionally, indicate all proposed built-in casework, fixtures, equipment, furnishings and floor finishes noting the items to be provided outside of the construction contract.
8. Roof Plan: Provide an overall Roof Plan indicating the proposed roofing systems, slopes, firewall or other area separations and points of access. Show locations proposed for major mechanical equipment and rooftop classroom spaces. Equipment location shall take into account roof overhangs near roof unit fan discharge and access for repair and removal.
9. Exterior Elevations: Provide Exterior Elevations at 1/16" = 1'-0' (minimum scale) of at least two major facades, describing all wall systems, other materials, and the size and nature of all openings. Show the proposed Floor Elevation (or elevations, for multi-level schemes).
10. Building Sections: Provide at least two (2) major building sections indicating and describing proposed structural elements, proposed distribution of MEP (Mechanical, Electrical and Plumbing) and fire protection systems, ceiling heights, areas of exposed structure, changes in the roof plane, etc. The building sections shall include all information necessary to describe the spatial nature of the program spaces depicted. Indicate all fire separation walls.
11. Structural Plan and Narrative: Provide a conceptual structural framing plan (or plans, for multi-level schemes) indicating the relationship of major members to the program spaces. A thorough narrative shall be provided describing the proposed structural system(s) including foundations. Also provide a copy of the geotechnical report with recommendations.
12. MEP and Fire Protection Systems Narrative: The narrative of all proposed HVAC (Heating, Ventilation and Air Conditioning), BAS (Building Automation Systems), electrical, plumbing and fire protection systems shall include distribution, projected loads (block and peak loads), projected cooling and indicate locations of major equipment. Electrical systems shall include, but not necessarily be limited to, power, BAS, lighting, data, public address / telephone, fire alarm, security, and surveillance. Provide a draft sequence of operations for HVAC systems based on these requirements.
13. Program Space Analysis Chart: Provide a chart comparing all program space requirements indicated in the Project education specifications and those proposed by the schematic plans.

14. Security Plan: Provide a series of plans that address classroom security, camera locations, access control and site fencing. In conjunction with the Executive Director of Security, AE shall have a detailed discussion on the layout and level of protection required for reception and the entrance vestibule. In most cases, reception and the entrance vestibule will make use of the glazing in Appendix L. In other cases, due to the space configuration, the reception counter may require ballistic-rated glazing, frame, and drywall. In addition, a package handling device may be needed.

2.2.3 SD Review Process

AE shall submit written responses to all SD Review Comments within 10 business days of receipt to ensure the comments were understood. After the comments are resolved and the resolution is accepted by the Key Stakeholders, comments shall be incorporated into the Construction Documents.

Third Party Review of Systems: The Commissioning Authority (CxA) shall review the Basis of Design documents for HVAC, Lighting Controls and Domestic Water for compliance with these Design Requirements.

Note: This submittal corresponds to the Schematic Design package required by the OSF as outlined in SC P&C Guide. However, the requirements stated above exceed those required by the OSF for an SD submittal. AE shall make submission to the OSF separately as soon as documents meet the requirements of OSF and the approval of Owner. Submission to the OSF shall not occur until after Owner has approved design for submission.

2.3 Design Development Phase (DD)

2.3.1 DD Overview

The primary purpose of Design Development is to define, describe, and coordinate as many aspects of the Project as possible so that what remains after approval of the DD submittal is the documentation of detailed Construction Documents. Major issues that could cause delay and restudy during the Construction Documents phase shall be resolved by the conclusion of the DD phase.

2.3.2 DD Submittals - Documents

1. **Annotated set of SD documents or written report** shall indicate that all OSF, Owner and Program Management review comments from all reviews have been addressed and/or incorporated into the Design Development Documents.
2. **Specifications** using ARCOM MasterSpec, BSD Speclink, and eSpecs or prior approved equal. Specifications shall be in the CSI Masterformat 2014 format and numbering system and shall be tailored specifically to the Project.
3. **Updated Construction Cost Estimate** Provided by Program Management.
4. The Architect shall have a meeting with the Owner to define the door hardware to be used on the project. The hardware schedules will be prepared by the Architect in conjunction with the Owner's AHC consultant. The Architect shall be responsible that it meets the requirements of this document.
5. **Design Phase Review Checklist** Shall be provided using Owner approved checklists. AE may use their own checklist unless one is specifically provided by Owner.

2.3.3 DD Submittals – Drawings

1. **Site Plan**: All elements of the site plan described by the SD documents shall be fixed for this submittal including detailed topography and any earth retaining structures which may be required. Additionally, a proposed landscape plan, typical site sections and site details shall be provided. All site utility requirements shall be determined for the current construction and the planned future construction, permanent and portable classrooms, and load profile.

2. **Floor Plans:** The overall plan (or plans if multi-level) shall be fixed including dimensions and building code analysis information at 1/16" = 1'-0' scale. All program space information from the SD documents shall be included on these plans. The plans shall include room numbers using the approved room numbering scheme as required in this document. Partial floor plans at 1/8" = 1'-0' scale shall be developed for each area of the building, constituting the whole. These plans shall show the final configuration of all built-in casework, fixtures, equipment, furnishings, and floor finishes, noting the items to be provided outside of the construction contract. If the program includes new or renovated kitchen facilities, provide an enlarged plan of the kitchen at ¼" = 1'-0" scale with an itemized legend and manufacturer's literature for each unit of equipment. At the DD submittal, it is expected that floor plans shall be in their final configuration and shall include all electrical and mechanical spaces. Enlarged plans (1/4' = 1'-0" minimum) of the primary mechanical room, electrical room and the MTR shall be provided, indicating all required equipment including associated service clearances.

3. **Roof Plan**: The overall Roof Plan shall be fixed indicating all roofing systems, slopes (including all required crickets), firewall or other area separation penetrations, parapets, gutters and downspouts, roof drains, overflow scuppers/drains, roof top HVAC equipment, plumbing vents, roof hatches, access ladders and walk pads. Equipment location shall take into account roof overhangs near roof unit fan discharge and access for repair and removal.

4. **Reflected Ceiling Plan(s**): The overall Ceiling Plans, including reflected ceiling plans at 1/16" = 1'-0" (minimum scale) indicating all ceiling materials and systems, changes in the ceiling plane, fire separation walls ceiling mounted fixtures and equipment, and all HVAC, electrical and fire protection fixtures and devices.

5. **Interstitial Plans** (if necessary): These are above ceiling plans and shall provide a plan or details that clearly show all walls and partitions that terminate just above the ceiling and that terminate at the floor deck above or roof deck. This information may be shown on Reflected Ceiling Plans if a separate interstitial plan is not necessary.

6. **Interior Elevations**: Provide interior elevations sufficient to depict the location and number of all wall mounted devices and fixtures including but not limited to power, data, public address / telephone, BAS equipment, HVAC supply and return grills, Flat Screen Electronic Devices, fire extinguishers, and fire alarm within the major instructional and main administrative spaces.

7. **Door and Finish Schedules**: Provide door and finish schedules establishing the numbering systems and indicating materials, sizes, and fire ratings.

8. **Exterior Elevations**: Provide Exterior Elevations at 1/16" = 1'- 0" (minimum scale) of all facades, fixing the finished floor elevations(s), all materials and the size and nature of all openings. Enlarged partial elevations (1/8" = 1'-0" minimum) shall be provided depicting and describing any special detailing.

9. **Building Sections**: Full building sections shall show all floor levels, mezzanines and major changes in the roof plane and shall show and describe all slab, floor/ceiling and roof/ceiling

assemblies. Drawings shall indicate roof slopes, structural members, major mechanical equipment and ductwork, ceiling heights, floor/roof elevations and all fire separation walls.

10. **Wall Sections**: Provide wall sections to describe all typical exterior wall systems including the foundation and slab, windows, any intermediate floor system, and the roof at ¾" = 1'-0" indicating the same level of information and detail required for the exterior section(s).

11. **Interior Room Numbers**: Prepare and issue to Program Management for approval a list of room names and room numbers (see Appendix C), to allow coordination with schedules and electrical and equipment panel boards.

12. **Structura**l: Provide the overall foundation, floor and roof framing plans with the size and location of all major members fixed and indicated. Shall provide detailed sections of typical conditions coordinated with, and at the same scale, as Architectural drawings depicted the same or a similar condition.

13. **MEP&FP (Mechanical, Electrical and Plumbing and Fire Protection)**: Provide overall plans with the size and location of all major equipment and distribution system elements fixed and indicated. Provide enlarged plans (1/8" = 1'-0" minimum) of the major instructional and main administrative spaces indicating the location and number or system devices including power, data, BAS, public address / telephone and fire alarm. Provide distribution and riser diagrams, equipment schedules and key details sufficient to describe the full scope of every building system. Provide final Sequence of Operations for HVAC system. The systems to be addressed include, but are not limited to, HVAC / BAS, plumbing and fire protection, power, lighting, data, public address / telephone, fire alarm, security and surveillance. The use of the public address (PA) system being separate from the fire alarm/emergency communication system, silencing the public address system is not required. However, the fire alarm requirements of NFPA 72 regarding intelligibility shall still be met when the fire alarm system alarms throughout the building. All utility requirements shall be determined, and loads indicated. Short Circuit and Ground Fault Analysis of the power distribution system shall be provided with this submittal.

14. **Updated Program Analysis Space Chart**: Provide an updated chart comparing all program space requirements indicated in the Education Specifications (if provided) and/or those proposed by the Design Development plans.

15. Security: Provide a series of plans that address classroom security, camera locations, access control and site fencing.

2.3.4 DD Review Process

1. The AE shall submit written responses to all DD Review Comments within 10 business days of receipt to ensure the comments were understood. After the comments are resolved and the resolution is accepted by the Key Stakeholders, comments shall be incorporated into the Construction Documents.

2. Third Party Review of HVAC System: The CxA shall review the design documents for achieving Owner's Project Requirements and the Basis of Design. The CxA shall review the design documents to determine the necessary coordination of system installation required for commissioning. The CxA shall provide comments to the Program Manager and for incorporation into the 95% Construction Documents within 10 business days of receipt.

3. This submittal corresponds to the Design Development package required by the OSF P&C Guide. However, the requirements stated above exceed those required by the OSF for DD. The AE shall make submission to the OSF separately as soon as documents meet the requirements of OSF. Owner's review of the submittal shall conclude with a special session/meeting with the AE and

Program Management to discuss the design and detailing of all aspects of the building within 10 business days of receipt.

4. Program Management will schedule a Design Review Workshop with AE, Owner or Designee and PM to receive final comments. AE shall provide written responses to all comments received at the Design Development Workshop. After the comments are resolved and the resolution accepted by the Key Stakeholders, the AE shall incorporate them into the Construction Documents. All parties shall be advised that no further functional input may be accommodated without adversely impacting project timelines and budgets.

2.4 Construction Documents Phase (CD 95%)

Unresolved issues from the approved Design Development submittal will be identified in writing by the AE and require written approval by Program Management and Owner within 10 business days of receipt. AE shall prepare the complete set of Construction Documents (Drawings and Specifications) that describe the technical requirements of the Work to be done under the Construction Contract. This submittal does not correspond to any package required by the OSF and shall represent approximately 95% complete Construction Documents.

2.4.1 95% CD Submittals shall include:

1. Updated Construction Cost Estimate provided by Program Management.
2. Construction Phase Review Process Checklist provided by Program Management. A/E shall provide a completed AIA D200-1995 (latest version) to Program Management and Owner.
3. Annotated set of DD documents or written report indicating that all OSF, Owner and Program Management review comments from DD review have been addressed and/or incorporated into the Construction Documents.
4. Provide 95% Complete Project Specifications.
5. Provide an electronic copy of all calculations and the geotechnical report as part of the submittal.

2.4.2 95% Construction Drawings shall include:

1. Drawing orientation and scales shall match the Architectural Drawings with the exception of Civil and Landscaping Design.
2. **Civil**: All aspects of the site development work shall be complete and detailed to include, but not limited to:
    - Grading
    - Drainage structures and associated piping
    - Detention ponds
    - Earth retaining structures
    - All drives
    - Parking
    - Curbing and walkways
    - Site access
    - SCDOT requirements

- Acceleration and deceleration lanes
- All structures (new and existing, including those to be demolished) dimensionally located as appropriate
- All utility connections
- Playing fields
- Permanently installed physical education equipment
- Fencing
- Tree save areas
- New landscaping
- Erosion control and a complete project phasing plan (for work to be performed at existing campuses).

3. **Architectural**: All aspects of the work shall be fully developed and detailed for this submittal and shall include, but not necessarily limited to:
    - Fully dimensioned plans with room names and numbers, door numbers and finishes indicated, and coordinated with structural and all other building systems
    - Complete exterior elevations
    - Complete building sections
    - All major wall sections
    - A roof plan indicating slopes and the location of all equipment, penetrations and access points
    - Reflected ceiling plans indicating all materials, fixtures, devices and changes in plane
    - Interior elevations showing fixture and building system device locations, door schedule including hardware sets, door/frame elevations and typical frame details
    - Window schedule with elevations and typical details
    - Finish schedule
    - Full specification sections for all required work.
4. **Structural**: Provide all foundation and framing plans, fully dimensioned and coordinated with the Civil, Architectural and MEP & FP disciplines including, but not necessarily limited to, the size and spacing of all framing member, slab/floor elevations and bearing heights, slab depressions, openings for ductwork, etc., section details at typical and special conditions, and reinforcing schedule.
5. **MEP & FP**: Construction Drawings shall be complete and fully coordinated with all disciplines (Civil, Architectural, and Structural, etc.) showing the location of all units of equipment and their distribution systems. Documents shall also include completed riser diagrams, system details, fixture and equipment schedules, and full specification sections for all required work. Provide complete control diagrams and sequence of operations with initial operating schedules, occupied set points, unoccupied set points, interfaces to internal equipment controls, and alerts and notifications.

6. **Kitchen:** Where a new or renovated kitchen is part of the Project, Construction Drawings shall provide a fully developed and dimensioned enlarged plan (1/4" = 1'-0") with a complete equipment schedule, locating all utility connections. Additionally, provide full specification sections for all required work.

7. **Security:** Provide a series of plans that address classroom security, camera locations, access control and site fencing.

2.4.3 95% CD Review Process

1. The AE shall submit a written response to all 95% CD Review Comments within 30 days of receipt to ensure the comments were understood and shall be correctly incorporated into the Bid Documents.

2. The CxA shall back-check comments made during the DD phase and submit a final commissioning review document to the AE.

3. Once the 95% CD comments are incorporated and all issues resolved, the Architect publishes the Bid Documents (100% CD Documents)

4. 100% CD Documents to be submitted to OSF for Approval

2.5 Bid Phase

The AE shall assist Program Management in preparation of information for bidders, the bidding process, preparation of proposed contract forms, and Conditions of the Contract regarding Project Stakeholder roles and responsibilities during construction.

2.5.1 Bid Phase Activities

To be determined and prescribed by Program Management and approved by Owner

2.6 Construction Contract Administration (CCA) and Construction Phase

The AE and Program Management shall ensure that the contractor roles and responsibilities indicated below are included as requirements in bidding and construction contract documents.

2.6.1 Overview

The Contractor joins the existing Project Team. The first Project Team Meeting shall be the Pre-construction Meeting hosted by the Owner and Project Manager. The objective of this meeting is to engage the team and to clearly define roles and responsibilities, establish ground rules for communication and problem solving during the Construction Phase.

The AE's role during the CCA and Construction phase shall be in accordance with their contract. In general, the AEs act as Owner's Representative to determine whether the Contractor is constructing the Project in general conformity with the overall design concept and intent. The AE observes the work, reviews progress reports, submittals, and certifies the applications for payment, attends Project Team Meetings, prepares and recommends contract modifications, and inspects the Project for Substantial and Final Completion.

A Pre-Final inspection shall be held after all systems are in place and in operation. The Program Manager requires the Contractor and sub-contractors to attend this inspection including, but not limited to, the HVAC, Plumbing, Electrical, TAB, Building Automation System and Kitchen sub-contractors.

2.6.2 Construction/CCA Submittals

1. **Contract Documents**: AE updates the Bid Documents with any changes occurring during the Bid Phase and submits the final 100% Construction Documents prior to contract award and work commencing.
2. **Construction Quality Assurance Plan**: The Contractor shall submit a Quality Assurance plan for review and approval by Program Management and Owner.
3. **Construction Phase Schedule**: The Contractor submits a Construction Phase Project Schedule to include major milestones and dates for Construction Phase Submittals and Construction Phase Activities to bring the Project to Substantial completion on the agreed upon timeline and within the agreed upon budget. Schedule shall include the necessary time allocation for final testing and commissioning of the building envelope and all energy-using systems. All work and testing shall be complete prior to substantial completion inspection.
4. **Construction Phase Review Process**: The Construction Phase Review Process provides a process for RFI distribution, review and approvals, a change order process, a financial review process, interdisciplinary coordination reviews, quality assurance reviews, OSF reviews and approvals, and other agency and AHJ reviews and approvals as identified herein and in the Agreement between Owner and Contractor.
5. All Contractors and subcontractors via Program Management shall deliver the required extra materials not later than 5 weeks prior to the start of the Functional Performance Testing.
    a. Preventative Maintenance Equipment Forms
    b. Extra Materials Delivery Form
    c. Corrective Action Report Form
    d. Operations & Maintenance Training Form
    e. Sewer, water and storm drainage documentation that is required by local municipalities and all final video inspection documentation.
6. **Contractor submits a checklist** of all submittal documents necessary for Close Out including, but not limited to, product bonds and/or warranties, spare parts, shop drawings, Owner training and demonstrations, maintenance supplies (attic stock), equipment manuals and certifications required by the Specifications to the CxA for inclusion in the Systems Manual.
7. **Meeting minutes**: Project Manager shall keep meeting minutes including for the Kick-off meeting to establish roles and responsibilities, the communication protocol and a problem-solving methodology.
8. **RFIs:** The Contractor shall be responsible for keeping the tracking log of Requests for Information (RFIs). The Contractor shall review RFIs submitted by Subcontractors for accuracy and correctness prior to submitting to the AE for response. If an AE response to an RFI has a cost or schedule impact, the Contractor shall notify Owner and Project Manager immediately and use the appropriate channels to get approval to proceed with the work. The Contractor shall keep one set of Record Documents onsite which is continuously updated with responses to RFIs.
9. **Change Orders:** To be determined by Program Management and Owner.
10. **Payment Requisitions:** To be determined by Program Management and Owner.
11. **IBC Special Inspection Reports:** To be determined by Program Management

12. **Checklist of Permits**: Contractor shall issue a checklist of required permits for the Project, including agency, permit description, contact person, date requested, and date acquired.

13. **Utility Connection Approval:** AE shall coordinate with utility providers and provide each utility with all required documentation and approvals so that utilities may provide temporary (if necessary) and permanent utility connections to the Project. Utility bills shall be paid from Project funding until the building is turned over to the Owner.

2.6.3 Construction Phase Review Process

To be determined by Program Management and Owner

2.6.4 Construction Project Management

To be determined by Program Management and Owner

2.6.5 Construction Contract Administration

To be determined by Program Management and Owner

2.6.6 Test and Balance (TAB) – See General Division 01

2.6.7 Commissioning (Cx) – See General Division 01.

2.6.8 Red Zone Meetings

The Owner, Program Management Team, A/E and Contractor shall hold a "Red Zone" review conference at the appropriate time during construction. Follow the standard agenda in Appendix G.

2.7 Project Close-Out

2.7.1 Close-Out Overview

During the Closeout Phase the Contractor shall be responsible for developing the Punch List, coordinating the Training of O&M personnel by the Equipment Manufacturers, providing the CxA with Operation and Maintenance documentation including Warranties, reviewing the As-Built documentation with Owner and obtaining the Certificate of Occupancy. The CxA shall be responsible for compiling the Systems manual and verifying that the O&M personnel received the appropriate training to operate and maintain the building in the manner it is intended. The Contractor, AE, Program Management and Owner shall be responsible for reviewing the Punch List and deciding which items the Contractor is responsible for completing before Final Completion is obtained. A Final inspection shall be held with Owner, AEs, all Contractors and Subcontractors to demonstrate to Owner that all systems in the building are operating as designed and intended. For any system not operating as designed, the warranty shall not commence until system is verified as performing by the Commissioning Authority and AEs.

2.7.2 Close-Out Submittals

1. Functional Performance Test documentation shall be submitted by the CxA
2. Final Commissioning Report shall be submitted by the CxA
3. As Built Documents: As-built drawings shall be submitted by the Contractor to AE. AE shall obtain marked up drawings from the Contractor to produce and deliver electronic As-builts in both AutoCAD and PDF formats. All drawings shall be marked as "AS BUILTS". AS Builts shall be provided to the CxA for inclusion in the Systems Manual.

4. An electronic copy of all approved shop drawings shall be provided by contractor to Program Management.
5. Contractor shall submit all forms required by OSF.
6. Owner shall provide a list of Owner Furnished/Owner Installed (OFOI), Owner Furnished/Contractor Installed (OFCI), and an Interior Signage schedule of previously approved room names and room numbers.
7. The Contractor shall provide the equipment/system submittals in accordance with the requirements of Division 01 to the CxA.
8. The Contractor shall provide the preventive maintenance equipment data sheet to the CxA in accordance with the requirements of Division 01.
9. All Contractors and subcontractors shall submit O&M data for systems and equipment being commissioned to the CxA for inclusion in the Systems Manual.

2.7.3 Training

See Division 01.

2.8 Post Construction

2.8.1 Inspections

The Project Manager shall host two post construction inspections by the Project Team to assure that the building is continuing to operate in accordance with the plans and specifications and that there are no unresolved issues with operation of the facility. These inspections shall address building envelope and all energy using systems including, but not limited to, Plumbing, HVAC and electrical work.

The first post construction inspection shall take place 6 months after final construction inspection. The second post construction inspection shall be held 1 month prior to expiration of the 1-year warranty period. All discrepancies and deficiencies discovered during these inspections that relate to defective materials or defective workmanship shall be corrected by the Contractor at no additional cost to Owner.

2.8.2 Training

See Division 01.

PART II: DIVISION & DISCIPLINE SPECIFIC REQUIREMENTS

The requirements of the following Divisions shall be included in the contract documents unless otherwise approved by Owner. AE shall review and coordinate all Divisions prior to completion of DDs to avoid duplications, contradictions, errors, and omissions. Questions, comments, and/or concerns regarding any of these requirements should be addressed in writing to the Program Management or Owner for resolution.

Owner will update these Divisions on a regular schedule to be communicated by Owner. AE will be expected to comply with all requirements that are current at the commencement of their specific Project.

DIVISION 01 - GENERAL REQUIREMENTS

EXTERIOR MOCK-UP REQUIREMENTS

Exterior Walls

Provide a freestanding mockup of a typical exterior wall construction and include a detailed description of the mockup components. Depending on the school design, interior mock-ups may be required. The mockup shall be a minimum 8 ft. long by 8 ft. high and be a composite representation of the actual design for the purpose of evaluating the quality, workmanship and establishing the color and pattern. The mockup shall include the following:

- Intersection of the various wall components
- A control joint showing sealant colors
- Window openings, flashing, waterproofing seal, etc.
- All air barrier system components, membranes, flashings, sealants, etc.
- Through wall flashing joints and dams

Sprayed On Fire Resistive Materials

Mock-ups for sprayed on fire-resistive materials shall have at least 100 sq. ft. of surface done for each UL test. Check for density and bond strength.

STORAGE AND HANDLING OF MATERIALS

All materials shall be stored and handled on site in accordance with manufacturers' recommendations in such a way that no warranties are voided.

LEVEL OF CLEANLINESS

The facility shall be turned over to the Owner clean to APPA Level 2 (Ordinary Tidiness Indicators).

ASBESTOS/LEAD FREE DOCUMENTATION

AE/Contractor shall provide a notarized letter to Owner stating that no asbestos or lead containing materials were used in the design or construction of the Project. See Appendix F for sample form.

TEST AND BALANCE (TAB)

The Testing & Balancing of the systems shall be managed by the General Contractor.

COMMISSIONING REQUIREMENTS

All new Owner construction and major renovations require Commissioning (Cx) of the building's energy using systems, the building envelope and other assemblies. Cx shall follow the format and content recommendations of ASHRAE Standard 202 - 2018. ASHRAE defines Cx as "a quality-focused process for enhancing the delivery of a project that requires verifying and documenting that all of the commissioned systems and assemblies are planned, designed, installed, tested, operated and maintained to meet the Owner's Project Requirements". The Commissioning Authority (CxA) shall be retained by Owner and shall inform Key Stakeholders and Project Team members of Owner requirements.

The CxA Requirements are:

- CxA shall review the Basis of Design (BOD) to ensure compliance with these Design Requirements. Submit issues log to AE for consideration.
- CxA shall write the initial Cx Plan and provide milestones to the Contractor that shall be included in Construction Phase schedules. CxA shall update the Cx Plan over the course of the Project.
- CxA shall review the Construction Submittals of all systems and materials related to the Cx process to ensure compliance with the Design Requirements.
- CxA shall create Pre-Functional Test Checklists.
- CxA shall conduct periodic site visits and send site visit reports to the Project Team that includes any Cx-related issues found while onsite. The CxA shall track Cx issues on a log to document when the issues were identified, the party responsible for responding, final resolutions and when the issue was closed and verified by the CxA.
- CxA shall witness a sample of Test and Balance (TAB) procedures and verify that systems are functioning as the design intended, and if not, document issues and resolution procedures.
- CxA shall create Functional Performance Test procedures and oversee testing of equipment and systems to be commissioned.
- CxA shall obtain required O&M Manuals, warranties, training materials, etc. from the Contractor. CxA shall produce the Systems Manual following ASHRAE Guideline 1.4-2014 "Procedures for Preparing Facilities Systems Manuals".
- CxA shall witness a sample of the Owner Facility Management Training and verify that all training requirements are completed by Contractor.
- CxA shall participate in Program Management/Contractor's pre-final and Final Occupancy Inspections, if required.
- CxA shall submit the Final Cx Report.
- CxA shall conduct a 10-month Post Occupancy Inspection/warranty review of facility systems and assemblies. This site visit shall be scheduled before the warranty phase has ended. Final Cx Report shall be updated to reflect results of 10-month Post Occupancy Inspection.

The following Systems and Assemblies Required to Be Commissioned by the CxA:

- HVAC
- Boilers and Domestic Hot Water Systems
- Building Automation System

- Building Automation Controlled Lighting Controls Systems
- Renewable Energy Systems (if requested)
- Emergency Generator (if requested)

Specify the following Cx Requirements by Project Phase

Schematic Design: (SD)

- Review the BOD to verify compliance with Design Requirements.
- Review Design Submittals to verify compliance with these Requirements and BOD. Create a Design Review log to track comments related to Cx. Submit the log to the Project Team to review and for their response.
- If CxA review of Design Submittals reveals non-compliance with Requirements, BOD, or OPR, communicate impact on Cx Schedule, Training needs or other Owner's Requirements and Update OPR and Cx Plan accordingly.
- Develop Cx Requirements for Design Development Documents.

Design Development: (DD)

- Review Design Submittals to verify compliance with these requirements and BOD, and update the Design Issues Log.

95% Construction Documents (95% CD)

- CxA shall perform a Back-check of comments made during the DD phase and submit a final commissioning review document.

Construction

- Conduct a Construction Kick-off Commissioning Meeting with contractor and subcontractors
- Update Cx Plan
- Provide Cx-related milestones to the Contractor to incorporate into the Project Schedule
- Review Construction Submittals related to Cx

Pre-functional Process

- Create Pre-Functional Tests checklists for Contractor completion
- Witness a sample of Contractor Start-up of Systems
- Review Pre-Functional Test checklists completed by Contractors

Functional Performance Testing (FPTs)

- Verify and Witness TAB of HVAC
- Verify BAS Sequence of Operations
- Create Functional Performance Tests
- Witness completion of Functional Performance Tests conducted by Contractors
- Issue and distribute Status Reports and Issues Log at each step of Functional Performance Testing

- Witness Owner Training
- Compile O&M manuals, warranty information, Owner training information, As Builts, and complete the Final Commissioning Plan for inclusion in the Systems Manual
- Provide Owner with Systems Manual in searchable PDF format.

Post Occupancy

- Review Contractor Callback issues provided by Program Management between Final Inspection and ten-month Warranty Walk-Through review.
- Participate in ten-month warranty walk through inspection
- Update Issues Log and distribute

TRAINING REQUIREMENTS

Specify the following training requirements for Owner Personnel:

- The time required for training shall be specified as appropriate for the system or component in the contract documents. Training shall be coordinated by Program Management and scheduled 30 days in advance with Owner prior to substantial completion. Similarly, if systems require sending Owner personnel to the factory, this shall be coordinated 30 days in advance of the factory visit with Program Management and be included in contract documents. Program Management shall be responsible for the sequencing of training deliverables and schedules so that all training requirements are met prior to substantial completion and within the required timeframes.
- At a minimum, training is required on the following:
    - HVAC
    - Domestic Hot Water
    - Domestic Water Booster Pumps
    - Sump pumps
    - Lighting Controls
    - Emergency Power and Generators
    - BAS system and controls
    - Fire Alarm
    - Elevator Systems
    - Automatic Fire Protection Systems
    - Security
    - Communications/Technology
    - Marquee Signage and Sound Systems
    - Door Hardware
    - Specialty Finishes
    - Envelope
    - Utility feeds

- Owner personnel shall receive comprehensive training from manufacturer's factory authorized/certified personnel using formal written curriculums and classroom instruction on the proper use, operation and maintenance of all systems 90 – 120 days prior to Substantial Completion.
- Owner personnel shall receive comprehensive Functional Hands-on Field Training in the proper use, operation and maintenance of all systems 14 - 30 days prior to Substantial Completion.
- Contractor shall be required to compile all the necessary information and materials for training Owner personnel and others as directed.
- Owner Food Service Personnel shall receive comprehensive Functional Hands-on Field Training in the proper use, operation and maintenance of all food service equipment within 10 business days following equipment start-up. Training shall consist of 2 separate sessions, with the second occurring no more than 30 days following occupancy
- The CxA shall review the Contractors submittal of required Training Documentation and Operations and Maintenance Manual and organize it into the Systems Manual. The Systems Manual shall be in electronic PDF format with a table of contents that includes links to each section. The Systems Manual shall contain information specific to the systems commissioned.
- The Owner Training sessions shall be videotaped by the Contractor and provided to Owner at completion of the training sessions.

Contractor shall furnish the following materials in the O&M Manuals:

- A copy of the training plan, including schedule, syllabus, and agenda. Compile and provide all training Materials provided by the manufacturers.
- A detailed description of each system and its components, wiring and control diagrams, installation procedures, and control sequences for starting equipment, operating equipment in all modes and shutting equipment down.
- A written schedule in electronic PDF and a Microsoft Excel spreadsheet of all equipment manufacturers, including model numbers and serial numbers.
- A parts list, including source of supply and recommended spare parts.
- All required emergency instructions and safety precautions.
- Maintenance information for each piece of equipment to include overhaul instructions and lubricating schedule including type, grade, temperature, and frequency range.
- Approved submittals for each piece of equipment and the Controls.
- Scanned PDF copies of record drawings, shop drawings and As-Builts.
- Product information identifying performance curves, rating data, features, and options on all installed equipment.
- Copies of approved certifications and laboratory test reports.
- Copies of warranties.
- Test procedures including the impact of testing and operation of fire and life safety systems.
- Contact information for each Contractor who installed equipment.
- Contact information for local manufacturer representative for each piece of equipment.

- A schedule of uninterruptible power supplies and Emergency Power Generation, including a list of equipment and design kW load on each.

WARRANTIES AND MAINTENANCE AGREEMENTS

General Requirements

- Warranties shall include all material and labor cost for corrective action or replacement. All warranties shall commence from the date of Substantial Completion, not from equipment startup date.
- Program Management shall respond within 24 hours after a complaint is issued via Owner work order system. After 24 hours, Owner shall have the right to repair and back charge Program Management.
- AE shall require, as a bid alternate, a two (2) year Contractor's warranty for all Work from the date of substantial completion to be provided by the Contractor.

One (1) YEAR WARRANTY MATERIALS & LABOR

- All Work shall be fully warrantied for one year from the date of substantial completion by the Contractor.

Two (2) YEAR WARRANTY

- Sheet waterproofing shall have manufacturer's standard warranty plus a 2-year labor warranty from installer.
- Outdoor air units shall have a 2 years Labor.

Five (5) YEAR WARRANTY MATERIALS AND LABOR

- Wood Doors
- Outdoor Air Unit compressors, coils, piping, refrigeration circuits, manufacturer's controls and accessories
- LED Marquee sign including LED Message Center, modules cabinet, structure and installation.
- Termite Control
- Transient Voltage Surge Suppression (TVSS)
- Surge Protection Devices (SPDs)
- All coastal protective coatings on HVAC cabinet, equipment, condenser coils and coils exposed to 100% of outdoor air.
- Roofing – replacement projects and new construction
- <u>LED Scoreboards - Jumbotrons</u>

Ten (10) YEAR WARRANTY MATERIALS AND LABOR

- Fiberglass Reinforced Plastic (FRP) Door Systems
- Operable Partitions
- Pre-Engineered Walkway to include metal failure, fastener failure, and finish failure.

Twenty (20) YEAR WARRANTY

- All aluminum window finishes shall carry a 20-year coastal finish warranty (i.e. warranty shall permit product use in coastal environments)
- All aluminum storefront and curtain wall finishes shall carry a 20-year coastal finish warranty (i.e. warranty shall permit product use in coastal environments)
- All fixed and telescoping audience seating shall include replacement structural steel components, nets, bolts, axles and wheels as necessary to maintain the integrity of the original installation.
- All metal wall panels systems and assemblies shall carry a 20-year coastal finish warranty (i.e. Warranty shall permit product use in coastal environments)

Twenty (20) YEAR NO DOLLAR LIMIT "SYSTEM" WARRANTY

- Modified Bitumen Roofing
- Built-Up Roofing
- A complete roofing system warranty to include insulation, cover boards, fasteners, all membrane components, all base and counter flashing components, walk pads, and all roofing accessories. Warranty shall remain intact and warrant roof systems performance based on the latest version of IBC (International Building Code) for the Southeastern United States.
- Sheet Metal Roofing for entire roofing system which shall include coverage for weather-tightness failure, finish cracking, peeling, color fading, flashing failure, and/or trim failure
- Fluid Applied Membrane Roofing Systems

Thirty (30) YEAR WARRANTY

- Asphalt Shingle Roofing

DIVISION 02 – EXISTING CONDITIONS

Owner requires an environmental consultant to coordinate on all types of demolition and waste disposal if any study indicates the presence of hazardous materials as defined by OSHA or other regulatory bodies.

SELECTIVE DEMOLITION

Require Selective Demolition (removal of a portion of an existing structure and selected site elements) when buildings are to remain.

- The extent of demolition shall be clearly shown on the drawings for each discipline affected.
- Unless otherwise noted, demolished materials shall become Contractor's property.
- The Contractor shall prepare and implement a Waste Management Plan on all projects.
    - Establish diversion goals and describe where the materials will be taken and how the recycling facility will process the materials
    - Provide a written report detailing all major waste streams generated, including diversion and disposal rates.
- The Contractor shall document (photographs, videotapes) the extent of demolition, pre-demolition if Program Management requires this for the Project.
- The Contractor shall notify Owner 14 days prior to start of demolition If Owner indicates that they will occupy portions of the facility adjacent to selective demolition.

COMPLETE DEMOLITION

Complete Demolition is the total removal of an existing structure, to include removal of known below-grade construction and existing utilities shown on the site survey. In some instances, utilities may be abandoned in place when approved by Owner. Owner or Designee shall notify Contractor in writing when complete Demolition can begin. After notification, any remaining contents (furnishings, equipment, etc.) shall become the Contractor's property.

- The Contractor shall prepare and implement a Waste Management Plan on all projects.
    - Establish diversion goals and describe where the materials will be taken and how the recycling facility will process the materials
    - Provide a written report detailing all major waste streams generated, including diversion and disposal rates.
- When Contractor is asked to remove and salvage any items, for example historic items, that these items be labeled as "remove and salvage".
- Contractor shall accomplish building demolition only by mechanical or hand methods; explosives or imploding are not allowed.
- Contractor shall submit an environmental protection plan addressing environmental protection, dust control, and noise control measures.
- Contractor shall coordinate with District's environmental consultant studies indicate the presence of hazardous materials.
- Site restoration as a result of demolition activities shall be addressed in the specifications.

DIVISION 03 – CONCRETE

GENERAL REQUIREMENTS

- AE shall specify pre-placement meetings for all concrete work.
- AE shall require Contractor to mix, finish and cure concrete flooring and subflooring in accordance with manufacturer's written installation instructions for each type and location of flooring shown in the finish schedules.
- AE shall specify a porosity inhibiting admixture to reduce moisture in slab.
- Installations shall require initial floating to form uniform and open textured surface plan, free of lumps, humps, divots and hollows.
- Contractor shall finish and measure surface so gap at any point between concrete surface and unleveled freestanding 10-foot long straightedge resting on two high spots and placed anywhere on surface shall not exceed 3/16 inch.

CAST-IN-PLACE CONCRETE

- Vapor retarders and perimeter slab insulation requirements shall be coordinated with Division 07 Sections.
- Color additives and specialty toppings shall not be specified unless approved by Owner.
- Permanent sealers, such as epoxy coatings, shall be specified in Division 9.

PLANT PRE-CAST STRUCTURAL CONCRETE

- Tilt-up precast panels that are site precast and finished on site shall not be used.

PLANT-PRECAST ARCHITECTURAL CONCRETE

- Insulated precast Architectural panels, with thin brick facings, or stone facings may be used for portions of a building or entire building envelopes.
- Feasibility studies on their use shall include cost, structural implications, effect on construction schedule and maintenance requirements.
- Precast concrete panels shall not be left exposed as an interior finish in any application.

Specify the following Design Requirements for Precast Concrete Panels:

- General:
    - Insulation shall comply with current International Energy Conservation Code adopted by SC and ASHRAE 90.1 at minimum. Discuss with Owner Engineering Director before beginning design.
    - Wall Panel Size – standard design dimension shall be 12'-0", 12'-8", or 13'-4" wide x 32' to 45' tall x 7.5" to 9.5" thick depending on specific loading conditions and module Architectural details.
    - No more than 10% of total panel pieces shall vary from the nominal standard width. Non-standard panels shall be utilized at building corners to make up dimensional differences.
    - Wall Panel size and detail shall be repetitious.

- Joints – standard joint width shall be ¾” for precast wall panels. Plan for tolerances accordingly in exterior Architectural details and window system compatibility. See current edition of Precast/Pre-stressed Concrete Institute (PCI) Handbook.

- Architectural Details
  - Reveals – standard reveal width shall be 2” at the mouth, 3/8” deep; other reveal patterns shall occur in 2” increments and no deeper than 3/8” to protect reinforcing clear cover. Do not use elaborate patterns. Budget allotment is the equivalent linear footage of 6 horizontal reveals per panel. Reveals used to surround brick areas count against this allotment.
  - Colors shall be selected from 3 standard concrete mix designs (Gray Rock Gray – gray cement with granite aggregate, Buff – antique white cement with white aggregate, Modified Buff – antique white cement with brown aggregate) all using locally available coarse and fine aggregates. Select from 3 standard sandblasted exteriors (moderate, medium, heavy) that may be mixed together to highlight Architectural details throughout the building.
  - Brick - Modular brick may be used for accents using standard sheet coursing dimensions not to exceed 10 courses tall. Do not use non-linear coursing patterns. Corner bricks shall not be used. Maintain no more than 50% brick coverage across the building elevation, preferably per panel. Brick shall be selected from the standard Endicott color/texture sample boards (16 colors, 4 finishes each = 64 brick options).
  - Prototype Design – maintain simple Architectural features repeated throughout each elevation.

- Openings and Other Elements
  - Windows – shall be standard size window openings following OSF guidelines. Limit opening sizes within wall panels to three different sizes to economize production and set up costs. Use of more than three different window opening sizes shall require the approval of Program Management and Owner. Refer to tolerance of rough openings per PCI Handbook.
  - Positioning Openings – maintain all openings (doors and windows) a minimum distance of 18” of any edge of wall panel to prevent additional engineering design and reinforcing materials costs. Standardize opening positions within wall and panel members to economize production.
  - Metal/Glass Integration – “ribbon” glass areas, large storefronts, and glass/metal curtain walls in place of load bearing precast elements shall not be used with precast panels.

- Manuals and Resources
  - Design Manuals – use PCI Handbook.

DIVISION 04 – MASONRY

GENERAL REQUIREMENTS

- Provide a broad scope specification on specified masonry wall components. Do not use multiple narrow scope sections for brick, mortar, and concrete masonry units.
- Interlocking concrete unit masonry and masonry constructed with surface-bonding cement shall not be used as building components.
- Cavity walls constructed of brick veneer, rigid insulation, and CMU back shall be acceptable as the building envelope for additions to existing structures already using this type of construction.
- Rigid insulation shall be installed in such a manner as to prevent thermal bridging in exterior wall systems.
- Split face block shall not be used, and ground face block shall only be used in limited Architectural accents and detailing.
- Bull-nosed concrete masonry units shall be used at pedestrian corners
- Cast masonry window sills shall not be allowed

UNIT MASONRY ASSEMBLIES

- All corridors and group toilets are required to be constructed with CMU walls. Exceptions for interior administration areas and other low traffic, non-student areas are permitted with approval from Owner.
- Use an integral water repellent for exterior applications of concrete masonry units with the exception of exterior face brick. (Water repellent may be used on interior face brick as a deterrent to soiling and staining.)
- Require parging and waterproofing of exterior faces of below grade masonry walls.
- Exterior brickwork shall enclose all structural columns and beams of concrete or steel.
- Use Bull-nosed concrete masonry units at pedestrian corners at vertical walls with the exception of the base course, where square corners are allowed.
- Face brick shall comply with ASTM C 216.
- Drawings and Specifications shall include face brick manufacturer, size, color, and bond pattern. Do not use a brick allowance. Face brick shall be utility size.
- Mortar for CMU shall be a mix of Portland cement and lime, Type S. Mortar for face brick applications shall be mortar cement, ASTM C 1329, Type N.
- Grout for unit masonry to comply with ASTM C 476, and note “Grout” on the drawings. AE shall avoid non-specific notes such as “Fill block with concrete” or “fill bond beam with concrete”.
- Masonry joint reinforcement and ties for multi-wythe walls shall be adjustable (2-piece) type with single pair of side rods and continuous diagonal cross ties or ladder type with separate adjustable veneer ties engaging the cross ties. Horizontal reinforcing with multiple side rods alone shall not be used to tie face brick to CMU backup. All shall be made of hot dipped galvanized steel. Corrugated metal ties are not acceptable.

- Adjustable masonry veneer anchors for attachment to metal studs shall have pronged legs to bridge insulation or sheathing and contact studs.
- Require cavity drainage material so that cavities are kept clear of mortar droppings.
- Require extruded polystyrene insulation for cavities.
- Require field quality control testing for mortar and for grout in reinforced masonry walls.

STONE CLADDING

Use of natural or precast stone requires written permission from Owner. In the event that permission is granted, it shall be limited to historic preservation or renovation projects where matching is necessary.

MASONRY RESTORATION AND CLEANING

- High pressure cleaning is not acceptable and cleaning materials shall be approved by both the brick and mortar manufacturers prior to cleaning.
- For historic structures or materials, the Secretary of Interior Standards for the Treatment of Historic Properties and the National Park Service Preservation Briefs for masonry Restoration and Cleaning shall be followed.

DIVISION 05 – METALS

STRUCTURAL STEEL

- The steel fabricator shall either be AISC certified or provide documentation certifying that all steel fabrications are be made in accordance with AISC standards and guidelines.
- A light grey primer shall be used for interior exposed structural steel and shall remain unpainted.
- Exterior structural steel shall be hot dipped galvanized, and field or factory painted with high performance coating
- Where steel members are to be fireproofed, no field primer is required.
- A pre-installation conference shall be held shortly after the layout is performed.

STEEL JOISTS

- Specify open-web K-series joists for floors and roofs, and LH-series for long-span applications.
- Specify a light gray primer for all joists.

COLD-FORMED METAL FRAMING

- Provide submittal requirements for design calculations, shop drawings, and installation drawings for curtain-wall framing supporting exterior masonry veneer, floors, and roofs.
- Performance requirements shall require that member depths are shown on the drawings.
- The fabricator shall design the metal thickness based on the design loads and deflection criteria specified. The design loads shall be shown on the structural drawings.
- Specify G60 coating for non-masonry panel supports, and G90 coating for masonry wall supports.
- Deflection tracks for vertical deflection clips shall be designed to allow for construction tolerances and to accommodate live load deflection of the primary building structure.
- Un-punched studs and track shall be used when fabricating lintels.
- A Pre-installation conference shall be held shortly after the Cold Formed Metal Framing layout is performed.

METAL FABRICATIONS

- Steel lintels shall be hot dipped galvanized steel.
- Steel framing and supports for mechanical and electrical work shall be coordinated with Divisions 23 and 26.
- Use ferrous metals for typical components.
- Use hot dipped galvanized steel for exterior components.
- Shapes shall be chosen that are easy to maintain and shall not retain water. Circular shapes are preferred.

EXTERIOR METAL PANELS

Use of exterior metal panels must be approved by Owner. Exterior metal panels shall be located a minimum of 8 ft. above ground level. Metal panels shall be an integrated system with the

insulation and fasteners approved and inspected by the manufacturer. Aluminum Composite Panels shall not be used.

METAL STAIRS

- Specify preassembled metal stairs with concrete-filled metal pan treads.
- Structural calculations and detailed shop drawings shall be prepared by a qualified professional engineer licensed and legally authorized to practice in South Carolina.
- Specify pipe and tube railings as an integral part of the stairs, however, when handrails and railing systems are required as isolated units, they shall be specified in the following section "Pipe and Tube Railings." Painted handrails and railings are not allowed.

PIPE AND TUBE RAILINGS

- All handrails and railings shall be fabricated from aluminum.
- Painted handrails and railings are not allowed.
- Specify placement of each joint system on shop drawings. These shop drawings are to be included in close out documents to Owner.

GRATINGS

- Specify metal bar gratings, expanded metal gratings, formed-metal plank gratings, and extruded-aluminum plank gratings as required for the specific project and application.
- All exterior or weather-exposed gratings shall be made of hot dipped galvanized steel.

ARCHITECTURAL JOINT SYSTEMS

- Specify exterior and interior building joint systems, with and without fire barriers that accommodate movement resulting from one or more causes such as thermal changes, seismic forces, or wind sway.

DIVISION 06 – WOOD, PLASTICS AND COMPOSITES

ROUGH CARPENTRY

- The use of wood construction shall be approved prior to the Schematic Design Phase.
- The use of wood shall be limited to furring, nailers, blocking, miscellaneous lumber, and construction panels -- wood nailers and blocking are not required to be fire-retardant.
- Plywood is required to be pressure treated.
- Plywood and composite wood-based materials installed on the inside of the air barrier shall be free of added urea-formaldehyde. If the construction type requires non-combustible materials or assemblies, consider a different product or assembly.
- Fire-retardant plywood shall be used with caution for roof construction and only where specifically approved in writing by OSF prior to including it in any Contract Documents.
- All lumber and plywood materials shall be stored off the ground and under cover and shall be vented to prevent condensation and warping.
- Wood materials that come into contact with the ground or masonry shall be properly treated with moisture and pest protection.

FINISH CARPENTRY

- Specify cope at returns and miter at corners to produce tight fitting joints and use of scarf joints for end-to-end joints.
- For Major Renovations: Damaged or defective finish carpentry shall be repaired to eliminate functional or visual defects. Where not possible to repair, require contractor to replace finish carpentry and adjust joinery for uniform appearance.

INTERIOR ARCHITECTURAL WOODWORK

- AE shall require compliance with “Architectural Woodwork Standards” published by the Architectural Woodwork Institute (AWI)
- Transparent Finished Casework; Casework is required to be made of premium graded oak and of a heavy-duty construction.
- Doors: Construction and thickness shall be designed to prevent warping.
- Shelves: Do not exceed spans of 3 ft. for ¾ in. thick shelves and 4 ft. for 1 in. thick shelves.
- Countertops: Classroom, general use and group restroom countertops shall be solid surface materials (countertops and backsplashes). No laminate or concrete countertops will be permitted. Coordinate color selection.
- Cabinet Hardware: shall be heavy duty, 4-inch pull rod for drawer and door pulls
- Drawer Slides: shall be100lb. capacity wheeled slides with self-closing feature.
- Door Hinges: shall have concealed hinges, European style, self-closing with built-in horizontal and vertical adjustment. Require 5 knuckle hinges on typical casework
- Require door silencers for all cabinet doors.

- All cabinets and/or casework shall be constructed of premium grade wood. Non-cabinet or furniture grade plywood is permissible only if finish veneer is applied. Particle core materials are not accepted.
- Where transparent finish is shown, cut doors and drawer fronts of each run of cabinets from one "counter front" sheet of plywood and install them in the same position so that the grain runs vertically and grain matches between adjacent doors and/or drawers. Contractor shall be required to submit samples of transparent finishes that show the extremes in color variation.
- Enclosed cabinets shall not be installed underneath sinks. All sink base cabinets shall be slotted / perforated to allow ventilation.
- Shelving: For PE and Custodial area shelving the shelving shall be metal with a maximum shelf length of 36-inches and be 24-inches deep.
- Media Center: the sill height for windows shall allow for installation of 48" high wall mounted shelving units. Freestanding units shall not be more than 48". Wall units may be up to 72" high.
- Contractors shall not install architectural woodwork until the building is enclosed, the permanent heating and cooling system is in operation, and the residual moisture from plaster, concrete masonry or terrazzo has dissipated.

DIVISION 07 – THERMAL AND MOISTURE PROTECTION

ROOF ASSEMBLIES

- AE may contract with an independent Registered Roof Consultant (RRC) if project involves any roofing, including but not limited to new construction, roof replacement, modifications to the existing roof systems, and new penetrations.
- The RRC shall write and furnish the Architect with all (Division 7) specification sections related to the roof design and exterior wall systems, including all components.
- The architect and the RRC shall monitor roof construction and final acceptance and provide weekly inspection reports to Program Management, the Contractor, and AE within three (3) working days of each visit.
- Low Sloped Roofs: Specify a modified bitumen or fluid applied roof system with a minimum slope to point of discharge of 1/4 inch per foot on new construction only.
- AE shall provide an OSHA compliant roof safety plan as part of design documents.
- Canopies and Covered Walkways: Specify overhead canopies/covered walkways at primary building entrances, car loops and bus drop-offs as follows:
    - Structure shall have sufficient slope to drain water away from the building.
    - Structure shall not drain across sidewalks
    - Sheet metal panel systems shall be used for soffit construction. Gutters and downspouts shall be used to direct water away from the sidewalks or discharged water into underground storm drain lines. (Stucco and drywall soffits shall not be used.)
    - Canopies shall be factory coated and not field painted
- Skylights: Skylights shall not be permitted
- Insulation: Roof and wall insulation values shall be in line with the energy codes of the State of South Carolina. Higher values will be considered if it contributes to the reduction in the HVAC requirements.
- Provide a roof information card that identifies materials, manufacturers, substantial completion data, contractor, designer, contact for warranty repairs, and other basic information.
- In Big Box Spaces (i.e. Gymnasium, Multi-Purpose Rooms, High Bay Classrooms and Cafeterias) specify an Acoustical Steel Roof Deck to control acoustics.

EXTERIOR WALL ASSEMBLY

- Single wythe exterior walls are not allowed.
- The floor, wall and roof shall be designed to perform as a unit so that it is energy efficient and leak free.
- A/E design team shall form a Building Enclosure Team (BET) to ensure continuity for the entire building enclosure: floor, roof, and walls. The BET team shall be led by a SC Registered Professional Architect and consist of the following: a Registered Roofing Consultant (RRC), a Registered Waterproofing Consultant (RWC), and a Registered Exterior Wall Consultant (REWC).

- The BET will be a part of the A/E team during the design development phase, contract document preparation, design reviews and especially during contract administration.
- The A/E shall formulate a quality assurance plan (QAP) that starts with the plans and specifications preparation and includes the construction a mock-up wall that has facets of the flashing and a window in it. The QAP will be in accordance with the latest guidelines of the Air Barrier Association of America (AABA).
- The wall system components shall have been tested together to produce a systemized code and standard compliant unit that meets as a minimum ASTM E2357 (Air Leakage), ASTM E331 (Water Leakage), NFPA 285 compliant (Fire Propagation, and ASTM E119 (Fire Resistance) latest versions.
- The wall system shall at a minimum have an air/water resistive barrier, foam insulation (minimum R value of 12 (ASTM C518), mortar dropping protection, flashing materials (including end dams, corners and weep vents) and hook & ladder brick ties. The wall system shall be coordinated and submitted as one package for approval by the BET.

BUILDING ENCLOSURE TEAM REQUIREMENTS

- BET will assist the Architect with review of applicable close-out documents.
- BET will be available for consultation by phone or email as needed during the project.
- **Design Development Phase**
    - The building enclosure walls, windows, doors, and roof shall perform as an integrated system.
    - BET shall attend two quality assurance (QA) review meetings for elementary and middle schools and four QA meeting for high schools to review and discuss proposed building envelope systems and proposed detailing systems.
    - BET shall provide design review of Architect's guidelines, details, and other standards for consideration in the development of building enclosure walls.
    - Architect and BET to provide design, details, specifications, and other standards for consideration in the development of the roof system. Specifications shall follow the format provided by the Architect.
    - BET shall review preliminary specifications for all materials and assemblies and materials associated with waterproofing/air barriers for the wall, exterior wall penetrations, and roof edge detailing and adjacent vertical wall connections.
    - BET shall provide a written review of Architect's building enclosure wall system and applicable specifications.
    - Architect and BET shall provide complete specifications for all materials waterproofing the roof, including, but not limited to general roofing, roof insulation, flashing roof penetrations, flashing roof structures, flashing roof equipment, roof to wall intersection flashing, and parapet waterproofing. Specifications shall follow the format provided by the Architect.
    - BET shall provide all required roof related details drawn in AutoCAD or modeled in REVIT on sheet layout formats provided by the Architect for incorporation into the project drawing set. Architect will provide the digital files to be used as the basis for detailing.

- BET's drawings and specifications shall be signed and sealed by a Licensed Architect or Engineer in the State of South Carolina. Where applicable, a Registered Waterproofing Consultant or a Registered Exterior Wall Consultant will seal the drawings for work applicable to waterproofing or exterior walls for which the BET has total design authority.

- **Design Review**
  - BET shall provide building enclosure walls design review to include, but not be limited to, exterior window and door openings, wall cladding (veneer) terminations, air barrier and water barrier systems and building expansion joint details.
  - BET shall provide recommendations (in the form of comments, mark-ups, sketches and/or recommended products) to the Architect, for consideration in the development of the construction documents as they relate to the building enclosure wall details.
  - BET shall review applicable specifications generated by the Architect and provide comments for recommended changes.
- **Construction Administration**
  - BET shall review and accept, as appropriate, shop drawings and submittals as required by the Contract Documents related to the BET generated roofing specifications. Unacceptable submittals shall be processed with the Architect until compliance with specifications is realized.
  - BET shall provide comments to Architect for one review of building enclosure wall shop drawings and submittals as required by the Contract Documents.
  - BET shall participate in one preconstruction and one mock-up review meeting pertaining to the building's enclosure wall system(s) to confirm the contractor has a clear understanding of the methods of application and installation of the specified products.
  - BET shall participate in one preconstruction meeting pertaining to the roof system(s) to confirm the contractor has a clear understanding of the methods of application and installation of the specified products.
  - BET shall provide interim site visits during construction of the roof system(s). Site visits shall be once a week during the installation and details. Provide one punch list inspection and one final inspection.
  - BET shall provide interim site visits during construction of the exterior walls, windows, and doors. Milestone visits shall be as follows.
    - Substrate inspection prior to installation of weather resistant barrier and air barrier if applicable.
    - After completion of weather resistant barrier and air barrier if applicable.
    - At the initial 3 days of thru-wall flashing installation.
    - Thru-wall flashing prior to brick installation.
    - Windows after installation.
    - Window flashings after installation and prior to cladding.
  - BET shall prepare and submit reports relaying information pertaining to weather, area worked, application methods, and material types installed that day. Reports shall be submitted to the Owner and the team by COB each Friday.

FLOOR WATERPROOFING

- Discuss floor system with Plant Operations Flooring Manager at DD stage
- Specify floor waterproofing for restrooms, custodial closets, dishwasher rooms, kitchens, showers, and other areas with water faucets/sinks/etc.
- Specify the turn up membrane 4 inches at walls.
- Prior to installation of finish flooring, the Contractor shall flood the entire waterproofed area with water at least 2 inches deep at the shallowest point for 24 hours.
- Testing shall be completed in accordance with ASTM D 5957. Contractor shall repair any leaks and retest.

ELASTOMERIC SHEET WATERPROOFING

Where applicable, require sheet waterproofing.

WATER REPELLENTS

Water repellents shall be used in accordance with Southwestern Research Institute (SWRI) standards.

BUILDING INSULATION

- Insulation values shall be equal to or exceed the most current ASHRAE 90.1 or IECC Energy Code adopted by SC. Consult with Owner Energy Manager prior to selecting insulation thickness.
- Spray fireproofing over the exposed portion of the insulation shall be tinted to be able to observe complete coverage.
- Roofing and wall insulation shall be staggered to avoid thermal bridging at seams and to produce the desired thickness.
- Wall insulation joints shall be sealed, and all penetrations shall be sealed with expandable foam.
- Acoustic Insulation shall be installed for Recording Studios, Music Rooms and Practice Rooms.
- Lightweight insulating concrete or Exterior Insulation and Finish Systems shall NOT be used.

AIR BARRIER SYSTEMS

- Use fluid applied synthetic permeable air barrier membrane.

THRU WALL FLASHINGS

- All thru wall flashing shall be stainless steel
- End Dams shall be shop fabricated and welded
- All laps shall be sealed with liquid flashing
- Top of flashing shall be sealed with liquid flashing

ASPHALT SHINGLE ROOFING

- Shall not be used except on outbuildings and field houses. When used, shall be designed and built with 30-year architectural shingles with 130 mph or the latest requirements of Charleston County whichever is greater.

- Downspouts shall drain into an underground drainage system.
- Gutters shall have leaf guards installed
- Gutter downspouts shall have cast iron boots at ground to protect from landscape equipment and other damage.
- Gutter Boot height shall be a minimum 3 ft. above grade

SHEET METAL ROOFING

- Standing seam roofing shall be used for medium pitched roofs. Asphalt shingles shall not be used.
- System shall be a prefabricated, pre-finished metal panel roofing system.
- System shall include the metal panels, sliding clips and other attachments, flashing to adjacent construction and other accessories. As an option, standing seam metal roofs shall have removable, repairable panels.
- System shall meet the requirements of UL580 and ASTM E 1592.
- Finish of all roofing panels, trim and accessory elements shall have shop-applied high-performance anti-corrosion coating.
- Use of exposed fasteners shall be minimized and all fasteners, exposed or covered, are required to be of stainless-steel construction and shall match the color of roofing by means of factory-applied coatings.
- All metal panel roof areas shall drain into external gutters and downspouts.
- Downspouts shall drain into an underground drainage system.
- Gutters shall have leaf guards installed
- Gutter downspouts shall have cast iron boots at ground for protection from landscape equipment and other damage.
- Gutter Boot height shall be a minimum 3 ft. above grade

MEMBRANE ROOFING

- Single ply Thermoset or Thermoplastic roofing is not permitted.
- Minimum slope to point of discharge shall be ¼ in. per foot and built into the structure. Use of tapered insulation or to execute replacement of existing tapered roof insulation systems for obtaining primary slope shall not be used unless a roof replacement project requires the additional slope to meet building code.
- All low slope roof areas shall be accessible by means of a roof hatch, exterior door or exterior roof ladders. Roof hatch shall be located in a service area, typically located in a custodial closet.
- Roof Insulation: Insulation thickness shall be a minimum of two layers as required to meet specified thermal resistance.
- Flashing: Base flashing shall be type recommended by membrane manufacturer to meet warranty requirements. No vertical lap joints in flashing closer than 8 ft. o.c. shall be permitted.
- Downspouts shall drain into an underground drainage system.

- Thirty (30) ft. of underground roof drainage piping shall be smooth wall to facilitate cleaning.
- Gutters shall have leaf guards installed
- Gutter downspouts shall have cast iron boots at ground to protect from landscape equipment and other damage.
- Gutter boot height shall be a minimum 3 ft. above grade

SBS MODIFIED BITUMEN BUILT-UP ROOFING

- No "Single Source" specification shall be allowed unless approved by Owner prior.
- Require a minimum 2-ply modified bitumen roof for low slope roofs with a prefabricated, reinforced, homogeneous Styrene-Butadiene-Styrene (SBS) block copolymer modified asphalt membrane secured to a prepared substrate. Both reinforcement mats shall be impregnated and coated on each side with a high quality SBS modified bitumen blend. The roof system shall pass ASTM D 5849 and be resistant to cyclic joint displacement at 14°F. Passing results shall show no signs of membrane cracking or interply delamination after 500 cycles as manufactured and 200 cycles after heat conditioning according to ASTM D 5147. The modified bitumen cap sheet shall have a factory applied surfacing. Phased installation shall be allowed when approved by the manufacturers in writing.
- The minimum design performance standards shall be as noted:
    - Base Sheet: Glass fiber and/or polyester reinforced ply sheet, meeting or exceeding requirements of ASTM D 6163, D 6164 or D 6509, Type I or II, Grade S. Base sheet shall be fully adhered. Mechanical fastening only allowed with CCSD permission. If allowed, the base sheet shall be ASTM D 6164, Type I, Grade S base ply.
    - Cap Sheet: Glass fiber and/or polyester reinforced ply sheet, meeting or exceeding requirements of ASTM D 6163, D6164 or D6222, Type I or II, Grade G. Granules to be white.
    - FM Class 1A-90 minimum (Must still meet site specific wind and seismic requirements)
    - FM LSPD 1-49 for Perimeter Flashing
    - FM LSPD 1-29 for Above Deck Roof Components
    - NRCA Roofing and Waterproofing Manual (Current Edition)
    - SMACNA Architectural Sheet Metal Manual (Current Edition)
    - (SMACNA details shall be modified to meet project specific requirements and shall be shown on the drawings.)
- For low-slope roofs, the building structure shall slope a minimum of ¼-inch per foot. Sloped insulation may be used to form crickets and direct water to roof drains and scuppers. Interior roof drains shall have tapered insulation around all four sides of the drain to create a sump. Place a granular surfaced SBS modified bitumen target ply around the roof drains. Strainers shall remain in place at all times once the drains are connected to the building drainage system.
- Specify a two-ply base flashing system with surfacing to match roof surfacing
- Perimeter nailers and cant strips shall be of treated wood and installed in accordance with FM 1-49. Provide polyisocyanurate board insulation and cover board. Cover board shall be roof system manufacturer's recommended material. Indicate R-values on the drawings.

- Base flashings shall be secured with termination bar at 6-inches on center, with top of base flashing sealed with reinforcement fabric and asphalt roofing cement. Base flashing shall be minimum 12-inches above roof.
- Walkway pads shall be placed at the roof hatch and at the service side of the rooftop HVAC units. Specify mineral-granule-surfaced walkway pads and show the locations on the roof plan.
- When a fire-rated roof assembly is required, verify that the manufacturer's roof system, including the metal deck has been tested by UL.
- Interior roof drains shall be cast iron, including bowl, clamping ring, and strainers, with stainless steel bolts. Roof drains shall be located as close to midpoints between columns as reasonable.
- The Roof Consultant (RRC) shall have at minimum a Registered Roof Observer (RRO) to provide quality assurance inspections beginning the initial 2 days of roof construction and continuing once per week until substantial completion.
- The RRO shall provide Owner with weekly written QA reports.
- Design modifications to the roof system(s) shall be approved by Owner, Program Management, AE, RRC and if appropriate the roof system manufacturer. These modifications shall not have an effect on the specified warranty(s).
- The RRC shall provide a punch list inspection and a final inspection after the punch list items have been completed. Written reports shall be provided to Owner for both inspections.
- Downspouts shall drain into an underground drainage system.
- Thirty (30) ft of underground roof drainage piping shall be smooth wall to facilitate cleaning.
- Gutters shall have leaf guards installed
- Gutter downspouts shall have cast iron boots at ground to protect from landscape equipment and other damage.
- Gutter Boot height shall be a minimum 3 ft. above grade

FLUID APPLIED MEMBRANE ROOFING SYSTEMS

- AE and RRC shall specify fluid applied membrane roofing system on renovation projects and as an alternate on all new construction. See Appendix A for Basis of Design Manufacturers.
- Reroofing projects shall require a base sheet meeting the specification for modified bitumen base sheets above.

MANUFACTURED ROOF SPECIALTIES

Specify roof specialties including copings, fascia, gutters, and downspouts be formed, fabricated, finished, and assembled in the factory. Where possible, one manufacturer should be responsible for all the roof specialties on the Project.

ROOF EXPANSION ASSEMBLIES

- Expansion joints shall be constructed as a raised curb with a sloping 24-gauge galvanized pre-finished metal cover with interlocking standing seam joints at a maximum spacing of 10 feet. Secure with concealed fasteners every 8-inches on one side of the joint. The opposite side shall allow for expansion and contraction. Height shall be in accordance with manufacturer's recommendations.

- Pre-manufactured expansion joint covers, e.g. Expandoflash, shall not be accepted.
- Isolate non-supported roof/wall sections and changes in deck directions.
- Specify minimum 30 mils thick, consisting of a slip-resistant polyethylene- or polypropylene-film top surface laminated to a layer of butyl- or SBS-modified asphalt adhesive, with release-paper backing; specifically designed to withstand high metal temperatures beneath metal edge and expansion joints.
- Require documentation of coordination for installation of exterior wall joint systems with roof expansion assemblies.
- Require all contractors involved to sign off that all transitions are watertight following installation.

ROOF ACCESSORIES

- Roof accessories (pre-manufactured metal curbs and equipment supports, safety rails, relief vents, ridge vents, heat and smoke vents, and roof hatches) shall be galvanized steel sheet metal construction with a factory primer. Roof vents and roof hatches may be aluminum with a backed enamel finish. Hatches shall be 30"x36" and specified with full safety rail system around the hatch that meets the latest OSHA safety requirements.
- AE shall attempt to design roof and located equipment to avoid the need to utilize safety rails. If safety rails are necessary, AE shall submit plans for location of safety rails to the Program Manager for approval. AE shall verify requirements for safety rails around roof mounted equipment with current OSHA, OSF and AHJ requirements.

SPRAYED-ON FIRE-RESISTIVE MATERIALS

- Coordinate locations of fireproofing with the structural engineer.
- If fireproofing is to be exposed, and aesthetics is a concern, specify a sample or mockup for approval.
- Steel columns in mechanical rooms and high traffic areas shall be protected by cast in place concrete in lieu of spray on fire protection.
- Specify field quality testing for dry density and bond strength.
- Provide cementitious-sprayed fire-resistive materials with a minimum dry density of 39-lb/cu. ft. for exposed applications.
- Some manufacturers claim that the minimum dry density resulting from laboratory tests is sufficient to meet the Project requirements. The AE may specify higher densities to satisfy other requirements in addition to fire rating and durability. Clearly note in the specifications that the specified dry density and thickness shown are required regardless of the manufacturer's fire-resistive claims.
- Require Contractor to be responsible for sequencing the work, if Contractor installs equipment before the fireproofing, Contractor shall protect all installed work from over spray.
- The original installer, using the original means and methods for installation, shall do all patching of the fireproofing. Isolation patching of the fireproofing is not acceptable.

THROUGH-PENETRATION FIRESTOP SYSTEMS

- All firestopping shall be installed by a single subcontractor certified to install through-penetration firestopping systems.

- Shop drawings shall show each kind of construction condition penetrations and the manufacturer's tested firestop design designation to meet the required ratings of all UL Assemblies shown. This documentation method requires a single source responsibility for the design and product delivery for the Project. UL Assemblies shall be specified.

FIRE-RESISTIVE JOINT SYSTEMS

- A single source manufacturer shall detail and supply the joint systems for the entire project.
- Require the Contractor to submit details on each proposed assembly identifying intended products and applicable UL Assembly or UL classified device.
- Require the Contractor to coordinate with review agencies when inspection or rated penetrations are required.

JOINT SEALANTS

- Use elastomeric sealants. Limit latex sealants to non-moving joints in drywall construction.
- Use low or ultra-low modulus sealant for use on metal copings, metal fascia, and other metal components where a high degree of thermal movement is expected.
- Use low to medium modulus sealants for typical exterior and interior joints between masonry, concrete, doorframes, windows, and joints between combinations of these materials.
- Use medium to high modulus sealants for applications where joint movement is limited to +/- 25%, for example glazing, curtainwall, and structural glazing applications.
- Caulk precast concrete joints with a low to medium modulus sealant capable of withstanding structural movement of 50% in extension and 50% in compression without adhesive or cohesive failure.

DIVISION 08 – OPENINGS

GENERAL REQUIREMENTS

- CCSD has adopted ASSA ABLOY's Openings Studio as its door management and design software. Access to the software is free of charge. All A/E's shall use this during the design and construction phase of a project. See Appendix J for requirements.
- See Division 10 under "Security Signage" for information on door and window numbering
- Wood and hollow metal doors shall not be hung until the building is enclosed, the permanent heating and cooling systems are in operation and indoor relative humidity has been maintained at a level of less than or equal to 55% for a minimum of 7 consecutive days. Contract documents shall require contractor to create and maintain a log of relative humidity readings for the purpose of documenting these conditions prior to installation of doors.
- Selection of glazing type for reception and vestibule spaces must be discussed with Director of Security during the Schematic Design Phase.
- Hollow metal door closers shall be bolted through door**.**
- Show typical window elevations, schedule of each type and size, locations, in wall construction details, and glazing details on shop drawings.
- Doors exceeding 7 ft in height require approval by Owner
- Blinds shall be furnished under FF&E.
- Ten percent (10%) of window and door openings shall be water tested after installation
- Doors and hardware subjected to hurricane force winds may be hurricane rated as separate components and can be used in lieu of assembly rated components for renovations and new construction.
- Owner supplied access control
    - Any opening that the Owner or access control provider touches, they shall supply and install the closer if it is FRP, HM or Wood
    - Storefront openings and closers shall be supplied by the Contract Hardware Distributor (CHD) and installed by the Storefront supplier
    - Mullions shall be supplied by the CHD and installed by the GC/Storefront installer
    - If the opening is electrified and it's a pair of doors, the Owner/access control provider shall supply the mechanical and electrified exit devices.

FRONT DOORS

Main Entrance shall be equipped with a doorbell and an AIphone shall be provided by the Door Access Control vendor

KITCHEN DOORS

- Exterior kitchen doors shall be equipped with a doorbell and peephole by Doorscope Model 2000 or Owner approved equal.
- Doors from loading docks into the kitchen receiving areas shall be a minimum of 8 feet tall and 48 inches wide.

EMERGENCY EXIT DOORS

All emergency exit doors serving multiple spaces shall be double doors.

WOOD DOORS

- Swinging interior “A” label and “B” label double doors shall be wood. Only domestic species of wood shall be used.
- Structural Composite Lumber (SCL) core wood doors with transparent finish in hollow metal frames shall be used on most interior doors including 20-minute constructed fire doors. Thermal fused style doors with a thermally fused face may be used as an alternative. Doors shall be pre-fitted, pre-finished and pre–machined at factory for finish hardware. High density mineral core blocking reinforcement for mineral core doors shall be provided at hinge, closer, lock and strike locations. Doors shall be 1-3/4 in. thick and 7ft.high.
- Wood doors shall be solid 5-ply hot pressed (cold pressed not acceptable) bonded core with no added urea formaldehyde and no use of formaldehyde-based glue in the manufacturing process.
- All doors in instructional areas shall have narrow vision lights. Vision lights shall be laminated and attack resistant (4 minute minimum) Director of Security shall be consulted on the size of vision lights on classroom doors.
- No doors shall be delivered to the building until weatherproof storage space is available. Doors shall be stored in a space having controlled temperature and percent relative humidity range between 30 and 60 percent (conditioned air). Stack doors flat and off of the floor to prevent warping. Protect doors from damage and direct exposure to sunlight.

INTERIOR HOLLOW METAL DOORS AND FRAMES

- Doors shall be 1-3/4 in thick and 7ft. in height and be full flush.
- All interior metal doors, metal frames and metal sidelight frames shall be hollow metal and shall be:
  - ANSI A250.8, grade 3 extra heavy model 2A (welded, seamless) primed doors for field finish for interior doors
  - Face sheets and frames fabricated from 16-gauge cold rolled steel. Knock Down frames are not allowed.
- Jamb anchors at masonry wall openings shall be standard wire anchors and jamb anchors for plaster and gypsum wallboard partition openings shall be a minimum of 18-gauge steel. Frames at masonry walls shall be filled with grout.
- Specify door reinforcement as follows:
  - A minimum of 12 gauge for hinges and be continuous channel for the full height of door
  - 12 gauge for closers and be a continuous channel for the full length of the header
  - 14 gauge for strikes and be a continuous channel for the full height of the door
  - 7 gauge reinforcements for hinges on frames
  - 26 gauge steel plaster guards or mortar boxes welded to the frame shall be provided at hardware cutouts where installed in concrete, masonry or plaster openings

- Vision lights shall be provided at stairs/corridor doors, except at 3 hour labeled openings. Glaze with ¼ in. UL labeled glass at fire rated doors and ¼ in. tempered glass at other doors. Light size shall be 3 in. x 33 in. at fire-rated doors. Director of Security shall be consulted on the size of vision lights on classroom doors. Vision lights shall be located as required by ADA. Glazing kits shall be (concealed type) flush with door surface.
- All doors off hallways, corridors, and stairways shall have stainless steel kick plates. For main exit doors, kitchen, storerooms, and other doors subject to heavy use, specify extra-large stainless steel kick plates.

EXTERIOR DOORS (FRP DOORS)

- FRP doors and frames shall not be field painted - the color needs to be made into the material and shall be a standard color.
- Door finish shall be pebble. Smooth finish maybe considered as an alternate.
- Hybrid (FRP and aluminum) doors with tubular aluminum door frames shall be rated in the same manner as the door for wind loads with applied stop made by the door manufacturer.
- FRP doors with FRP door frames shall be foam filled and rated in the same manner as the door for wind loads.
- Exterior doors shall have continuous stainless steel or aluminum hinges.
- Water testing results of door shall be required as a shop plan submittal
- Doors, frames and hardware (Corbin Russwin) shall meet 3rd party testing in accordance with IBC as applicable to South Carolina, ASTM E330, ASTM E1886, ASTM E1996 requirements or standards that exceed the IBC requirements for South Carolina.

ACCESS DOORS AND FRAMES

- Shop-primed galvanized steel shall be used for general locations and stainless steel for wet locations.
- Locations for access doors for above ceiling equipment shall be shown on drawings.
- Access doors are not permitted for above ceiling HVAC equipment larger than 5 tons of cooling capacity. Refer to Division 23 for detailed access requirements.

OVERHEAD COILING DOORS AND GRILLES

- Overhead roll up doors and grilles shall be of metal construction and shall not interfere with required egress from occupied spaces.
- Dish return at cafeterias shall be stainless steel roll up doors.
- The design of the kitchen/serving area shall not permit the use of fire-rated roll-up doors.
- Doors shall be manual operation by crank or chain unless size dictates otherwise.
- Specify a slide bolt locking device (no lock cylinders permitted).

ALUMINUM ENTRANCES

- Door reinforcement shall be a minimum of 12 gauge for hinges and shall be continuous channel for the full height of door,

- Door reinforcement shall be a minimum of 12 gauge for closers and shall be a continuous channel for the full length of the header
- Door reinforcement shall be a minimum of 14 gauge for strikes and shall be a continuous channel for the full height of the door.
- 7 gauge reinforcements shall be used for hinges on frames.
- 26 gauge steel plaster guards or mortar boxes welded to the frame shall be provided at hardware cutouts where installed in concrete, masonry or plaster openings.
- Finish shall be Anodized or Kynar (Kynar to be provided with Coastal Warranty).

ALUMINUM STOREFRONT

- All exterior single access point openings shall be Fiberglass Reinforced Plastic (FRP) doors with aluminum storefront frames. Consult Owner before specifying.
- Multiple access point openings requiring electronic locks or swipe cards shall be aluminum store front doors and frames. All electronic locks shall be motorized electronic latch retraction or electrified mortise lock. Electronic strike mechanisms are only allowed with Owner approval.
- Exterior storefront applications shall include a thermal break.
- Door stiles shall be minimum of 5 inches in width.
- If Blade Stop frames are supplied, the storefront manufacturer blocking shall provide (Blade Stop Spacers) for closers, mullions and rim exit devices.
- Finish shall be Anodized or Kynar.
- Vertical rod assemblies are not allowed.
- Doors, frames and hardware (Corbin Russwin) shall meet 3rd party testing in accordance with IBC as applicable to South Carolina or standards that exceed the IBC requirements for South Carolina.

GLAZED ALUMINUM CURTAIN WALLS

- Glazed aluminum curtain walls are seldom used in school projects comprised of one or two stories (floors) and must be approved by Owner. Storefront systems are usually adequate.
- Require project specific preconstruction testing.
- When both aluminum storefront and glazed aluminum curtain wall systems are used on a project, clearly define and label each type on the drawings to correspond to the specifications.
- Require a curtain wall consultant when using curtain walls or specify delegated design to be provided by curtain wall manufacturer.

STEEL WINDOWS AND FRAMES

- Exterior windows shall be inoperable except for locations dictated by OSF requirements
- All exterior windows shall be equipped with insulating glass.
- Hollow metal glazing frames shall be fabricated from 14-gauge cold rolled galvanized steel.
- Do not extend hollow metal window systems to ground level.

- Frame anchorage at masonry openings shall be standard wire anchors. Frames at masonry openings shall be filled with grout. Frames at drywall or plaster openings shall be minimum 18-gauge steel and at a minimum shall be placed at the top, center, and floor.
- Blinds shall be furnished under FF&E.
- Water testing window openings shall be required.

ALUMINUM WINDOWS

- Specify thermally broken, single hung aluminum windows
- Provide aluminum egress hardware and opening devices for windows designated as egress windows. Indicate windows for emergency use by mechanically fastened signage.
- Windows shall be based on performance requirements listed in AAMA/NWWDA 101/I.S.2. Specify Heavy Commercial (HC) class, performance grade 40.
- Product data shall include manufacturer's specifications and test reports from an AAMA accredited laboratory.
- Samples for each specified finish type shall be provided.
- Hinges shall be concealed stainless steel. Cam handles and strikes shall be bronze. Double hung egress windows shall have only one center lock. Two locks shall be required on all other double hung windows.
- Insect screens shall be aluminum wire fabric, charcoal grey color.
- Windows shall match the storefront color and finish.

SKYLIGHTS

Skylights and solar day lighting tubes shall only be used when no other type of natural day lighting design is possible. Specify factory-assembled glazed unit skylights with integral curb for installation in flat roof areas. Skylights shall require fall protection around them. Clerestory windows are preferred. All skylights require Owner approval.

GLAZING

- Impact resistant, insulated, Low-E glass shall be used for all exterior applications throughout the District on all projects.
- UL rated ballistic resistant glazing and frames may be required as an alternate for reception areas and security vestibules as directed by Executive Director of Security.
- No sidelight windows shall be allowed on interior doors including classrooms unless otherwise directed by the Executive Director of Security.
- Use Solargray, Solarbronze and light green Solex glass tints. When selecting a tint, maximize visible light transmittance while balancing code requirements for solar heat gain coefficient (SHGC) and U-values. Other colors may be considered and approved by Owner.
- When multiple glass types are used in the Project, identify each type on the drawings and provide a glass schedule in the specifications to describe the characteristics of each type.

VESTIBULE GLAZING

- See specifications for Vestibule Glazing in Appendix L

ONE WAY MIRRORED GLASS

All elementary school work rooms, CD-kindergarten rooms shall require at a minimum, one-way, ½ lite mirrored glass installed in doors.

FINISH HARDWARE

- Hardware shall be based on the approved hardware shown in the Appendix A: Basis of Design.
- AE shall schedule a hardware coordination meeting with Hardware consultant, Owner Locksmith, and Owner Security office.
- The hardware installation specifications shall require the installers to have been certified by attending the Assay Abloy training. They shall produce the certification as a shop plan submittal.
- Finish hardware shall be stainless steel. Interior door hinges shall be aluminum or brushed chrome. Exterior doors shall have continuous aluminum hinges. Panic devices shall be anodized aluminum or stainless steel.
- All non-rated exit devices shall have the ¼ turn hex key dogging. Only the main entrance, faculty and students shall have keyed entry and ¼ turn hex key dogging.
- All double door entrances and foyer entrances shall have removable mullions (require a tool to remove), with the exception of those pairs of doors designated loading and unloading of furniture and other large objects (band rooms and performing arts areas) which shall have key removable mullions.
- All corridor fire rated doors shall utilize the appropriate trim and shall have the appropriate magnetic hold open device connected to the fire alarm system. AE shall specify floor finish below all fire rated doors.
- Within 30 days upon completion of the door hardware punch list, the General Contractor and the installer, accompanied by Owner's representative (for quality assurance) and the finish and security hardware representative(s) shall inspect all hardware. Require Contractor to fix items covered under warranty.
- All exterior doors, staff entrances, foyer egress doors and other strategic locations identified on a project specific basis shall utilize an electronic latch retraction with a card swipe with keypad.
- Offices to hallway doors shall utilize a separate card reader by strike and mortise lock.
- Vestibule to office doors shall utilize a separate card reader/keypad with an electrified mortise lock.
- Lock cylinders:
    - On all new construction and major renovations, locksets shall be provided with red construction cores. Plastic cores are not allowed – red cores only.
    - Shall match facility restricted keyway.
    - Door keying shall be grandmaster keyed as approved by Owner and after a keying conference with school officials takes place.
    - Provide (6) keys per lock cylinder for office and storeroom functions and (3) keys per lock cylinder for all others.
    - On renovation projects where the existing hardware shall remain in place, any new lock shall be keyed to the existing system as determined by Owner's locksmith. Contractor shall

directly contact and communicate with Owner's locksmith for specifications. Owner's locksmith will install all final cores with the assistance of hardware supplier. The hardware supplier shall provide Owner with the final bitting list on all projects to be included with project close out documents.

- On renovation projects, where additions and renovations exceed 50% of the existing facility, all lock hardware on existing doors shall meet ADA standards.
- On all new construction and major renovations provide 25 master keys.
- All hex exit device dogging keys and restroom privacy keys shall be turned over to the Owner's locksmith.

KEY BOX

- Provide key box in school vault, sized to hold 150% of building keys. Keys to be installed in key box by Owner locksmith at substantial completion.
- The architect shall ensure the wall location for the key box can accept the weight of the box. If the wall is gypsum board, the necessary blocking shall be added. Specify the use of TAPCONs for CMU walls. Plastic wall anchors are not acceptable.

KNOX BOX

- Require a Knox Vault 4400 series, at a minimum, at the building exterior directly adjacent to the front door. Additional Knox Boxes may be required based on the design of the structure (e.g., near FDC, outside exterior gates that prevent access to the campus). The CCSD system number can be obtained from the Executive Director of Security.
- The Knox Box shall be an Independent Dual Lock type, with no tamper switch.
  - One of the dual locks shall be keyed to the Charleston County School District's key system; the contractor shall obtain the CCSD Knox key system number from the Executive Director of Security and Emergency Management at the time of ordering.
  - The other lock shall be keyed as directed by the local Fire Department.
- The Knox Box shall be recessed mount at the front door and other locations where the Knox Box is installed on the building; surface mount may be considered for Knox Boxes installed in locations other than on the building (e.g., at an exterior gate). The color of the box will be at the direction of the architect based on the design of the installation location.

ACCESS CONTROL

- Access control requires careful planning with the Owner Security Office and IT Department. They will determine where access control is required and what type will be required for each opening. Appendix A has a list of door designations and required hardware.

DIVISION 09 – FINISHES

GENERAL REQUIREMENTS

- All finishes including colors, textures, sizes, and accessory materials shall be detailed in a Finish Schedule on the drawings. All floor, wall, and ceiling finishes shall be listed with a corresponding color or finish code. All colors shall be approved by the Owner and shall follow Owner color palettes.
- All Carpet throughout the building shall come from one manufacturer.
- All carpet and other flooring products will come from the Owner approved Flooring List. Final approval of the selections will be by the Owner not Program Management.
- No custom flooring products shall be allowed they must be standard off the shelf products.
- Texas Granite (TG)
  - Field color shall be white taupe, mission white, white blue or white grey
  - All patterns shall be “drop in” (custom cuts are only allowed for logos)
  - Accent colors shall be standard TG and selected from the school color pallet
  - Tiles shall be 12 inch x 12 inch and high gloss
- Color selections, type of paint, floor patterns, varying ceiling panel types and uses, tile patterns, and painting schemes shall be included in a Color and Material Legend as part of the Finish Schedule. Include color and finish schemes for plastic laminate for millwork, toilet partitions if more than one color is used, acoustical wall panels, painted doors and frames, and exterior field painted components such as doors, frames, ladders, handrails, and exposed structural steel.
- Paint finishes shall be in accordance with the Master Painters Institute (MPI) Architectural Painting Manual. Finish levels G1 through G3 shall not be permitted in any area.
- All paint and coating systems shall be specified to meet or exceed the minimum requirements for the current LEED or Green Globes standards for Indoor Environmental Quality. Submit product data with written documentation and printed statement of VOC content to demonstrate compliance.
- All paint systems shall be specified to be MPI of three coat systems (primer coat, intermediate coat and topcoat) unless noted otherwise
- Color Palette selection shall follow this procedure:
  - AE shall make color selections from the Owner pre-approved color scheme pallete in new construction projects and major renovation projects.
  - School theme colors may be used in the main lobby, cafeteria, and gymnasium. Owner must approve school colors not included in pre-approved schemes.
- Quarry tile shall only be permitted in kitchen areas.
- AE shall specify that Contractor shall clean and prepare one classroom for Owner inspection as the standard for cleaning and waxing.
- Floor finishes shall be protected from damage and construction activities until turnover.

- AE shall specify that final cleaning and buffing operations after protective covers have been removed shall be completed by Owner's cleaning vendor included in Contractor's construction contract.
- Moisture test shall occur prior to installation of adhesives and reference manufacturer's recommendations regarding moisture content.
- Maintenance stock shall include five cases of floor tile (LVT) and five cases of carpet tile
- No metal or other specialty ceilings shall be used. Refer to Appendix A "Basis of Design Manufacturers" for ceiling material types.
- Show ceiling heights on both the finish schedule and on the reflected ceiling plans.
- Lay-in ceilings are acceptable in single use toilets
- Lay-in ceilings are not acceptable in group toilets.

FLOORING TYPES BY FUNCTIONAL USE

- Academic Classrooms: Carpet Tile
- CD, Head Start, & Kindergarten Classrooms: All carpet shall be carpet tile. Texas Granite or LVT shall be at "Wet Areas". Birth to Kindergarten 50/50 split all other classrooms with wet areas 70/30 split.
- Cafeterias and Multipurpose rooms: Texas Granite or Owner approved equal
- Locker Rooms: Porcelain full body tile 12 inch x 12 inch. Larger sizes will be considered.
- Art Rooms: Unstained polished and sealed concrete – non-skid
- Laboratories: Texas Granite or Owner approved equal
- Group Restrooms: 8" ceramic or porcelain tile of dark color with dark epoxy grout. Larger tile sizes will be considered by the owner. See Appendix A for preferred grout color.
- Single Toilets/individual classroom toilets: 12 inch x 12 inch ceramic tile or full body tile is first choice but sheet vinyl is acceptable. See Appendix A for Basis of Design Manufacturers and color.
- Kitchens: 6" quarry tile (dark color with dark epoxy grout)
- Middle and High School Gymnasiums and Practice Gyms: Tongue and groove maple wood flooring only. Number One grade for High School and Number Two grade for Middle School shall be used.
- Stage Floor (Elementary and Middle Schools): LVT or Texas Granite. No steps leading up to the front of the stage.
- Stage Floor (High Schools): Wood flooring system consisting of two layers of ¾" plywood. No tongue and groove strip flooring. No steps leading up to front of stage.
- Corridors: Texas Granite or Owner approved equal
- Offices Carpet tile
- Media Center: Carpet tile
- Health Suite: Texas Granite or Owner approved equal

- Music Rooms/Chorus: Texas Granite or carpet tile
- Band/Drama Rooms: Texas Granite or LVT
- Computer Labs: Carpet tile
- Stairwell (landing and rises): Raised round dot rubber stair treads (with visual contrasting stripe full width), risers, and landings in dark colors with speckles. Visually impaired stripe is required. Owner shall approve product specified.
- Teachers' Lounge: Carpet tile
- Entrance/Air Locks: Walk off carpet for all entrances shall be a minimum of 10 feet. If practical the minimum shall be 16 feet at all entrances.
- Mechanical rooms/closets: Sealed concrete
- Electrical rooms/closets, custodial closets: Sealed concrete
- Security rooms/closets, technology rooms/closets: Sealed concrete
- Storage rooms: Sealed concrete
- Maintenance stock shall include five cases of each color of Texas Granite, five cases of floor tile (LVT) and five cases of carpet tile.

ATHLETIC-FLOORING ASSEMBLIES

- Resilient athletic flooring in high school new construction for multipurpose activity/P.E., etc. shall be used for wrestling, cheerleading and dance activities.
- Flooring shall be 3 mm or thicker commercial rubber tile type flooring. See Appendix A for Basis of Design Manufacturers.
- Maple flooring systems shall be used in gymnasiums for Middle Schools and High Schools. Assembly shall include hard maple strips installed over a subfloor system for shock-absorption and shall comply with the DIN standard for shock absorption, ball bounce, vertical and area deflection, surface friction, and rolling load. Wood flooring shall be strip flooring, tongue-and-groove, 25/32-inch thick. Number One grade for High School and Number Two grade for Middle School shall be used.
- Wood athletic flooring systems shall be "AACER" "Cush II" with pads and double ¾" plywood under floor or pre-approved equal: Maple. Oriented Strand Board (OSB) board shall not be accepted.
- Metal accessory components shall be minimum 16-gauge hot dipped galvanized steel.
- Specify gym floor finish. No less than four coats total and not less than two finish coats shall be provided.
- Game line, marker paint, team logo in center court and school name under goals (logo and name in high school main gym only) shall be high-gloss enamel compatible with floor finish. Game lines shall be applied between final seal coat and first finish coat.
- Laminated oak flooring or parquet-block requires Owner approval.

RESILIENT FLOOR TILE

- AE shall specify that contractor shall use Owner's current flooring contractor to furnish and install all Luxury Vinyl Tile (LVT) (VCT is not allowed).
- Tiles shall lay square with room. If patterns and alternate tile layouts are part of the design, clearly show the patterns and colors on the drawings.

RESILIENT WALL BASE AND ACCESSORIES

AE shall specify that contractor shall use Owner's current flooring contractor to furnish and install all rubber base and accessories as black vinyl base, 6-inches high and 1/8-inch-thick only; 4-inch base allowed at cabinetry. Floor accessories (carpet edge for glue-down applications, reducer strip for resilient flooring, and tile/carpet joiner) shall be color matched to the finish floor materials. Base required at all sealed concrete floor finishes.

CARPET TILE

- AE shall specify that contractor shall use Owner's current flooring contractor to furnish and install all carpet. AE shall not specify product. Specify carpet color as a part of the building color palette. Moisture test of sub surface shall occur prior to installation of adhesives and reference manufacturer's recommendations regarding moisture content.
- AE shall specify that Contractor shall install carpet after building is enclosed, permanent heating and cooling systems are in operation and indoor relative humidity has been maintained at a level of less than or equal to 55% for a minimum of 7 consecutive days. Contract documents shall require contractor to create and maintain a log of relative humidity readings for the purpose of documenting these conditions prior to installation of panels. Floor finishes shall be protected from damage and construction activities until turnover. Require removal and disposal of floor protection just prior to cleaning and/or furniture delivery.
- Reducer strips shall be installed at all LVT transitions to alternate floor surfaces except where there is a marble threshold.

WALL FINISHES

- Grout for wall tile shall coordinate with the colors of the tile floor grout.
- Exposed concrete masonry shall be painted. Specialty masonry, for example ground face CMU, when used on the interior shall be protected from soiling and staining. Exterior applications of these materials are covered in Division 4.
- Exposed concrete masonry finished in Food Prep areas shall comply with DHEC requirements.
- Ceramic tile or stainless-steel sheets over masonry in dishwashing rooms.
- In group restroom renovations the tile shall stop 12 inches below the existing ceiling grid and the 12 inches of unfinished wall shall be painted. If a new ceiling grid is to be installed, then the tile shall go up to the bottom of the ceiling grid.
- <u>In group or single restrooms (new or renovations) with painted CMU or painted gypsum board walls install an 18 gauge stainless steel panel from below the wall mounted electric hand dryer to the top of the covebase. The width shall be determined by the number of dryers mounted on the wall. If the restroom with these wall systems is being painted in a renovation it shall be installed as part of the renovation project.</u>
- Stainless steel shall cover the entire wall behind the dishwasher.

- Gypsum board walls shall be used in administrative areas and in areas where flexibility or expansion is likely.
- Heavy duty guards shall be installed on all corridor corners. Plaster and gypsum walls are not acceptable in corridors, except for intra-office corridors.

GYPSUM BOARD ASSEMBLIES

- Gypsum board walls and ceilings shall be specified as UL and ASTM E 119 assemblies, including steel stud framing, suspension systems, and various types of panel products and installed per USG and/or manufacturers recommendation.
- Gypsum wall board shall be 5/8 in. thick, type X for walls and for ceilings. Provide sag-resistant gypsum board for ceiling applications. Vinyl laminated gypsum grid panels may be used in wet environments such as kitchens, where accessibility may be required, and security is not a primary concern.
- Water-resistant gypsum board shall be used for wet environments and for tile backing not subject to constant wetting including kitchens and group restrooms. Specify cementations backer units for tile backing in showers.
- Abuse-resistant gypsum wallboard shall be used for areas requiring a higher resistance to 8 feet AFF to surface indention and through-penetration.
- Specify galvanized metal studs with a G40 coating for interior wall, and a G60 coating for exterior wall applications. Stud depths shall be indicated on the drawings, but and not in the specifications, unless one size is used throughout the Project.
- Deep-leg deflection tracks shall be used for partitions extending to the structure to accommodate live load deflections. Do not extend partitions to the structure with no provision for deflection. Under normal circumstances, a deflection limit of 1/240 and a wall load of 5-to 15-lbf/sq. ft. shall be acceptable.
- Gypsum board is not allowed in corridors or group restrooms rooms as wall material.
- Specify STC ratings for partitions using sound attenuation blanket insulation.

GYPSUM BOARD SHAFT-WALL ASSEMBLIES

AE may specify gypsum board shaft-wall assemblies for fire-rated enclosures for vertical shafts, ductwork chases, elevator shafts, and other non-load-bearing enclosures as an alternative to masonry shaft enclosures. Structural steel shall not penetrate the shaft.

ACOUSTICAL CEILING TILES

- Acoustical Ceiling Tiles (ACT) shall be manufacturers standard lay in grid, square edge panels, 24 inch x 24 inch with 15/16” grid by same manufacturer in white finish. NOTE: No metal or colored tiles are allowed. White is the standard color.
    - ACT 1: General Ceiling Tile-classrooms, corridors, administration areas etc.
    - ACT 2: High Sound Absorption Areas- Band Rooms, Music Rooms etc. Practice Rooms. Chorus etc.
    - ACT 3: High Moisture and wet areas-Toilets, Locker Rooms, Food Prep Areas etc.
- Washable tiles shall be used in kitchens and serving lines

- Tiles in Multi-Purpose Rooms shall be equal to USG Rock Face 2x2 56335 with # 20428 Panel Retention Clips on 2 opposite sides or approved equal.
- Humidity resistant tiles shall be used in ALL areas
- Install tiles only after building is enclosed, the permanent heating and cooling equipment is in operation and indoor relative humidity has been maintained at a level of less than or equal to 55% for a minimum of five (7) consecutive days. Contract documents shall require the General Contractor to create and maintain a log of relative humidity readings for the purpose of documenting these conditions prior to installation of tiles.
- Specify the following for Ceiling Tiles and Grid Systems – No substitutes
    - Ceiling Tiles
        - ACT 1: General Tile to be installed everywhere except where Type 2 or Type 3 are required.
        - Specify USG High NRC-CAC Radar # 22521 square edge panels with minimum .70 NRC and 40 CAC minimum
        - OR Armstrong High NRC-CAC Fine Fissured # 1810 with minimum .70 NRC and 40 CAC minimum.
        - ACT 2: High Sound Absorption Areas
        - Specify USG Mars # 88134 with minimum NRC 0f .85 and 35 CAC
        - OR Armstrong Calla # 2820 with minimum NRC of .85 and 35 CAC.
        - ACT 3: Moisture, wet areas, food prep and serving areas and toilets.
        - Specify USG Sheetrock ceiling panels 2x2 # 3260 with washable vinyl face.
        - No substitutes
    - Grid Systems:
        - ACT 1 and ACT 2
            - Specify USG (Donn) DX 26 HD Grid and Donn #M 18 wall molding with 1 1/8" horizontal leg dimension
            - OR Armstrong Prelude XL # 7301 HD Grid and # 7850 wall molding with 1 1/8" horizontal leg dimension
            - Note: A ¾" clearance on horizontal leg of wall molding is still required as called for in Guidelines for Seismic Design Category "D"
        - ACT 3
            - Specify Donn DXLA 26 HD Cap Coated Aluminum Grid and Gordon CG WA 20 2" Aluminum Wall Molding
    - NOTE: Architect shall clearly define the proper Seismic Design Category to be used for installation purposes and show details of proper installation of ceilings and all accessories required.

ACOUSTICAL WALL PANELS

- Panels shall meet the following criteria:

- 7 pcf Density in 1” or 2” thickness depending on absorption requirements by Architect.
- Finish to be Guilford FR 701 fabric OR Guilford “Anchorage”. Alternative colors are allowable to coordinate with various accent walls and school colors. Owner shall approve color choice.
- Installation Method - Z-Clip Method
- Edge Detail Square Edge and Square Corners.
- High Impact Panels - Same basic specification with a 1/8” High Impact Resistant 16-20 PCF fiberglass laminated to face of panel.
- Installation Height: Architect to discuss height of installation above floor with the Project CM prior to detailing on drawings.

PAINTING

- All paint finish schedules shall be designated using the Mater Painters Institute Standard Finish Number Nomenclature.
- Coordinate painting systems with shop-applied primers specified in other Sections.
- A mockup of 2 ft. x 4 ft. shall be produced for each color.
- Semi-gloss paint shall be used for sheet rock walls. Block wall surfaces use semi-gloss paint. Finishes in high traffic areas shall be washable.
- A primer or block filler plus at least two finish coats systems shall be used on substrates.
- Per current LEED or Green Globes standards, low to no VOC paint shall be used.
- Specify field painting of exposed bare and covered pipes, ducts, hangers, exposed steel and iron supports, and surfaces of mechanical and electrical equipment. Painting subcontractor shall paint this equipment, not the mechanical or electrical trades. Painting of mechanical and electrical work shall be limited to items exposed in equipment rooms and occupied spaces.

PAINTING SCHEDULE

Painted Surface Location	Substrate	MPI Paint System Number	MPI Gloss Level	Remarks
Exterior	Asphalt Surfaces (zone/traffic markings for drive and parking areas, game lines)	Ext 2.1B - Alkyd Zone/Traffic Marking, Type N	NA	
Exterior	Concrete Vertical Surfaces, Non-Traffic	EXT 3.1A: Latex Over Alkali-Resistant Primer	5	
Exterior	Concrete Horizontal Surfaces - Decks and Stairs, where coated	EXT 3.2D: Alkyd Floor Enamel (Gloss/Sheen as Specified)	6	

Painted Surface Location	Substrate	MPI Paint System Number	MPI Gloss Level	Remarks
Exterior	Concrete Horizontal Surfaces - Parking Areas and Driveways, Game Lines, etc.	EXT 3.2F: Alkyd Zone/Traffic Marking	NA	
Exterior	Gypsum Board Ceilings – (Typical Areas)	EXT 3.3J: Latex Over Alkali-Resistant Primer	2	
Exterior	CONCRETE MASONRY UNITS (CMUs) (Concrete Block and Concrete Brick)	EXT 4.2L: Latex Over Alkali-Resistant Primer	5	Do not paint clay masonry units (bricks)
Exterior	STRUCTURAL STEEL AND METAL FABRICATIONS	EXT 5.3G: Alkyd Over Alkyd Primer	5	
Exterior	GALVANIZED METAL	EXT 5.3L: Alkyd	5	
Interior	CONCRETE MASONRY UNITS (CMUs) (Concrete Block and Concrete Brick)	Precatalyzed water based epoxy MPI #153	5	
Interior	Gypsum Board Walls – (High Touch Areas)	Precatalyzed water based epoxy MPI #153	5	
Interior	Gypsum Board Walls	Precatalyzed water based epoxy MPI #153	1	Large areas where it cannot be touched. Media Center wall
Interior	Gypsum Board Ceilings and Walls (Typical Areas)	INT 9.2A: Latex	5 – Wall 3 - Ceiling	Must have approval from Facilities Management to use
Interior	Gypsum Board Ceilings and Walls (High Moisture Areas)	Precatalyzed water based epoxy MPI #153.	5 – Wall 3 - Ceiling	
Interior	Wood and Hardboard (Paint Finish)	INT 6.4R: Latex	5	

Painted Surface Location	Substrate	MPI Paint System Number	MPI Gloss Level	Remarks
Interior	Woodwork (Clear Finishes)	INT 6.3K: Polyurethane	5	
Interior	Woodwork (Stained Finishes)	INT 6.3E: Polyurethane over stain	5	
Interior	Ferrous Metal	INT 5.1S: Institutional Low Odor/Low VOC Latex System	5	
Interior	Ferrous Metal (Galvanized)	INT 5.3N: Institutional Low Odor/Low VOC Latex System	5	
Interior	Insulation Canvas Jackets	INT 10.1A: Latex	5	Provide anti-fungal additive

DIVISION 10 – SPECIALTIES

SIGNAGE - REVIEW

- A draft signage schedule shall be developed prior to completion of Design Development stage and requires Owner approval. See Appendix D Interior Signage standards.

ROOM NUMBERING SCHEME

- Room numbering shall consist of (3) numbers
- Alpha identifiers shall be included for main corridors, sub-rooms, storage and custodial rooms, public and private toilets, and electrical and telecommunications/data rooms.
- First floor rooms shall be numbered as 100's
- Second floor rooms shall be numbered as 200's
- Third floor rooms shall be numbered as 300's
- Rooms with odd numbers shall be on one side of the hall and rooms with even numbers shall be on the opposite side of the hall.
- Main spaces that include sub-rooms shall include a letter after the main room number to identify the sub-space.
- Private toilets shall be labeled with the room number followed by the letter T.
- Public toilets shall be labeled with the Letter T followed by the room number.
- Main corridors shall be labeled with the letters CR followed by corridor number
- Stairs shall be labeled with the letters ST followed by the stair number.
- Mechanical rooms shall be labeled with the letter M followed by the room number
- Electrical closets shall be labeled with the letter E followed by the room number
- Data/telecommunications closets shall be labeled by the letter D followed by the room number.
- Custodial/janitorial spaces shall be labeled with the letter C followed by the room number.
- Predetermined storage rooms shall be labeled with the room number followed by the letter S
- Vestibule areas shall be labeled with the room number followed by the letter V

ROOM NUMBERING EXAMPLES

ROOM TYPE	EXAMPLE
1st floor classroom	102
2nd floor classroom	202
Sub-room	102A, 102B, etc.
Public toilet	T102
Private toilet	102T
Electrical room	E102
Main Corridor	CR102
Storage room	102S
Custodial room	C102

Telecommunications/Data room	D102
Vestibule	201V
Mechanical room	M102
Stairs	ST1

INDOOR SIGNAGE

- The room numbers and names in the schedule shall match the room numbers and names on the drawings.
- Once the final building layout design is complete, Owner will use Construction Documents to create the Permanent Room Numbering plan. The permanent numbering plan, matched to original plan numbers, will be provided to the designers. Owner assigned Permanent Numbers are to be used in all final numbering of panels, and As-Built Drawings.
- Signs to identify all rooms and spaces shall comply with ADA recommendations as to character proportion and color contrast. Signage shall also meet ANSI and ADA requirements for tactile characters and/or symbols.
- The room number sign shall be permanently affixed.
- Signs shall be mechanically attached to walls using concealed, corrosion resistance metal fasteners with tamper/vandal resistant one-way heads.
- All signs shall have radius corners.
- Room name and number signs shall be located on the wall adjacent to the strike side of the door and centered approximately 5'-0" above the floor. Where there is no wall adjacent to the strike side of the door the signs may be located on the doors.
- Non-Restricted Use Rooms are considered flexible use and subject to change based on current needs. Therefore, the majority of rooms will be permanently designated on signage only by room number. Each room's signage will contain the permanent room number and a 2" tall slot for an insert that allows the school to generate a description of the room's use and occupant as appropriate. (Rooms such as classrooms, special education rooms, computer labs, foreign language, etc.)
- Large gathering spaces shall be identified with signage that reflects its usage: GYMNASIUM, MEDIA CENTER, CAFETERIA, MULTIPURPOSE ROOM, AUDITORIUM, etc.
- Provide one sign each at gymnasium, media center, cafeteria, multipurpose room, and auditorium to read MAXIMUM OCCUPANT LOAD – xxx (AE to verify number and mounting heights of signs).
- In Cafeteria, traffic flow directions shall be identified with signage that reflects desired traffic: ENTRANCE ONLY, EXIT ONLY, ORDER HERE, PAY HERE.
- Dedicated rooms shall have room number and name that reflects its usage: HEALTH, CUSTODIAL, etc.
- Mechanical/Electrical/Utility/Fire Riser (dedicated) rooms shall have signage stating, "NO STORAGE" on doors of closets smaller than 36" wide, 72" high. Signage for all Mechanical/Electrical/Utility closets shall include floor taping of areas in which storage is prohibited, following dimensions of IFC code.

- Restrooms: In elementary and middle schools the signage shall have BOYS or GIRLS on group restrooms and MEN or WOMEN on public restrooms. In high schools the signage shall have MEN or WOMEN. Classroom restrooms shall be called RESTROOM. Faculty restroom shall be called FACULTY/STAFF RESTROOM.
- Each classroom shall have a slide-in sign for installation of the evacuation plan. It does not have to have the word Evacuation Route on it.
- Corridors shall have "Evacuation Route" signs strategically placed around the facility. They shall be the slide in slide out style for 8.5"x11" paper.
- Provide one sign for each stairwell with handicap graphic to read: (All stairs shall be numbered) STAIR #
- Elevator Signage: Provide one sign (WITH 3 SLOTS) in the elevator that reads:
    - IN CASE OF EMERGENCY:
    - #1 Use the Emergency Call Button or Phone to Call for Help
    - #2 If Unable to Reach Someone – Use your Cell Phone to Call:
        - Elevator Company - (XXX)-XXX-XXXX [By Elevator Maintenance Company]
        - 24 Hour Call Center (XXX)-XXX-XXXX
        - Security - (843) 296-2166
    - #3 If you are still unable to Reach Someone: Call 911
    - School Name:
    - School Address:
    - Building Number:
    - Elevator Number:

SPECIAL SECURITY SIGNAGE

- Security Signage is provided to assist first responders in the event of an emergency situation at an unfamiliar school building. A secondary but important value is to assist visitor navigation. <u>All security signage shall be approved by the owner, Executive Director of Security or their designee.</u>
- <u>Exterior door number: a one or two-digit number assigned to each and every exterior door (including mechanical rooms, etc.), or set of doors, affixed to the top right corner of each exterior door (or the right leaf (from the outside) of a set of doors) in 6-inch, cut-out, white, vinyl letters. Every front entrance shall be door #1 and the door numbers shall proceed clockwise around the facility perimeter. For campuses with multiple buildings the main building shall be numbered first for all its doors, followed by the next building, also in a clockwise direction from building to building around the campus. No numbers will be skipped. The numbering will not start over for each building but will continue sequentially throughout the campus so that no door number is repeated on the entire campus, e.g., all buildings at SOA/AcMag and all buildings at the Wando campus. Specific exceptions exist at the West Ashley HS campus where the West Ashley CAS will have its own door numbering and CE Williams MS will have its own door numbering. The same is true at North Charleston HS, where the CAS will have its own, separate door numbers.</u>
- <u>Exterior Doors-Storefront</u>
    - <u>White UV resistant vinyl font Swiss 721 bt 6-inch and body width of number 1-inch.</u>

o Attach numbers to the door in the upper right hand corner of the glass

o For multi leaf doors install on right leaf looking from outside.

· Exterior Doors-Painted Hollow Metal or Smooth Fiberglass

o White UV resistant vinyl font Swiss 721 bt 6-inch and body width of number 1-inch.

o Attach numbers to the door in the upper right hand corner.

o For multi leaf doors install on right leaf looking from outside.

· Exterior Fiberglass Doors-Pebble Finish Fiberglass

o White UV resistant vinyl font Swiss 721bt 6-inch and body width of number 1-inch

o Attach numbers to the door in the upper right hand corner.

o Sign shall be surface mounted using a .040-inch thick aluminum plate. Attach the plate using the door manufacturer's recommended epoxy glue or 3M automotive grade double-sided tape. Lettering shall be 4/6-inch (depends on door frame size) font Swiss 721 bt black in color on a white background. Attach the numbering to the upper right hand corner of the door. Smooth finish FRP doors may use standard vinyl numbers.

- Window labels for each rooms' number shall be 6" and body width of letter 1". Labels shall be placed on the exterior window in the far left corner in a manner to be easily read from the exterior/outside. Rooms with high bay windows shall have decals on their lower windows if present. For mobile units, the classroom numbers on the windows and exterior doors shall begin with a capitol "M". Ex: M101
- AE shall consult with CCSD Security on stairwell numbering.
- A permanent graphic map is fixed to the wall at each key entry location showing the building layout and position of entry. (You are here)
- Directional Way finding Signs are posted at key intersections to provide directions to specific areas of the building
- An Evacuation Map is provided for all spaces and is placed in a durable see through acrylic sleeve mounted on wall at the rooms exit. The map orientation is specific to the layout of the building when exiting the room.
- Provide signs to read: SECURITY CAMERAS ARE IN USE, BUT MAY NOT BE MONITORED AT ALL TIMES. (Place at reception, vending, cafeteria, commons area, and any other room with security cameras).
- Provide signs to be installed on the windows leaf of the main entrance pair of doors and at ALL entrance doors. Decal shall read:
  - Decal 1 (Leaf 1): NOTICE: PERSONS ENTERING THE CAMPUS ARE SUBJECT TO SEARCH PURSUANT TO SOUTH CAROLINA CODE 59-63-1110.
  - Decal 2 (Leaf 2): WELCOME ALL VISITORS ARE REQUIRED TO REPORT TO THE SCHOOL OFFICE
- Provide sign to be installed on the office/reception door window. Decal to read:
  - Decal 3: OFFICE SECURITY CAMERAS ARE IN USE, BUT MAY NOT BE MONITORED AT ALL TIMES.

- Provide two (2) signs to install on each telecommunication and facility security room. All telecommunications and facility security rooms shall be numbered. The numbers shall be coordinated with Owner project manager designee. Sign to read:
- MTR, TR#, or FSR
    - Sensitive Electronic Equipment No Storage Allowed
- On the door to the location of the Emergency Responders Radio Communication (ERRC) equipment place the lettering identified below.
    - White UV resistant vinyl font Swiss 721 bt 4-inch and body width of number 1-inch.
    - Attach letters to the door in the upper right hand corner.

FIRE DOOR SIGNAGE

- Fire door number: a one or two digit number assigned to each and every interior fire door, or set of interior fire doors on a vinyl sticker affixed to the hinge edge of the door in ½-inch-wide by 1-inch-tall black lettering on a white background. The fire doors nearest to the front entrance shall be #1 and the fire door numbers shall proceed clockwise around the facility footprint. For campuses with multiple buildings the main building shall be numbered first for all its fire doors, followed by the next building, also in a clockwise direction from building to building around the campus. No numbers will be skipped. The numbering will not start over for each building but will continue sequentially throughout the campus so that no fire door number is repeated on the entire campus, e.g. all buildings at SOA/AcMag and all buildings at the Wando campus. Specific exceptions exist at the West Ashley HS campus where the West Ashley CAS will have its own fire door numbering and CE Williams MS will have its own fire door numbering. The same is true at North Charleston HS, where the CAS will have its own, separate fire door numbers.

OUTDOOR SIGNAGE

- Post and panel signage shall be exterior, non-illuminated
- Provide sign outside on kitchen receiving door to read: KITCHEN RECEIVING – RING BELL FOR SERVICE

YARD SIGNAGE REQUIREMENTS

- All yard signage shall be shown on a civil drawing showing quantities and locations. Consider combining key entrance, parking, and drop-off signs to suit the site traffic flow. NOTE SIZES SHOWN ARE MINIMUM: AE to review sizes with current code and adjust as required to meet code.
    - 18 by 18 inch yard sign(s) shall read: STUDENT DROP-OFF AND PICK-UP AREA (Place at car entrance)
    - 12 by 18 inch yard sign(s) shall read: BUSES ONLY (Place at bus entrance)
    - 12 by 18 inch yard sign(s) shall read: NO PARKING SCHOOL BUS LOADING (AE to verify number and sign location).
    - 12 by 18 inch yard sign(s) shall read: NO PARKING FIRE LANE (AE to verify number and sign location).
    - 12 by 18 inch yard signs with handicap graphics shall read: RESERVED PARKING (AE to verify number and handicapped parking lot sign locations).

- 12 by 18 inch yard signs shall read: VISITOR PARKING (Place at visitors parking, AE to verify number).
- 12 by 18 inch yard signs shall read: RESERVED PARKING (AE to work with CCSD Security to determine parking lot location and verify total number of parking spaces.)
- 18 by 18 inch yard sign(s) with right or left graphics arrow shall read: ENTRANCE (at main entrance).
- 30 by 30 inch reflective yard sign(s) shall read: STOP (at every vehicle exit).
- Require paint vehicular directional arrows at strategic locations, on the drives
- Require paint vehicular stop lines at every vehicle exits, on the drives.

BUILDING NUMBER SIGNAGE

- Each CCSD building has a unique 4-digit number assigned to it by the Facilities Management Department. If the number is less than 4 digits it will have zeros (0) in front of it. Example: CCSD 0011.
- Every single building on every campus that is constructed as part of a project will be assigned a number.
- The Capital Project Manager (CPM) will request this number(s) depending on how many buildings from the FM Project Manager (FMPM) assigned to the project.
- A sign will be located on the right-hand corner of all four sides of the building. If building shape is complex the FMPM will work with CPM and A/E on placement.
- The signs will be no higher than the first floor of a multi-story structure. On single story structures it will be 18 inches below the roof line. The sign will be 24 inches from the edge of the structure. The exact location will be shown on the architectural drawings.
- Signage shall be 6” high by 24” wide; made of .040 thick aluminum, with two holes punched (centered, left and right, on narrow sides) for anchoring.
- Lettering shall be 4” high; Font - Swiss 721 bt; red in color; on a white reflective background field.
- Anchors #8-#10 by 1 ¼”. Holes ¼ inch should be predrilled into building using ¼” drill bit.
- Screws are #8 x 1 ½”, stainless steel. Screw length may be longer if required,
- The Building number shall appear on the cover sheet of all drawing packages.

SCHOOL LED MARQUEE

- Confirm all LED marquee requirements with IT prior to beginning design.
- LED Marquee shall be located near the main school entrance and setback from the right-of-way in accordance with the County or City sign ordinances. In no case shall the sign be located within fifteen (15) feet of the right-of-way. Marquee Support Structure shall be of material and construction to match the school building
- AE required to show conduit for power and communication cables on electrical drawings.
- LED display shall meet the following:
  - 10 mm outdoor-rated LED matrix display, unless not allowed by municipal ordinance. In such cases, variances will be granted on a case-by-case basis.

- Color Capability: 64K minimum
- Design must be based on 16:9 ratio
- Estimated LED Lifetime: 100,000 + hours
- Single or double-sided display as determined by Owner per site conditions
- Viewing Angle: 90 degrees' horizontal x 40 degrees' vertical (minimum)
- Contrast: 5000:1 (minimum)
- Graphic Capability: Text, graphics, logos, basic animations, multiple font styles and sizes
- Size of Displays: Defined by Owner per site conditions
- External temperature sensor
- Light sensor for automated dimming and brightness control
- Communication Options: Primary physical interface requires fiber to designated TR wall (SM or MM depending on distance). Logical communications via Ethernet. Wireless can be provided only as a back-up but must be capable of security shutdown. Direct connection to local device with password protection for local programming.
- LED Marquee Controller shall comply with the following:
  - Software application with text and graphic displays with modules that support create, schedule, and quickly change the display content.
  - Modules: Message editor, schedule editor, sign previewer, configuration editor, video manager, and on-line interfaces with information providers.
  - PC based Windows application with wireless capability (secondary access, securable)
  - Sign must be able to be manageable remotely.
  - Remote re-boot option preferred.

- Specify a Five (5) YEAR WARRANTY for the complete LED Marquee sign including message center, modules, cabinet, structure and installation.

DIRECTORIES

- Way finding and office directories shall be provided that identify routes to different areas of the campus, i.e. office, auditorium, gymnasium, athletic fields, etc. and shall provide location and option for type to Owner for approval.

VISUAL DISPLAY SURFACES

- Marker Boards: all marker boards shall be magnetic type, provide flag holder brackets at the top of each marker board and map rail at the top of each unit. Porcelain enamel marker boards shall be
  - Balanced, high-pressure-laminated, of 3-ply construction, consisting of face sheet, core material, and backing.
  - Face sheet shall be porcelain enamel clad, stretcher-leveled aluminized steel.
  - Core shall be 3/8-inch particleboard.
  - Backing sheet shall be 0.015-inch thick, aluminum-sheet backing.

- Aluminum pen tray with radius edges.

- Follow Technology Design Specification for Flat Screen Electronic Devices Requirements.
- Tack boards: shall be vinyl-fabric faced with mildew-resistant, washable vinyl fabric, laminated to ¼ inch thick cork sheet, and factory laminated to 3/8-inch thick fiberboard backing. Mount to allow ½ inch behind the board for air flow. Metal trim and accessories for all marker boards shall consist of extruded aluminum. Finish shall be Class II, clear anodic finish. Bottom of boards shall be no more than 34 in. from the finished floor.
- Tack strips: shall be ¼ inch cork with metal trim on all sides. Allow one foot of tack strip in hallway between classrooms for each student not to exceed covering a total of 20% of the wall surface.
- Bulletin Boards and Display Cases: Shall be manufacturer's standard illuminated and non-illuminated for bulletin boards and glass display cases.

CLINIC CUBICAL CURTAINS

- Cubical Curtains shall be launderable and flame resistant.
- Fabrics shall be light tight and fade resistant.
- Curtain tracks shall be extruded aluminum, with satin anodized finish.
- Curtain carriers shall be one-piece nylon glides.
- Fasteners shall be stainless steel.

LOUVERS AND VENTS

- Architectural louvers shall be fixed, extruded aluminum with a high-performance coating finish to match storefront system.
- Specify horizontal, drainable, storm resistant blades unless design dictates otherwise.
- Screens shall be ½-inch aluminum mesh, bird screening. Never specify insect screening at outside air intakes, as they clog frequently and require constant maintenance. If insect barriers are required, specify the proper filters and screening as part of the mechanical equipment.

FLAGPOLES

- Shall be ground-set, with base plate and foundation tube, cone-tapered flagpoles made from aluminum.
- Finish shall be clear anodized, Class 1 (0.7 mils).
- Shall be a height of 25 feet for the main school and 15-20 feet for the flagpoles at the stadium, baseball and softball fields. Each flagpole shall be required to withstand a 155-mph wind velocity.
- Shall have the following fittings:
  - Finial Ball: shall be Aluminum flush-seam, size to match pole butt diameter.
  - Truck: shall be ball bearing, non-fouling, revolving, double-track assembly for main school flagpole and single track for others.
  - Cleats: shall be two, 9-inch cast metal cleats with fasteners.
  - Halyards: shall be two continuous, external with lock for main school flagpole, single halyard for others.

- Flag Snaps: shall be two swivel snaps per stainless steel or brass halyard.

METAL LOCKERS

- All lockers shall have sloped hoods.
- Corridor lockers shall be mounted a minimum of 12” off the floor to allow the floor underneath to be maintained.
- Student Locker sizes shall be as follows:
  - Student Corridor – 12” W x 15” D x 36”H, double tier
  - Kitchen/Coach – 12” W x 15” D x 60”H, single tier
  - For PE:
    - Box – 12” W x 15” D x 12” H, 5 tier
    - Wardrobe – 12” W x 15” D x 30”H, double tier
    - Team Lockers – 15” W x 15” D x 60” H, single tier
    - Women’s Varsity & all Jr. Varsity – 18” W x 18” D x 60” H, single tier
    - Men’s Varsity – 24” W x 18” D x 60” H, single tier

FIRE-PROTECTION SPECIALTIES

- Specify portable fire extinguishers. Mounting brackets and fire extinguisher cabinets shall comply with NFPA 10. Fire extinguishers shall be in recessed cabinets. Fire extinguishers shall be in recessed cabinets and shall include a plunger latch to keep it closed.
- Fire extinguisher locations and coverage shall be based on Multi-purpose dry-chemical type, UL-rated 4-A:60-B:C, 10-pound capacity. Carbon dioxide type shall be UL-rated 10-B:C, 20-pound capacity.
- Fire extinguishers in mechanical rooms and other services spaces shall be wall mounted with bracket. Provide recessed stainless-steel cabinet types in all other locations to suit fire extinguisher type.
- Fire extinguisher cabinets shall be mill finish aluminum and recessed. Specify recessed cabinet, with exposed flat trim, in walls of sufficient depth. Provide semi-recessed cabinet, with 2-1/2 inch rolled edge trim, in walls of shallow depth. Provide surface mounted cabinet, mounted directly on wall, where it is impractical to recess, such as concrete walls. Fire extinguisher to be Contractor furnished and installed to comply with NFPA10.
- Identify fire extinguisher with silk-screened, vertical letters, applied to the cabinet glazing.
- Fire extinguisher cabinets are to be numbered in consecutive order with engraved three-layer laminated plastic, black letters on white background. Nameplates are to be installed on all fire extinguisher cabinets and wall brackets. Program Management shall approve numbering system.

PRE-ENGINEERED WALKWAY COVERS

- Walkway covers shall be aluminum, consisting of extruded aluminum posts, beams and roof deck panels. Deck screws shall be stainless steel, sealed with seals and washers as recommended by manufacturer. All components shall be from one source from a single manufacturer.

- Specify canopy system to be engineered and fabricated to withstand the design loads indicated on the structural drawings to meet the code requirements for the Project. Submit professional engineer's certificate.
- Canopy system shall incorporate an external drainage system for discharge at the ground level. Canopy roof systems shall not slope back towards the school.
- If canopy lighting is required, the conduit and lights shall be run below the roof deck and secured to the structure and not screwed through the roof.
- Finish on all exposed components shall be a fluoropolymer 2-coat system. Color shall match storefront system, when used. Verify color selections with Owner.
- Extended drains shall tie in and terminate to underground storm drainage system. Drainage system shall not discharge onto sidewalks.

OPERABLE WALL SYSTEMS

- Operable Wall Systems shall only be used between the cafeteria/cafetorium and a multi- purpose room.
- Panel wall shall be constructed of welded steel 3 ½ in thick with minimum 16 gauge steel face sheets with panel weight not to exceed 10 lbs. per sf
- Suspension Tracks shall be steel or aluminum with adjustable steel hanger rods.
- Panel walls shall be primed steel, fire-resistant, manually operated, individual panels with mechanically operated bottom sound seals. Panels shall be tested to confirm they have field installed acoustical performance of 42 NC.
- Panel walls shall be factory primed (with manufacturers recommended primer for steel) and painted with an erasable marker paint OR factory primed with 2 coats of pre-catalyzed water based semi-gloss epoxy. Total DFT (dry film thickness) minimum shall be 5 mils or 1.5 mils per coat.
- The floor flatness of the multipurpose room/cafeteria shall be coordinated with the wall manufacturer prior to pouring the concrete.
- Trolley load limit must be 50% higher than the maximum weight of the panel.
- Drawings shall show field-assembled wall above the wall panels to maintain the STC rating from top of wall panel to underside of deck. Indicate all joints in the wall to be sealed and any accessories such as pass doors and marker boards.
- Coordinate requirements for overhead structure with the structural drawings. Verify that the support beam flange is wide enough for the panel manufacturer's support brackets.

ACCORDION FOLDING PARTITIONS

- Specify accordion folding partitions, in lieu of operable wall panels, when room separations are frequent. The partition shall have a minimum STC rating 45 per ASTM E90. Pass doors and wall accessories are not required. Set up shall be quick and easy.

METAL STORAGE SHELVING

- Shelving shall be provided by the General Contractor and shall include installation.
- If shelving is provided by Owner FF&E Coordinator, he/she shall provide the installation vendor.

- Manufactured shelving shall be an open style with front box posts, rear angle posts, metal shelves and sway bracing. Metal shelving shall be used in all custodial areas, lawn equipment storage, elementary school playground yard storage, A/V storage, and textbook storage areas and/or as specifically identified in the Educational Specification.
- Basis of Design product for metal storage shelving shall be Clipper Open Storage Units by Penco, or a comparable product. Unit size shall be 36" to 48" wide, 12" to 18" deep and 87" high. (Width and depth shall vary within this range to meet the requirements of each application.)
- All shelving shall be secured to the wall to prevent tipping.
- Shelf label holders shall be provided.
- Posts and beams shall be fabricated from cold-rolled steel.
- Finish shall be standard gray finish enamel.

TOILET PARTITIONS

- Group toilet partitions, urinal screens and doors shall be solid dark color phenolic.
- Toilet partitions and doors shall be floor and ceiling anchored and overhead braced. Urinal partitions shall be floor and ceiling anchored and overhead braced. Prefabricated toilet partitions and metal partitions are not permitted. Toilet partitions shall be secured with vandal resistant stainless-steel machine screws with expansion anchors at masonry and tile walls and with solid blocking at hollow walls and expansion anchors at other walls. Provide stainless steel or polymer resin base trim to conceal floor anchorage and leveling devices.
- Provide continuous brackets to support compartment panels to each other and to the wall.
- Hardware shall be stainless steel. Specify continuous stainless-steel hinges on stall doors. Door hinges shall be self-closing at all locations. Provide rubber-tipped coat hook/bumper on each stall door.
- Urinal screens shall be provided between adjacent urinals and located next to lavatories. Screens shall be floor and ceiling anchored and overhead braced.
- Partition, door and screen components shall be of the same construction and materials.

TOILET ACCESSORIES

- Toilet accessories manufacturers shall be as shown in Appendix A Basis of Design Manufacturers (deviations are allowed if approved by Owner) and shall be furnished and installed by the Contractor.
- Jumbo roll toilet paper dispensers shall be located in a wall recessed, open-faced stainless-steel cabinet that runs from the floor to 1.5 inches below the horizontal grab bar. It shall be sized so that the toilet paper can easily be changed.
- Typical accessories include but are not limited to the following. The schedule and drawing designation follow each item:
    - Paper Towel Dispenser: PTD
    - Waste Receptacle: WR
    - Toilet Tissue Dispenser: TTD
    - Foam Soap Dispenser: FSD

- Sanitary Napkin Disposal Unit: SNDU
- Grab Bar: GB
- Shelf Unit: SU
- Mirror Unit: MU
- Shower Curtain Rod: SCR
- Shower Curtain: SC
- Folding Shower Seat: FSS.
- Hook Strip: HS.
- Robe Hook: RH.
- Mop and Broom Holder: MBH.
- Warm-Air Dryer: WAD.
- Under lavatory Guard: UG
- Infant Care is Project specific

LAUNDRY

- Athletic laundry equipment for high schools shall include a 60-pound capacity washer-extractor and a 75 pound capacity dryer and be located on an exterior wall. Design to 1 set per 1000 student ratio. The athletic washer and dryer shall require access either direct or via hallway with double door entrance for installation and maintenance.
- Residential heavy-duty washer and dryer hook-ups shall be provided for access by special student programs. In some schools, based on student population, a second hook-up shall be required.

DIVISION 11 – EQUIPMENT

FOOD SERVICE EQUIPMENT

- Coordinate food service equipment requirements with Owner Food Services Executive Director. The Executive Director shall approve food service consultants and the specific project requirements. Kitchen Equipment and schedules shall be developed based on the approved equipment shown in Appendix A: Basis of Design Manufacturers, no deviations allowed.
- Provide separate Food Service drawings for equipment locations and schedules.
- Specify requirement for coordination drawings to include service utility characteristics.
- Specify requirements for operation, maintenance, and parts data.
- Specify startup and testing requirements for food service equipment.
- A /E shall specify that the GC coordinate the kitchen hood design (by the Food Services Consultant) with the kitchen hood manufacturer and the installation by the mechanical subcontractor
    - Specify that the GC shall schedule two separate coordination meetings to include the following disciplines: architect, mechanical and electrical engineer, fire protection engineer, Food Services Consultant (kitchen hood designer), kitchen hood manufacturer, mechanical contractor, BAS vendor, Commissioning Authority, TAB agent and Program Management.
        - The first meeting shall occur after kitchen equipment submittals have been approved.
        - The second meeting shall occur prior to installation and startup of the kitchen hood.
    - The meetings shall be facilitated and documented by the Commissioning Authority
- Program Management shall coordinate a kitchen hood training session for the Owner to be conducted by the mechanical contractor or the hood manufacturer to demonstrate the operation of the kitchen hood.
- Kitchen exhaust hoods, fire-extinguishing systems, fire alarms and disconnects are specified in Divisions 21, 22, 23, 25, and 26.
- Specify a hose bib, reel and floor drain shall be provided in kitchens for the purpose of floor cleaning.

SOUND SYSTEM EQUIPMENT

- Sound system equipment for the Cafetorium shall include two full range column array loudspeakers, one mixer amplifier with dual 70 volt amplifiers, one compact disk player, one wireless microphone system with hand held transmitter with 300 ft. line of sight capability and one rack mounted A/C power distributer.
- Sound System equipment for Middle/High School Football Stadiums shall include 2 full range weather proof and wind resistant speakers, one voice range weather proof long throw horn loudspeaker mounted to poles, one dual channel amplifier with 70-volt transformer outputs, one single rack space mic/liner mixer and one desktop announcers “push to talk” microphone. See Appendix A for Basis of Design Manufacturers.

MEDICAL EQUIPMENT (Outside of Classrooms)

- Medical Equipment wall mounted boxes shall be furnished by the Contractor.

- Stop the Bleed (STB) kits shall be Owner furnished. STB cabinet flush or surface mounted (AE to consult with Owner) shall be furnished by the Contractor. Surface mounted applications shall be 3”x8”x8”. Install cabinets as designated by Director of Nursing in all classrooms.
- AED (Defibrillators) shall be Owner furnished. AED cabinet shall be furnished by the Contractor and be flush mounted in the wall. AED cabinet dimensions are 3”x8”x8”. AED cabinets shall be located on the first floor by the office, near gym/cafeteria/multipurpose rooms and areas where the public is allowed in for exhibits. Minimum of one AED cabinet per floor. Consult with Owner Nursing staff to confirm cabinet size and location during the design process. Installation shall be by contractor and be ADA compliant. Center of cabinet handle shall be installed 48 inches above finished floor. Cabinet shall be equipped with a battery powered alarm.

GYMNASIUM EQUIPMENT

- Athletic equipment shall be aluminum or corrosion resistant steel. Materials shall be factory painted, baked-enamel, and powder-coat finish.
- Anchors, fasteners, fittings, and hardware shall be manufacturer’s standard corrosion-resistant or non-corrodible units; concealed tamperproof, vandal and theft resistant.
- Mounting pads shall be wood, neutral color painted finish.
- Specify deployable gymnasium floor covering with holding rack. Covering shall be 32 oz. or greater, 3 ply, resilient reinforced polyester in a single color.

GYM DIVIDER

- Divider curtains shall be the motorized type using electric power.
- Lower section shall be solid vinyl coated polyester
- Upper section shall be VCP woven mesh.
- Provide anti-bacterial and fungi-resistant treatment.
- Provide heavy duty galvanized steel track, beam clamps, and hanger brackets.
- Carriers shall be 1-1/8 inch diameter nylon tire ball bearing wheels, spaced approximately 12-inches on center.
- Provide tieback straps to secure curtain to wall when not in use.

WALL PADS

- Installed around all walls in wrestling room/practice rooms and on gymnasium walls underneath the goals.
- Wall pads shall be 2-inch thick, 3.5-pound density polyurethane foam bonded to a 7/16-inch thick waferboard, fully wrapped with vinyl coated polyester covering.
- Provide “Z-Clip” attachment at the top of each pad.

LED DISPLAYS

- Specify (2) two LED display scoreboards to be wall mounted on the wall in the main gym of middle and high schools. The scoreboard shall be capable of handling basketball, volleyball and wrestling. Controls shall be wireless. Daktronics Model BB-2103-13 (or current equivalent) may be used as the Basis of Design. Minimum size 8 ft. wide x 6 ft high. See Appendix A for acceptable manufacturers.

BASKETBALL

- The High School main competition basketball backboard for high school gymnasiums shall be not less than ½" thick transparent, tempered glass, 72 by 48 inches width by height, with painted markings and rim-restraining devise.
- The Middle School and Elementary Schools backboards shall be 1-1/2 inches thick composite board fiberglass, 72 by 48 inches width by height, with rounded corners, white background and required markings.
- Provide fixed, non-movable, single-rim basket ring competition goal, with no-tie loops for attaching net to rim without ties.
- Supply nylon, 12-loop-mesh nets between 15" and 18" long. Indoor backboards shall have bottom and side edge protective padding.
- Main interior basketball blackboard mounts shall have safety strips (ASTM standards) only retractable installations.
- Gym equipment shall comply with FIBA International Basketball Federation and NFHS National Federation of State High School Associations.
- Exterior basketball courts shall have (2) two outdoor backstops. Include permanent ground installation in concrete base. In Elementary Schools, provide fixed height basketball goals at 8 feet.
- Sound system shall include six full range loudspeakers, one dual 15" subwoofer with fly points, one dual channel amplifier with 70 volt transformer outputs, one dual channel power amplifier, and one single rack space mic/line mixer. See Appendix A for Basis of Design Manufacturers.

VOLLEYBALL

- Volleyball equipment shall include a chrome-finished steel floor plate and inserts removable, paired post standards with adjustable, telescoping height
- Net shall be 32-feet long with a net tensioning system.
- Volleyball net shall be adjustable between 8 feet and 5 feet to allow volleyball or badminton use.
- Include all accessories for a complete installation.
- Provide wall storage hooks for mounting on wall to store game standards.

BASEBALL, SOCCER, FOOTBALL

- Specify (2) two foul poles for both baseball and softball fields.
- Specify (2) two soccer goals with tip-over proof anchors for new construction
- Specify (2) football goal posts shall be provided if a new field is constructed.

GAME LINES IN ELEMENTARY SCHOOL MULTIPURPOSE ROOM

- Set out of bounds lines shall be four ft. from the walls.
- Adjustable basketball goals shall be directly above the out of bounds lines.
- Foul line shall be 15 ft. to the basketball backboard.
- Remaining lines shall be set in accordance with recognized game and age group standards.

PROJECTION SCREENS

- Use of projection screen shall be limited to large spaces (not for classrooms) and conference spaces. Projection screens shall be:
  - Wall or ceiling mounted
  - Front-projection screens
  - Manually operated (Electrically operated screens, if required for the project, require Owner approval.)
  - Viewing surface shall be vinyl-coated glass-fiber fabric with gain characteristics complying with FS GG-S-00172D (1) for Type C screen surface.
  - Edge treatment shall be black masking borders
  - Screen size shall be approved by Owner or PM.
  - Screen pull rods shall be provided to reach pull bails on screens mounted out of reach.
  - Electrically operated screens (if approved by Owner) shall be UL-labeled units, with 3-position control switch for flush wall mounting. Unit shall have motor in roller with permanently lubricated ball bearings.

LOADING DOCK EQUIPMENT

Loading dock equipment shall include dock bumpers, dock levelers, and truck restraints and a dock plate installation.

RESIDENTIAL APPLIANCES

All residential appliances (kitchen, microwave, refrigerator, laundry appliances) in staff lounges, employee and student break rooms, health rooms and home economics classrooms shall be electric operated, Energy Star rated and the color white.

LABORATORY FUME HOODS

- Fume hoods shall be limited to science labs in high schools. Locations and sizing shall be approved by Owner or PM.
- Coordinate the fume hood selection with the mechanical equipment.
- Coordinate the work surface selection with Division 12 Section “Laboratory Casework.”
- Coordinate safety device requirements and locations with the fume hoods.
- Airflow indicators and alarms shall be in accordance with NFPA 45.

STAGE ACCESS

- All new construction shall have ramp access to stages in auditoriums and cafeterias – no chair lifts are permitted.
- There shall be no stair access to the front of the stage in elementary schools.

STAGE CURTAINS

- Fabrics shall be permanently flame resistant or chemically flame resistant with documentation to be included in close out documents.
- Ensure rated walls with electrical panels are sufficient to maintain wall rating.

- Woven cotton shall be velour curtain products
- Medium weight fabric shall range in weight from 20-25 oz. /linear yard before flame-retardant treatment.
- Shall be Fifty percent (50%) fullness exclusive of turn backs and hems.
- Color shall be as required for the specific project requirements.
- Fabricate steel-tract channels from roll-formed galvanized steel, minimum metal thickness to be adequate to hold 200% of curtain weight and provide seismic restraint.

EQUIPMENT BUDGET GUIDANCE

The following table is a list of equipment for reference only and identifies a partial list of items that are furnished to the Project by either the Construction or the FF&E budget lines. All equipment shall be specified to meet EPA Energy Star standards where applicable.

CONSTRUCTION BUDGET (Cost Account 1.0)	FF&E BUDGET (Cost Account 5.0)
Allowable	**Allowable**
Affixed trophy cases (ms/hs)	Art tables and drawers
Apron racks (science)	Chairs
Choral risers (fixed)	Classroom furniture (typ)
Coat hooks	Concession stand equipment
Computer network	Cots
Curtain tracks and curtains (health rooms)	Desks
Dishwashers (science/high schools only)	File cabinets/with rollers
Door switch	First aid kits-mounted (Contractor installed)
Drinking fountains	Flags (brackets provided on marker boards
Elevator	"Gator" HS - Athletics
Eye wash stations w/shower (clinic & science)	Hospital scales (weight scale)
Fire alarm system	Ironing boards (standing)
Fire extinguishers	Kilns
First aid kits (mounted)	Kindergarten Learning Materials (not toys)
Fixed p/e equip. (v.ball & tennis stanchion inserts)	Microwaves
Flag pole	Music Equipment (other than band)
Folding partitions	Music stands
Hardware (all finish hardware)	HS Outdoor athletic equipment (unfixed)
Hose bibs	Portable choral risers
Ice machines (kitchen only)	Refrigerators-K & lounges
Kitchen equipment	Standing bookcases
Knox box fire key access	Standing storage cases
Lab casework	Tables
Lockers	Training Tables
Marker boards w/map & flag holder	Washer / Dryer
Mirrors	Choral risers (ES & MS) – MOBILE
Padding behind basketball goals	Ice machines - HS Athletics
Power driven backboards	Floor scoreboards - HS Athletics
Projection screen (fixed only – portables in FF&E)	Refrigerators for Home Economics
Retractable bleachers	Wardrobe units (cubbies)
Roll-up doors	**NOT ALLOWABLE**
Safety goggle sterilizers	Aquariums
Science lab tables for MS & HS	Autoclaves
Shop equipment (for CC's)	Centrifuges
Signage (interior/exterior)	Custodial Equipment
Sound proof practice rooms	Media Drop Boxes
Staff mail boxes	Laminating machines
Stage curtains	Lawn tools/equipment
Stage lighting	Maintenance tools/equipment
Stage lighting	Microscopes
Storage shelving	Pencil sharpeners
Tackboards	Playground equipment
Tennis stations and nets	Rolling laundry baskets
Theater rigging	Sewing machines
Time out rooms	Wall Decoration
TV/monitor mounts	Wall mounted ironing boards
	Waste Baskets
	Media Ctr Book Check-out System
	Playgroud fall surfaces
	US Mailbox - Contractor Installed
	Water distiller /deionizer units
	Window blinds
	Stoves / Ranges
	Telephone system

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DIVISION 12 – FURNISHINGS

Division 12 – Furnishings remains under development by Owner personnel at this time. AE's are encouraged to provide comments and suggestions for this division during their review.

AUDIENCE SEATING

- Chair Description: Fully Upholstered Back & Seat, 2 Fabrics: Seat: Culp Hathaway/ Back: Absecon Shire. Fabric to meet California Technical bulletin 117. Zipper Seat Covers. Gravity Lift Seat, Full Fold. Chair widths 19"-24". Back to be 35" high off floor with tufted upholstery on face of back. Wood Aisle Panel. Steel stanchions and foot plate.
- Consult with Owner for fabric color and type prior to specifying
- Chair Envelope (Closed Depth): To maximize seat capacity and egress the closed depth shall not exceed 15.5".
- Steel Stanchions: Minimum 14 gauge and 1/4" steel plate foot. Black Powder Coated.
- Inner Back and Seat Frames: Tubular Steel. Plywood or plastic inner structure is not acceptable. Serpentine springs are unacceptable.
- Back Foam: 5" thick at Lumbar. 2" thick at top.
- Seat Foam: 4.5" thick, cold- cured sculptured molded.
- Aisle Panel: 3/4" Plywood core with finished veneer outer surface with louver top to conceal aisle light in panel.
- Aisle Lights: To be housed in top portion of aisle panel beneath wood louver, protected from contact & collision. Fixture to be UL listed, low voltage, 9 LED deluxe warm white bulbs.
- Armrests: Solid Injection Molded Polyurethane, Black. Armrest security screw required.
- ADA Transfer Panel: Swing away panels. Panels to match all aisle panels and have ADA label.
- Row Letters & Seat Numbers: Black Polymer with white letters. Snap into tamper proof receptacle. No rivets, brads or glued on plates.
- Warranty: 5-year standard warranty on metal, foam, plastic. Steel stanchion warranty 15 years
- Attic Stock: 1% of Total number of installed chairs.
- Sample: Provide Sample Meeting Specification.

DIVISION 13 – SPECIAL CONSTRUCTION

Division 13 – Special Construction remains under development by Owner staff at this time. Included below are the items covered under this division. AE's are encouraged to provide comments and suggestions for these items during their review.

- Walk-in Freezer
- Walk-in Refrigerator
- Weight Room
- Stadium Seating
- Vault
- Mobile Classrooms
- Special Structures
- Sound conditioned rooms (band/performance rooms)
- Kiln Rooms
- Athletic Rooms/Weight Rooms
- Greenhouses
- Metal Building Systems
- Metal Towers (band fields)

DIVISION 14 – CONVEYING SYSTEMS

HYDRAULIC ELEVATORS

- The elevator equipment including controllers proposed for the project identified below shall be Non-Proprietary. See Appendix B for the CCSD Elevator Non-Proprietary Affidavit.
- Hydraulic freight cargo type elevators shall be used for service and passenger applications. Three stop elevators shall be bore hole type. Two stop elevators shall be hole less hydraulic type. Traction and electric elevators are not permitted.
- All elevator equipment and diagnostic systems shall be non-proprietary. A signed affidavit attesting to this shall be provided by the contractor.
- Contractor shall provide 2-year warranty on all parts and labor from date of acceptance of the elevator.
- Elevators shall be full size cabs (7'0" W x 5'1" D) with a rated load of 3000 lbs. Speed shall be 100 FPM.
- Elevators shall comply with the latest edition of ASME A17.1, including recent amendments.
- Shop drawings shall show the project specific machine room layout drawn to scale (not the manufacturer's typical machine room layout) for the building. If modifications to the Contract Documents are required to comply with the Code and/or the elevator manufacturer's requirements, the changes shall be clearly shown on the shop drawings. The final machine room layout, required to meet the elevator code, is the elevator manufacturer's responsibility. If installation results in violations to the elevator code, the Contractor shall be responsible for field corrections at his own expense.
- Elevator machine rooms shall be air-conditioned.
- Traveling cable shall include CAT5e provision for security camera support. Security camera shall be included in package as directed by CCSD Security.
- The elevator manufacturer shall provide signed documents certifying that hoist way, pit and machine room layout, including door location, size and swing, locations and dimension of all wall mounted electrical devices and services, as shown in the Contract Documents, are adequate for the elevator system being provided.
- The Installer shall be an authorized distributor of the equipment to be installed, have 5 years prior experience, have a local service office and a staff of qualified technicians.
- The Installer shall comply with manufacturer's installation instructions and the approved shop drawings. Drill excavation to accommodate plunger-cylinder units in well casings; fill void spaces between cylinder casing and cylinder with corrosion protective filler, or fine sand. Install plunger-cylinder units plumb and accurately centered. Set sills flush with finish floor surface at landings.
- The storage tank shall be constructed of steel and shall be provided with a removable cover containing a removable oil dip stick. The pump and submersible motor shall be mounted on reinforced isolation. The control valve shall be mounted in the discharge line above the oil level and easily accessible from the top of the tank. An air-bladder silencer shall be provided at the control valve discharge. Tank and pump noise shall not be heard outside the machine space.
- Sump pumps shall be provided in all elevator pits. Pump units shall be submersible type.

- Operating System shall be a microprocessor and provide battery-powered lowering if power fails.
- Car Enclosure Requirements:
  - Canopy: 14-gauge steel, powder coated.
  - An emergency exit will be provided as required by code.
  - Ceiling: Downlight ceiling, Island type, #4 Stainless Steel, LED lighting.
  - Front Return Wall(s): 16-gauge #4 Stainless Steel.
  - Transom: 16-gauge #4 Stainless Steel.
  - Car Door(s): #4 Stainless Steel clad.
  - Car Sill(s): Aluminum.
  - Ventilation: Two-speed exhaust fan in car canopy controlled by key switch in car operating panel.
  - Side Walls and Rear Wall:
    - Vertical panel system consisting of palladium rigid sheet permanently bonded to surfaces and beveled edges of particleboard backing material. (Basis of design -- Inpro Corp, color selection by CCSD)
    - Stainless Steel toe kick
    - Stainless Steel reveals, corners, and friezes surrounding panels
  - Handrail(s): #4 flat bar Stainless Steel 1⁄2”x 1 1⁄2” with retuned ends on each wall
  - Infrared curtain unit (ICU) door protection.
  - Accessories: Pad & buttons
  - Entrances
    - Passenger type hoist way entrances with UL label, hollow metal, horizontal sliding doors will be provided.
    - Hoist way Doors: 3’-6” wide by 7’-0” high.
    - Door(s): #4 Stainless Steel
    - Frame finish: 16 ga, #4 Stainless Steel
    - Entrance Columns: 16-gauge #4 Stainless Steel.
    - Car Sill(s): Aluminum.
  - Entrance type and clear opening size will be in accordance with data at the beginning of this proposal.
  - Entrances will include unit frames, flush design door panels, sight guards, dust covers, and necessary hardware.
  - Fascia, hanger covers, toe guards, dust covers, and structural members will be fabricated and finished in accordance with vendor standards.
- Key switch control shall be provided in addition to standard activation.
- Emergency communication systems shall meet ADA requirements. See Appendix E for Emergency Elevator Signage.
- Contractor shall supply elevator pads and hooks for protection to be used by contractor during construction. A new set of pads shall be provided to the Owner upon completion of construction. See Appendix E for emergency signage for the interior of the cab.
- Two-way communication systems outside of elevators in areas of safe refuge shall be coordinated with the CCSD Security.

DIVISION 21 - FIRE SUPPRESSION SYSTEMS

SPECIFY the following for FIRE SUPPRESSION SYSTEMS:

- Basis of Design Manufacturers are shown in Appendix A.
- AE shall locate sprinkler/fire pump rooms on the ground floor with exterior access.
- Use wet pipe sprinkler systems throughout all structures wherever allowed by code. A request to use dry pipe systems in areas not required by code shall be submitted in writing to Owner with clear explanation of why they are necessary for the specific application and shall be approved by Owner prior to proceeding with the design.
    - All out-buildings, including sporting event support structures (press box, concession stands, restroom facilities, etc.) shall be designed to avoid the need for automatic sprinkler protection whenever possible. This shall include, but not be limited to, type of construction, height, separation, compartmentation, etc.
- The AE shall be responsible for obtaining local water system information and coordinating flow test with the local water company and Fire Chief. Fire pumps shall be approved only after providing appropriate supporting calculations and meeting with the local fire department to assess their capabilities and equipment.
- Hydraulic Analysis shall show calculated demand and minimum required water supply required.
- Emergency power supplies for fire pumps or engine driven fire pumps shall only be provided where required by the AHJ or code due to an inadequate or unreliable power source from the utility company serving the Project.
- Art kiln rooms shall be equipped with a smoke/heat detector and sprinkler head as required by code.

DIVISION 22 –PLUMBING

Basis of Design Manufacturers are included in Appendix A.

GENERAL REQUIREMENTS

- All water consuming devices shall exceed minimum IPC requirements by at least 20%.
- All interior water coolers shall include two separate units - one standard height and one handicap. The handicap water cooler shall have a water bottle filler on it. All water coolers shall have filters that meet NSF/ANSI 42 and 53.
- Provide floor drains with trap primers at or near water heaters, dishwashers, emergency showers, teacher lounges, nurse offices, single fixture toilet rooms, media centers with attached kitchens and break areas, and CD classroom near sinks.
- Specify underground and under slab DWV piping as Cast Iron (or PVC if approved by Owner). PVC may be used for sanitary sewer pipe outside the 5-foot building footprint
- Potable water piping under slab may be PEX with Owner's permission (copper is the baseline). Circulating pumps cannot be used with PEX. Above grade domestic water shall be copper as the standard.
- Provide positive freeze protection on all water lines subject to freezing conditions.
- A ball valve shall be included in branch piping to all exterior hose bibs. Where suitable, hose bibs shall be located adjacent to exterior mechanical rooms, dropping branch piping exposed in mechanical room and locating ball valve a maximum of 6 ft. above the finish floor. When the hose bib does not align with a mechanical space on the exterior of the building, the ball valve shall be above an accessible ceiling near the exterior wall and the ceiling grid shall be appropriately marked as to the location of the valve.
- Specify maximum distance of 80 feet of pipe between cleanouts for toilet waste lines. Cleanouts to be accessible from interior of building. Cleanouts to be both at beginning and end of lines.
- All new and existing sanitary drainage systems and storm drain systems to the point of service connection or termination outside the building footprint for storm drainage shall be completely cleared with a plumber's snake and flushed after a building is completed and prior to Substantial Completion.
- Tempered water shall be provided only in areas required by OSF and the plumbing code including, but not limited to kitchen, early childhood, kindergarten, Grade 1, and special needs classrooms.
- Nurses' clinics and lounges shall have stand-alone tank style water heaters for tempered water located near fixtures to avoid need for a recirculation pump. If ADA requirements preclude a deep sink in the counter install a wall mounted ADA accessible sink in clinic. These two areas should not be connected to the building's hot water loop.
- Nurses Clinics shall use a funnel floor drain.
- Pending funding availability, Teacher's Rooms shall have a separate toilet for staff.
- Chrome escutcheon rings shall be used at all exposed ceiling and wall penetrations.

- Isolation valves shall be used in cold water and hot water mains and branch piping so that water can be shut off to each classroom wing, administration area, group toilets, and science classrooms.
- Group toilets shall have metered faucets.
- Contractor shall provide video documentation of pipe interior of all below grade DWV Systems under building slab and on site to the point of service. Video shall document continuous slope and proper drainage (no dips, no crowns). Video should show all mains and branch connections as well as continuous measurement of pipe length.
- Require Contractor to provide photographic documentation of locations (including burial depth) of all below grade water and DWV systems under slab and on site to the point of service.
- Video and photographs are to be included in project closeout documentation.
- Utility Meter shall be located at property line and/or right of way line in non-traffic area.
- Secondary water meters shall be added for cooling towers, mechanical system make up water and irrigation systems. These shall be separate from main building service in order to avoid sewer charges. All water meters shall be connected to the BAS for monitoring and alarm capability.
- The cost of providing the water services, taps, meters, and vaults/boxes shall be part of the Contractor's responsibilities in the Contract Documents.
- Backflow preventer shall be located with the fire riser/main domestic water riser, located inside the building, directly accessible from the exterior.

PLUMBING IDENTIFICATION

- The following identification system shall be used:
- Paint and code all exposed piping in mechanical and boiler rooms with stencil paint, manufactured stick on or wrap around systems. Piping shall have flow arrows and labels located at 10 ft. intervals, at all turns and at each floor or wall penetration:
- Locate and color code pipe markers and flow arrows as follows:
    - Maximum of 25 ft. and closer if congested
    - Near each change in direction
    - Near each valve
    - Near each branch
    - Near equipment
    - Near origination and termination points
    - Near where pipe passes through walls (on both sides of wall)
    - Near access doors
    - Cold Water – dark blue
    - Hot Water – dark red
    - Gas Lines – Yellow

- Ceiling valve marker for valves shall be located above **and below** lay-in ceilings. Attach valve marker to adjacent ceiling grid.
- Above ceiling valve markers: ½ inch diameter self-adhesive color-coded circle. Color code as listed above for system served.
- Below ceiling valve markers: Engraved Phenolic Plastic Nameplates, ¾" tall black surface with ¼" tall white lettering

PLUMBING FIXTURES

- Main domestic water heaters shall be located on ground floor on a slab. Any room containing water heaters shall have a minimum installed clearance recommended by manufacturer. Doorways in rooms with water heaters shall have a minimum clearance of the width of fixture plus 6 inches to replace water heaters.
- AE shall perform a life cycle analysis between a water heater with a tank vs. tankless to determine what unit should be used in the facility. Tankless water heaters are the first choice for the kitchen hot water supply.
- Specify vandal-proof options for all fixtures used by students. This includes but is not limited to handle screws, aerators, showerheads, and water coolers.
- Water closets shall be floor mounted. Specify floor mounted elongated bowl water closets.
- Dimension all floor drain locations on drawings.
- Washer box shall be for all residential type washing machines with cold water, hot water, and drain for both commercial and residential use.
- Shower valves shall have single handle, scald proof control.
- Group restroom urinals and water closets shall be double A or C alkaline battery-operated diaphragm type flush valve, Zurn or Owner approved equal, that are fully compatible with a flush handle if it is needed. See Appendix A for Basis of Design Manufacturers. Public toilets and individual classroom toilets shall have manual type angle control-stop valve with vacuum breaker. Bathroom sink faucets shall be vandal resistant metering type. Faucets with handles or wrist blades are required for lab sinks, art rooms and kitchens
- Specify mop sinks with stainless steel wall protection on all sides. Floor mounted mop sinks shall be pre-cast stone and wall mounted mop sinks shall be cast iron.
- Provide hose bib inside a lock box in group restrooms.
- Fixtures in classrooms shall have faucet necks centered over the drain hole of the sink.
- Classroom restrooms and classroom sinks shall have wall mounted soap and paper towel dispensers provided by Contractor.
- Public use and staff restrooms shall have electric hand dryers and wall mounted soap dispensers.
- Provide clay traps in art room sinks.
- Provide group or multi-user wash fountains in group toilets.
- Show on drawings a freeze proof yard hydrant on a pedestal on the roof within 50 feet of any roof mounted HVAC equipment that shall require routine indoor and outdoor coil cleaning. Hydrant shall be structurally supported such that it is not able to move more than 1/8th inch maximum.

- In lieu of bubblers on sinks in classrooms a deck mounted single glass filler with rubber bumper may be used. It must meet ADA ANSI/ICC A117.1.

DIVISION 23 - HEATING, VENTILATING & AIR-CONDITIONING

GENERAL REQUIREMENTS

- Building Design should not require smoke evacuation. If required, a separate smoke evacuation system shall be engineered. Automated doors shall not serve as smoke evacuation air intake.
- Prior to HVAC equipment selection a meeting shall be coordinated by the AE to facilitate the integration of proposed equipment manufacturer factory installed controls with CCSD BAS system.
- Diversity: All HVAC systems having central plant equipment, such as chilled water cooling, hot water heating, variable air volume systems, water source heat pump system, cooling towers, boilers, pumps, piping, and associated equipment shall be sized using industry prescribed diversity factors or actual central system/building design loads. When diversity is not used to design the central system equipment, copies of the load design software input and output reports along with a written justification accompanied with appropriate energy and economic analysis to justify not providing diversity in the central equipment sizing shall be provided to Program Management for approval.
- Acoustics: Design, calculation and measurement shall demonstrate compliance with the HVAC background noise level requirements of not more than 45 dBA for major renovations. New Construction shall demonstrate compliance with the current edition of ANSI/ASA S12.60 – "Acoustical Performance Criteria, Design Requirements and Guidelines for Schools."
- All HVAC equipment selections shall include pleated, extended media MERV 13 filters with a minimum thickness of 2 inches. If the proposed HVAC equipment cannot accept MERV 13 filters, a complete engineering analysis demonstrating that a combination of increased outside air ventilation greater than code minimum, plus filtration at the proposed MERV rating plus the application of additional air cleaning technologies will perform equal to or better than code minimum ventilation plus MERV 13 filters and remove an equal amount of PM 2.5 from the recirculated air serving the occupied space. The analysis shall show that the proposed solution also provides equal to or better energy efficiency. The Owner has adopted an equipment labeling convention that includes the 4-digit building number in the equipment label.
- The labeling of Roof Top Units Name shall agree with the A/E designed mechanical equipment schedule. The tag shall be 6" x 4" black background with 1" white lettering.
- The Owner and Program Manager will schedule a meeting with the Owner's BAS contractor as soon as the system type has been selected. The BAS contractor will work with the Mechanical Engineer to ensure seamless integration of the controls and the mechanical equipment. The Program Management Project Manager and Mechanical Engineer shall submit written documentation confirming the consultations with the BAS contractor.
- Elevator machine rooms shall be air-conditioned.

EQUIPMENT LOCATION / ACCESSIBILITY / SERVICE

Specify the location and accessibility of HVAC equipment as follows:

- Equipment and systems shall be designed and located so that Owner personnel may conduct routine maintenance with minimal interference to the daily operations of the facility.
- All HVAC equipment shall be installed per manufacturer's recommended clearance guidelines with sufficient space for maintenance personnel to change filters and pull coils.

- All HVAC equipment shall be installed to provide sufficient space for Test and Balance (TAB) and Controls personnel to access control valves and panels.
- All multiple split system condensers mounted on the roof contiguous to each other shall be set on a rail system
- Equipment (except VAVs) shall not be located in ceilings or in areas where a ladder is required for access or height presents obstacles to maintenance.
- VAVs shall be located in the classroom ceiling right inside the doorway for easy access.
- Roof mounted equipment shall be designed and located so that fall protection is not required and be accessible by a full-sized staircase or elevator. In buildings with pitched roofs, equipment shall be located under the roof and in conditioned attic spaces accessible by stairs. The design must allow for removal of equipment without modifications to the building structure. Ladder access to units in attics is not permitted.
- Electrical outlets shall be installed within 25 feet of HVAC roof top equipment.
- Condensate floor drains shall be accessible from the front of the unit. The condensate drain system shall not be tied directly into the roof drainage system and it shall not allow water from the roof or storm drainage system to enter the building.
- Expansion tanks shall be bladder type.
- Equipment, mechanical and electrical rooms shall provide consistency in layout and service requirements. A layout shall be provided to Owner for review and approval prior to fabrication or installation.
- Quick disconnects shall be used on all power, water, control and duct connections.
- MEP design drawings shall contain a note telling contractor not to install electrical disconnects on the equipment identification tag. Do not mount disconnects on any equipment access cover or obscure any unit nomenclature or nameplates
- Cooling Towers: shall be located on the ground unless impractical and/or prohibited by the BAR.
- Boilers and Loop pumps shall be located in the main mechanical room, which shall be located adjacent to cooling towers.
- MTR and Security Systems: Shall be located in separate but adjacent rooms. No piping to be installed above MTR room.
- Musical Instrument Storage: Rooms containing band equipment shall be conditioned like occupied spaces.

CLIMATIC DESIGN INFORMATION

- The following Climatic Design Information shall be used for the design of all HVAC systems (Based on ASHRAE Handbook of Fundamentals, 2013 Edition, Chapter 14, Climatic Design Information for Charleston, SC):
    - Summer: 92.1 Dry Bulb Degrees F, 77.6 Mean Coincident Wet Bulb Degrees F (ASHRAE 1% Condition)
    - Winter: 27.3 Degrees F Dry Bulb (ASHRAE 99.6% Condition)
    - Summer outdoor air dehumidification for ventilation: Outside condition: 78.9 Dew Point Degrees F, 84.4 Dry Mean Coincident Dry Bulb Degrees F (ASHRAE 0.4% Condition). Note

outdoor ventilation air shall be cooled and dehumidified to approximately 48 to 50 Degrees F Dew Point Degrees F by dedicated outdoor air units before delivery to the occupied spaces. In the winter, the entering outdoor air shall be heated to approximately 65 to 70 Degrees F Dry Bulb before delivery to the occupied spaces.

EQUIPMENT SELECTION AND SIZING

- For planning purposes, HVAC Equipment for Elementary and Middle schools shall be Air Cooled DX, however if the design exceeds two stories, a water source system shall be used. High Schools and CAS facilities shall be decided on a case-by-case basis. Water Source Systems may be considered if presented to Owner in a BOD with a life cycle cost analysis or other analysis that indicates it is the best alternative for that facility. All units shall have standard 24-volt control circuit and web-based controls capability.
- Provide BACnet building automation system interface between manufacturer's unit controls and Owner BAS. Interface shall provide Owner BAS access and ability to manipulate all of manufacturer's adjustable set points and alarms.
- Coils shall be constructed with copper or aluminum tubing with aluminum fins. All condensate drain pans shall be stainless steel.
- Water Source Heat Pumps (WSHPs) shall be specified as high efficiency (Minimum 18 EER at standard ARI conditions) using R410a. No auxiliary heat other than the heat pump operation shall be provided for wintertime operation.
- Load match pump and piping systems should be considered to reduce cost and operation of a hydronic system.
- All water piping systems shall be designed with isolation valves provided to provide isolation capabilities per floor and per wing shutdown. Isolation valves may be designed as full port ball valves or butterfly type. Valves shall be labeled below and above ceiling with phenolic tags.
- All coils receiving outdoor air (air cooled condensing units, dedicated outdoor air unit coils handling 100% outdoor air, etc.) shall have a factory applied, industry standard 5000-hour salt spray tested seacoast coil coating. Application shall ensure entire coil and fin surface are coated and shall take place during manufacturing process and not on site. If available, the cabinets shall also be factory coated in addition to the standard process.
- Multiple compressor units shall utilize multiple independent refrigerant circuits.
- All units equipped with semi-hermetic compressors shall have oil protection.
- Penetrations thru the sidewalls shall have proper sleeve and be properly sealed.
- All refrigerant lines shall be appropriately sealed when installed and charged with nitrogen after installation, during construction and prior to start-up.
- Designs shall minimize refrigerant line set length on split systems.
- Sewer vents shall be located at least the minimum code required distance from any fresh air intake.
- Direct drive equipment with variable speed drives shall be used for all air handling fans (unless not offered). Any units with belt drive systems shall include a requirement that an extra belt be provided at closeout.

- Specify one extra fuse be provided in each fused disconnect at closeout. Electrical disconnects shall be non-fused unless otherwise required by the electrical code.
- All 3-Phase equipment shall have phase loss / brownout protection.
- All refrigerant systems shall have low and high-pressure switches, not a loss of charge switch.
- All control transformers shall have separate internal fuses or circuit breakers with manual resets.
- Variable speed drives shall be specified on all pumps and fans with motors greater than or equal to 5 horsepower.
- Standing seam Galvalume roof (or Owner approved equal) shall be used on outdoor air units and large air handlers that are constructed of cabinets by individual panels. Single-ply roofing systems or coating systems are not allowed.

AIR COOLED REFRIGERANT (DX) BASED HVAC SYSTEMS

- Systems serving classrooms, cafeterias, media centers, gymnasiums, and other stand-alone spaces shall be Air to Air Direct Expansion (DX) based systems consisting of a combination of split system heat pumps and packaged rooftop heat pumps.
- Units shall have variable speed fans and utilize multi-speed compressors or compressor capacity control to match the load in the space down to a minimum of 30% of design full load capacity (or manufacturers lowest capacity if lower than 30%) to better match loads in space year-round under part load conditions.
- Units shall be provided with economizers and heat recovery only where required by the most currently adopted SC energy code. Consult with Owner Energy Manager before beginning design.
- Ventilation air shall be provided by de-coupled dedicated outdoor air system (DOAS) ducted directly to the spaces (See DOAS requirements below). All HVAC units shall meet the minimum requirements of ASHRAE 90.1 and ASHRAE 62, latest edition adopted by OSF or more current if the facility is seeking certification under a building performance rating system that uses a more current code.
- For single story spaces with flat roofs, or the second story of a two-story building, each classroom shall be fed by individual rooftop heat pumps.
- First floor classrooms in multi-story buildings shall be served by individual split system heat pumps with the air handling units located in mechanical closets at the classroom with service access from the corridor. Air handling units suspended from the ceiling are not permitted.
- Condensing units shall be located on the ground or on equipment rails on the roof if ground space is not available or length of refrigerant lines is not practical.
- Packaged Rooftop DX VAV units shall be specified for the administrative areas with individual VAV boxes equipped with electric SCR controlled reheat serving each space served.
- The VAV unit may either take in outdoor air through the unit or be served by a ventilation air unit at the option of the designer.
- Design discharge air temperature for the packaged rooftop VAV units shall be 52 degrees off the coil during the cooling season

- Manufacturer recommended maintenance access space shall be incorporated into the design and shall be coordinated with the Architect and other disciplines and shall be clearly shown on the design documents for each trade (i.e. reflected ceiling plans, electrical plans, fire protection, etc.).
- Evaporator and condenser coil shall be coated with a coastal environment protective coating.

VENTILATION (DOAS)

- The use of VRF equipment shall be approved by the Director of Engineering.
- Packaged Dedicated Outdoor Air Systems (DOAS) shall be specified for areas of high occupancy (multiple classroom spaces, multi-purpose/cafeteria, media center, etc.).
- DOAS shall have a duct sensor (temp or humidity) installed that will shut down the unit and send an alarm to the BAS if unit fails to meet dewpoints.
- DOAS shall be located, zoned and sized, where possible, to minimize the need to employ heat recovery devices such as plate heat exchangers and enthalpy wheels in the DOAS.
- All spaces served by the ventilation air units shall be equipped with temperature, CO2 and humidity sensors to allow for demand ventilation based on building occupant CO2 levels (800 PPM max) and manage building humidity levels during both occupied and unoccupied modes. Space temperature, humidistats, and CO2 sensors may be combined into a single wall device.
- The DOAS wheel, supply and exhaust fans shall be equipped with VFD's and the unit shall be capable of modulation down to 50% of the rated design CFM for demand ventilation.
- The DOAS exhaust fan shall be modulated to maintain a positive building static pressure of approximately 0.05" water column which can be adjusted as required by BAS.
- The DOAS shall deliver dry and slightly sub-cooled ventilation air ducted to each space. Ventilation shall not be ducted into the return air duct of the terminal HVAC unit serving the space (such as a heat pump or fan coil unit). Air shall be ducted from the DOAS units directly to each space through ceiling diffusers.
- Option 1: Outside air for ventilation and humidity control shall be provided by Dedicated Outdoor Air Systems (DOAS) designed to provide discharge air in a range of temperatures from cold to neutral 65 – 70 degrees based on the Project specific written Sequence of Operation using a linear supply air temperature reset schedule and to deliver no lower than 48 Deg F apparatus dew point air to handle the latent load of the outdoor air on a design day and to handle some of the people latent load within the building. Design day outdoor air conditions shall be dew point 78.9 DP @ 84.4 degrees F mean coincident DB. However, if space design conditions require a dew point lower than 48 degrees, written justification must be provided.
- Option 2: Summer design supply air conditions for the DOAS shall be 70 degrees F DB max at 55 degrees DB min (adjustable from the BAS) with dew point 78.9 DP @ 84.4 degrees F mean coincident DB entering outside air conditions. Supply air apparatus dew point shall be 44 degrees F.
- The gas fired heating section (or SCR controlled electric reheat where gas is not available) shall be sized to deliver 70-degree air at the rated airflow with 20 degree entering outside air (53 degree rise minimum).
- DOAS shall be provided with economizer mode of operation – with bypass dampers provided as required depending on the unit manufacturer.

- Provide BACnet building automation system interface between manufacturer's DOAS unit controls and Owner BAS. Interface shall provide Owner BAS access and ability to manipulate all of manufacturer's adjustable set points and alarms.
- Owner BAS vendor shall provide BAS controllers to the DOAS manufacturer's factory for mounting and wiring at the factory.
- All floors of DOAS units shall be specified as aluminum or stainless-steel plate type for corrosion resistance.
- DOAS units shall include energy recovery where required by the most currently adopted SC energy code), be capable of varying outdoor air volume based on CO2, variable speed supply and exhaust fans, hot gas reheat and outside air and return air dampers.
- Fan arrays shall require individual disconnects.

COOLING TOWERS (IF WATER SOURCE HVAC IS USED)

- Two closed circuit evaporative coolers or one evaporative cooler with two independent cells shall be provided for loop water heat rejection.
- CTs with standard coils shall be sized for two cells at 35% of the total connected equipment heat of rejection load or optionally 50% of the building's calculated block load (or the simultaneous peak load) considering diversity to provide partial redundancy. Variances from this requirement require A/E to provide calculations and narrative explaining design rationale. A/E must receive Owner approval for any variances from this requirement.
- The block load shall be the maximum simultaneous load the water loop is expected to see at any one time during the year and shall be based on an 8760 hour per year software-based energy and HVAC load analysis of the facility based on the set points and operating schedules expected at the Project.
- CTs casings, pans, hardware and fasteners shall be of all stainless-steel construction (fiberglass shall not be accepted). Heat exchanger shall be either stainless steel or galvanized steel (G180 type).
- Open towers, plate and frame heat exchangers and primary/secondary pumping arrangements are not allowed.
- Separate Sidestream filters shall be provided for all Cooling Tower basins and for all Water Source Heat Pump loop piping systems at each school.
- Sidestream filters shall use the centrifugal separation principle of operation and shall operate continuously when systems are operating.
- Sidestream filters shall be selected for 10% of the system's total flow (10% Basin Pump flow for cooling tower basins and 10% of the loop water pump flow for the loop side of the system) and shall be selected to filter particles from the system that are 10 microns in size or larger. Evacuation of separated solids shall be accomplished automatically by the use of an electrically-actuated purge valve programmed at appropriate intervals and duration in order to efficiently and regularly purge solids from the separator's collection chamber. The purge pipe shall discharge into the nearest floor drain. This valve shall be monitored and controlled by the Building Automation System.
- CTs shall be sized based on industry standard diversity factors such as those found in the Daikin/McQuay (Example, not required to use Daikin/McQuay equipment) water source heat

pump design guidelines. In no case shall Evaporative Coolers be sized based on the total connected heat of rejection load of all equipment connected to the loop. This requirement to use system diversity in central equipment diversity shall also apply to the sizing of loop water pumps, system water heaters/boilers, pumps and piping mains.

- All CTs shall have two direct driven, variable speed fans and two motors with variable speed drives and two independent tower spray pumps independently controlled. All CT VFDs, control relays and contactors shall be located in the mechanical room.
- All CT shall have ladder and access platforms for maintenance and service. All CTs shall be specified with a swing arm hoist rated (for weight) to maintain all components of tower.
- A Water meter shall be installed on tower feed water and connected to the BAS. Once an expected average evaporation and bleed flow rate is established, an alarm shall be set to notify when flow rate is exceeded for more than 15 minutes any time throughout the year.
- Provide electronic flow meters on all water source heat pump loops connected to the BAS and displayed on the BAS system graphic.

BOILERS

- Facility shall have two (2) high efficiency gas fired, fully modulating condensing Boilers
- Each Boiler shall be required to be ASME pressure certified.
- Boilers shall be sized at 60% of the Block design heat load to add heat to the water loop. See notes regarding diversity sizing of Cooling Towers above. Variances from this requirement require A/E to provide calculations and narrative explaining design rationale. AE must receive Owner approval for any variances from this requirement.
- The total capacity of the Boilers shall not be greater than 75% of the total connected heat of absorption of the equipment connected to the loop and in most cases can be substantially smaller (as small as 25% of the total connected heat of absorption). Variances from this requirement require A/E to provide calculations and narrative explaining design rationale. A/E must receive Owner approval for any variances from this requirement.
- Provide BACnet building automation system interface between manufacturer's unit controls and Owner BAS. Interface shall provide Owner BAS access and ability to manipulate all of manufacturer's adjustable set points and alarms.

PUMPS

- Water shall be circulated to the heat pump units through a variable flow distribution loop fed by two base mounted centrifugal pumps, each sized for 100% of the block load for full redundancy. Each pump shall have a variable frequency drive for variable flow operation. Variances from this requirement require A/E to provide calculations and narrative explaining design rationale. A/E must receive Owner approval for any variances from this requirement.
- All hydronic systems shall have main and standby pumps. See direction for sizing and system diversity indicated under Cooling Towers section.
- <u>All pump motor electrical connections shall use split nuts.</u>

VENTILATION FANS

- Specify low speed, high volume, no-cage fans in big box spaces (cafeteria, multi-purpose, gyms, media, and auditoriums.) Basis of Design is Big Ass Fans Essence (E1). The fan shall be

furnished with standard mounting hardware and all required accessories as manufactured by Big Ass Fan Company or approved equal. If Big Ass Fans is selected A/E shall request equipment with logo only no verbiage (I.e., donkey visual without words Big Ass Fans.)

OCCUPANCY SCHEDULES

- Occupancy Schedules shall be determined on a Project Specific basis.

SPECIAL REQUIREMENTS BY SPACE

MECHANICAL CLOSETS

- Shall be laid out and designed with the same configuration throughout a project including, but not limited to, location of service clearance, valves, and electrical connections, electrical disconnects, control panels, filter sizes and access. Minimum clearances in the closets shall be 3' around the services sides (a minimum of two sides of unit, one side may be measured with closet door opened).

OFFICES/CLINICS

- Clinics shall have negative pressure to surrounding areas. See note above regarding equipment sizing when not utilizing DOAS units.

CORRIDORS, ENTRY SPACES, AND ATRIA

- Corridors, entry ways, security vestibules, and atriums shall be tempered as necessary to maintain a maximum of 76 degrees in cooling and a minimum of 65 degrees in heating in occupied mode.
- Tempering for first floor corridors shall use air from classroom units or DOAS units. For multi-story buildings corridors and atrium shall be conditioned separately.

KITCHENS

- There shall be two (2) HVAC zones in the kitchen:
  - Cooking / Prep Area
  - Managers Office and Dry Storage
- A/E shall coordinate kitchen hood with Food Service designer. Hood shall be designed by food service designer and installed by mechanical contractor.
- Rooftop kitchen exhaust fans shall be hinged with sufficient length on the electrical connection so that the fan can be easily moved (tipped) for cleaning and maintenance. Consider kitchen hood make up requirements in selection of HVAC units to serve kitchen and cafeteria.

GROUP TOILETS

The A/E shall establish a negative pressure in these areas and ensure use of direct drive exhaust fans to serve these spaces.

INDIVIDUAL TOILETS

Ceiling mounted exhaust fans shall be acceptable ducted to the outside of the building.

TELECOM ROOMS (TR), MAIN TELECOM ROOM (MTR), AND FACILITY SECURITY ROOMS

- All MTR and TR rooms shall be served by dedicated, air cooled cooling only units equipped with low ambient control and a backup exhaust fan controlled by a line voltage thermostat set to 80 degrees in the event of cooling equipment failure. This fan shall be a minimum of 600 CFM or

shall provide the room with a minimum of 10 air changes per hour, whichever is greater. Systems to operate 24/7/365 as required to meet set points.

- TRs and MTRs shall be designed with a raised threshold, walls from the floor to the bottom of floor or roof deck above, with all penetrations sealed to prevent free air return from adjacent spaces.
- Do not connect condensate drains in these areas to other drain systems; pipe directly to outside.
- No piping to be installed above MTR rooms.
- Provide BACnet building automation system interface between manufacturer's TR and MTR HVAC unit controls and Owner BAS. Interface shall provide Owner BAS access and ability to manipulate all of manufacturer's adjustable set points and alarms.
- The size of the dedicated unit shall be sufficient to accommodate the heat generated by the equipment. Refer to the Technology Design Specifications and Facility Security Access Control, Intrusion Detection, and Surveillance Design Specifications as provided in Division 27 for requirements.

INDOOR ENVIRONMENTAL QUALITY

- Temperature - The HVAC systems and BAS shall be capable of maintaining space temperature set points within 2 degrees F (plus or minus) head to foot and from space to space.
    - Set Points - Occupied
        - Indoor cooling shall be 73 Degrees F
        - Indoor heating shall be 70 Degrees F
    - Set Points - Unoccupied
        - Indoor Cooling Set shall be 84 Degrees F
        - Indoor Heating Set shall be 60 Degrees F
- Humidity - Indoor Relative Humidity shall range between 40% and 60% with a design indoor relative humidity of 55%.
- Airflow - Airflow shall be designed in accordance with ASHRAE Handbook, ASHRAE STD 55.1, and STD 62.1.
- Acoustical requirements - Noise levels in classrooms shall not exceed 25 NC (noise criteria).

VIBRATION REQUIREMENTS

- Rotating or vibrating equipment shall be provided with properly sized vibration isolators either as part of the manufactured piece of equipment or as an added component.
- All pumps shall be provided with flexible pipe connections.
- Air handling equipment shall have flexible duct connections (and flexible pipe connections if connected to a piping system).

SEISMIC REQUIREMENTS

Seismic restraint and isolation shall be provided in accordance with the currently adopted code. Seismic, wind restraint, and structural performance criteria shall refer to the structural engineer's drawings.

EQUIPMENT START-UP

- All major/large systems shall have a factory start-up performed by manufacturer trained, certified representative in the direct employ of the manufacturer.
- Provide 48-hour notice of system start-ups of major HVAC equipment to CCSD HVAC shop Foreman.
- All systems shall be labeled correctly and be in agreement with the BAS system.
- All units shall have a factory start up sheet completed (hard copies and PDF) provided in the project close out documents.
- Startup sheets shall include the locations of all supply air, return air, outdoor air and exhaust air-balancing devices.
- Contractor shall change filters on all systems prior to Test and Balance and prior to Owner Occupancy and at any other time if filter condition warrants.
- Water treatment shall begin as soon as the system is flushed of construction debris to the satisfaction of the Commissioning Agent.

SYSTEMS, MATERIALS AND EQUIPMENT NOT ALLOWED

- Fibrous duct liner and duct board
- Copper gas lines
- Condensate pumps are not allowed except for ductless mini split style units.
- Step-up or step-down transformers are not allowed on the input or line voltage side of units. This does not apply to factory-mounted transformers internal to the units.
- No refrigerant piping shall be run in floors, walls or under slab except for penetrations.
- Do not re-use any existing refrigerant lines.

HVAC PIPING SYSTEMS

- Piping for HVAC systems greater than or equal to 2 ½ inches shall be Schedule 40, ERW black steel with either welded or screwed joints. Piping shall be from a domestic manufacturer.
- Condensate lines from AHU's and fan coil units shall be type "L" copper. PVC piping is not allowed for Condensate lines from AHU's and fan coil units.
- Cold water lines and chilled water / hot water run outs less than or equal to 2 inches shall be type "K" copper with soldered joints. (Propress or Owner approved equal may be used for domestic potable water systems in addition to solder joints for copper pipes.)
- PEX shall be considered for under slab domestic water supply with Owner Approval.
- All exposed piping (insulated and uninsulated) shall be painted and color coded.
- Piping shall be color coded as follows with flow arrows and labels located at 10-foot intervals, at all turns, and at each floor or wall penetration:
    - Chilled water - Light Blue
    - Hot water - Light Red
    - Dual Temperature - Orange

- Make up water - Dark Blue
- Condenser lines - Green
- Gas Lines - Yellow

- Chilled water piping shall be insulated cellular glass and flexible elastomeric above ground with manufacturer's recommended factory applied jacket. Thickness per code or whatever is greater. Aluminum or stainless-steel jacketing shall be used for exterior exposed piping.
- Chilled water piping shall be insulated cellular glass below ground.
- Contractor shall dimension actual location of all underground piping on as-built drawings. A minimum of two (2) dimensions from building reference points shall be provided and a bury depth indicated.
- All underground lines shall be marked with a bright colored continuous plastic tape on top of the line. Underground tape shall be detectable type.
- All underground steel piping shall be double wall with HDPE covering and have cathodic protection.
- All piping systems shall be thoroughly flushed, chemically cleaned and filled with appropriately treated water/fluid before placing into operation.
- Hydronic systems shall be connected to bypass all HVAC units and equipment before cleaning and flushing begins and then flushed and the filters cleaned out at least three (3) times before the units are connected to the system and placed in operation. Remove startup filters from pump suction strainers once cleaning and flushing operations are complete and before TAB.
- Provide shut-off valves for all hydronic mains at all take-offs to mechanical rooms and pump rooms.
- Automatic flow control devices shall be used on all hydronic systems
- All Cooling Towers shall be completely cleaned and flushed after all systems are in operation and the site work has been completed prior to turning over to Owner. (AE shall approve flushing procedures and the Engineer shall be present at flushing).
- Sectional shut off valves shall be provided at the supply and return side of all equipment to allow for shut off of a section of piping for repair.
- All damper operators, control and service valves shall be installed such that they can be serviced by personnel standing on the floor of the mechanical room.
- The water source heat pump condenser water loop shall not be insulated.

DUCTWORK

- All duct shall be galvanized metal except:
  - Run-outs to VAV boxes and air distribution devices, flexible duct is allowed – maximum 6 foot length.
  - Kitchen – use stainless steel with welded joints for kitchen hood and dishwasher exhaust.
- During construction, ducts and equipment openings shall be sealed at all openings to protect the duct from construction dust/debris.

- All mechanical systems and equipment shall be inspected before start-up and at final inspection as to the cleanliness; units shall be in “like new” condition and any coils, covers, grills, etc. shall be free from damage.
- Minimize use of exposed ductwork. When exposed ductwork is used (gyms, etc.) it shall be heavy duty double wall spiral dark grey or unpainted
- Insulate all ductwork. Duct insulation thickness shall be 2” minimum or as required by currently adopted SC energy code, whichever is thicker.
- Duct insulation that gets wet shall be removed and replaced.
- All duct shall be constructed to SMACNA seal to Class “A”. All duct shall meet SMACNA Duct Construction Standards for Metal and Flexible Ducts.

REGISTERS AND DIFFUSERS

- Shall use 4-way adjustable volume diffusers
- Shall use aluminum grilles, registers and diffusers in all locations unless steel is required by fire codes.
- Return Air filter grilles shall be used where practical. Areas with high ceilings i.e. café, multipurpose rooms, gymnasiums, etc. shall be filtered at the unit.
- Temporary filters shall be installed in units and on all supply and return grilles if permanent HVAC is allowed to be used for temporary AC to minimize contamination of ducts and plenums. All openings shall be covered until startup so that construction dust and debris does not enter ductwork.
- Slot diffusers and perforated diffusers shall not be permitted. Design of kitchen air distribution, regardless of diffuser selection should be done by the A/E (mechanical engineer) to minimize negative effects on hood operation.
- Provide manual balancing dampers in all run outs to air distribution devices. Do not allow use of dampers in the device for testing and balancing.

DIVISION 25 - BUILDING AUTOMATION SYSTEMS (BAS)

GENERAL SYSTEMS CONTROL

- Consult with Owner for which of the following systems shall be integrated, controlled, managed and monitored through the BAS and Owner Energy Management System:
  - All HVAC systems
  - Lighting (integrated with lighting controls specified in Division 26). Include both interior and exterior lighting
  - Generator(s)
  - Water Heaters
  - Recirculation Pumps
  - Kitchen Hoods (alarm contacts only)
  - Kitchen coolers and freezers (alarm contacts only)
  - Building power demand
  - Building energy consumption
  - Building Natural Gas flow and consumption (Therms)
  - Domestic water flow and consumption (GPM and gallons)
  - Domestic make-up water flow and consumption (GPM and gallons) for all mechanical systems
  - Irrigation system water flow and consumption (Only if connected to a municipal water supply)
- A detailed Sequence of Operations shall be written by AE and programmed into the BAS using the required set points, schedules, etc., defined herein.
- Zoning of lighting controls shall be clearly labeled using wing and/or area names from construction prints in the actual controller itself and in a manual to be delivered with close out documents.
- Specify BACnet building automation system interface between manufacturer's provided controls (all systems listed in this section) and Owner's BAS. Interface shall provide Owner's BAS access and ability to manipulate all of manufacturer's adjustable set points, functions, and alarms.

BAS INTERFACE DISPLAYS

The BAS interface and graphics shall be standard and consistent for all similar systems (system to system) and for all buildings (building to building). Graphics of the following screens to be included as reference: Cooling tower and loop, Chiller and loop (if applicable), WSHP, Floor Plan, Landing Page, and DOAS. The system shall provide the following minimum information by screen:

- Floor Plans shall include:
  - Accurate layout of all rooms and floors
  - Room names and numbers (Room names only need to be included for non-classroom spaces such as media, cafeteria, gymnasium, culinary arts, multipurpose, admin, theater, etc.
  - Equipment location (room number) and callout or ID Tag or number

- Roof Top Plan with equipment location.
- Space temperature/humidity/CO2 as appropriate based on space type. (Space temperature/humidity/CO2 radio button/graphic box shall be green background with white text if all actual readings are within tolerance for setpoint. Box shall turn red or yellow with black text if measured/sensed point is in alarm)
- Current outdoor air temperature/humidity/CO2
- Power demand in kW (current, max today, peak this week, peak this month, peak this year)
- Power consumption in kWh (total today, total week to date, total month to date, total year to date)
- Water consumption in gallons (total today, total week to date, total month to date, total year to date)
- Natural Gas in therms (total today, total week to date, total month to date, total year to date)

- Roof Top DX / Water source heat pumps shall include:
  - Commanded status and actual status of unit (occupied, unoccupied)
  - Room temperature set point (heating and cooling)
  - Room temperature (and CO2 and humidity as defined in Division 23)
  - Unit discharge air temperature
  - Fan status
  - Commanded position and actual position of loop water control valve (open or closed)
  - Current outdoor air temperature and humidity
- DOAS shall include:
  - Current outdoor air temperature, humidity and dew point and CO2 levels
  - Temperature and humidity/dew point of outside supply air entering and leaving energy recovery devices
  - Temperature and humidity/dew point of building exhaust air entering and leaving energy recovery devices
  - Temperature of cooling coil discharge air
  - Commanded and actual supply fan status
  - Supply fan VSD commanded and actual speed
  - Exhaust fan VSD commanded and actual speed
  - Enthalpy wheel status
  - Loop Water System shall include
  - Water flow (GPM) to building
  - Loop Pressures
  - Water supply temperature to building
  - Water return temperature from building

- Loop Water Pumps shall include (INCLUDED ON COOLING TOWER INTERFACE):
  - Status (lead/lag/on/off/speed)
  - Include manufacturer's model and serial numbers, location on the graphic for each unit.
- Boilers/Loop Water Heaters shall include:
  - Status (on/off)
  - Leaving water temperature (setpoint and actual)
  - Flow Rate or Differential Pressure
  - Include manufacturer's model and serial numbers, location on the graphic for each unit.
  - Evaporative Cooling Towers shall include
  - Spray pump status (on/off)
  - Fan status (on/off/speed)
  - Entering water temperature
  - Leaving water temperature (setpoint and actual)
  - Make-up water flow (GPM) and total gallons (today, week to date, month to date, year to date)
  - Include manufacturer's model and serial numbers, location on the graphic for each unit.
- General Exhaust Fans (larger fans not controlled by light switch in space) shall include:
  - Status (on/off/occupied/unoccupied)
  - Include manufacturer's model and serial numbers, location on the graphic for each unit.
- Laboratory Fume Hood Exhaust Fans shall include:
  - All fans not included by a light switch shall include Status (on/off)
  - Include manufacturer's model and serial numbers, location on the graphic for each unit, and with Filter sizes and quantities if applicable.
- Kitchen Hood Exhaust and Make-up Air fans shall include:
  - Status (on/off/speed (if applicable)
  - Include manufacturer's model and serial numbers, location on the graphic for each unit, and with Filter sizes and quantities if applicable.
- Kitchen Hood Make-up Air Heaters shall include:
  - Status (on/off/percent kW or firing rate)
  - Discharge air temperature (setpoint and actual)
  - Include manufacturer model and serial numbers, location on the graphic for each unit.
- TR and MTR Room shall include:
  - Room Temperature level
  - BAS Alarms and Notifications

- Owner BAS vendor shall display within BAS and send Alarms and Notifications to designated District personnel via email and text message for the categories listed below.
- Messages shall repeat transmission of the alarm or notification once per hour until someone logs into the facility management system in response

ALARMS AND NOTIFICATIONS

General Alarm Requirements:

- Space temperature/humidity/CO2 as appropriate based on space type. (Space temperature/humidity/CO2) radio button/graphic box shall be green background with white text if all actual readings are within tolerance for setpoint. Box shall turn red or yellow if measured/sensed point is in alarm)
- All other alarms shall be shown in one of the margins of the floor plan and have a noticeable designation if the point or system is in alarm. Water source heat pumps shall include:
- Alarms for:
    - Room temperature variation +/- 4 degrees from set point
    - Room humidity > 70%
    - CO2 Levels >1600

DOAS Alarms

- DOAS shall have a duct sensor (temp or humidity) installed that will shut down the unit and send an alarm to the BAS if unit fails to meet dewpoints.
- Alarms for coil discharge temperature variation +/- 4 degrees from coil set point
- When commanded and actual supply fan status does not agree with commanded condition within 15 minutes of command.
- When supply fan VSD commanded and actual speed does not agree with commanded condition within 15 minutes of command.
- When exhaust fan VSD commanded and actual speed does not agree with commanded condition within 15 minutes of command.

Loop Water System Alarms

- Loop supply temperature variation +/- 5 degrees from set point in heating or cooling modes.
- High temperature alarm at 115 degrees F
- Low temperature alarm at 40 degrees F

Loop Water Pump Alarms

- When pump status commanded and actual speed does not agree with commanded condition within 10 minutes of command. (lead/lag/on/off/speed)

Boilers/Loop Water Heaters Alarms

- Boiler failure from Boiler Manufacturer’s boiler control panel (BCP)

Evaporative Cooling Towers Alarms

- Variable speed drive failure on CT fan.

- When make-up water flow (GPM) exceeds peak recorded flow rate for more than 5 minutes or it exceeds average flow rate for more than 30 minutes.

General Exhaust Fans (larger fans not controlled by light switch in space) Alarms

- None required at project close out.

Laboratory Fume Hood Exhaust Fans Alarms

- When fume hood exhaust fan status is on when zone is unoccupied.

Kitchen Hood Exhaust and Make-up Air fans shall include:

- When hood exhaust and make up air fan status is on when zone is unoccupied.

Kitchen Hood Make-up Air Heaters shall include:

- When kitchen hood make-up air heater status is on when zone is unoccupied.

TR Rooms and Other Stand-Alone HVAC systems shall include:

- Alarm temperature variation >5 degrees from set point

BAS TREND REPORTS

- All trends shall be for 15-minute intervals unless noted otherwise. The BAS compile trending data shall be as follows:
- Global system trends shall include for each site and a cumulative total. This list shall be reviewed Owner Energy Manager for each Project.
    - Outdoor air temperature, humidity/dew point and CO2 levels
    - Power Demand (kW), building main and all submeters (current, max today, peak this week, peak this month, peak this year)
    - Energy Consumption (kWh), building main and all submeters (total today, total week to date, total month to date, total year to date)
    - Water Consumption (gallons), building main and all submeters (total today, total week to date, total month to date, total year to date)
    - Natural Gas Consumption (therms), building main and all submeters (total today, total week to date, total month to date, total year to date)
- DX Heat Pump / WSHP shall be capable of trending
    - Discharge air temperature
    - Unit status (on/off/heat/cool)
    - Fan status
    - Space temperature/humidity/CO2 (set point and actual)
- DOAS shall be capable of trending
    - Current outdoor air temperature, humidity and dew point and CO2 levels
    - Temperature and humidity/dew point of outside supply air entering and leaving energy recovery devices

- Temperature and humidity/dew point of building exhaust air entering and leaving energy recovery devices
- Temperature of cooling coil discharge air Commanded and actual supply fan status
- Supply fan VSD commanded and actual speed
- Exhaust fan VSD commanded and actual speed
- Supply air flow (CFM)
- Exhaust air flow (CFM)
- Loop water control valve position (commanded and actual)
- Outdoor air damper position (commanded and actual)
- Building exhaust air damper position (commanded and actual)

WIRING

- All control wiring shall be routed in conduit and shall be color-coded.
- Conduit, wiring sizes, and type of insulation shall be in accordance with Division 26 – Electrical, and shall conform to the currently adopted edition of National Electrical Code.
- All electrical equipment shall bear UL labels.
- Each control circuit shall be protected by a circuit breaker of the proper size.

DIVISION 26 – ELECTRICAL

GENERAL REQUIREMENTS

- The use of Aluminum wire in a CCSD facility must be approved in writing by the Executive Director of Facilities Management
- Contractor shall provide for TEGG testing of the electrical power distribution system and provide documentation to Owner of the following tests: NFPA 70 compliance, Infrared Thermography, Ultrasonic Testing, De-Energized Testing, Energized Testing, Voltage and Ampere Diagnostics, Proper Torqueing. The TEGG inspection shall be performed by an independent 3rd party electrical contractor certified by the TEGG Service Corporation.
- Specify conduit and raceways as required by the ECMS standards, Technology Design Specification and Facility Security Access Control, Intrusion Detection and Surveillance Design Specifications.
- All electrical service inside the building shall be above grade in EMT.
- All electrical service outside the building shall be contained in stainless steel, NEC approved PVC or NEC approved flexible PVC.
- PVC coated GRC conduit shall be used in high corrosion areas such as cooling towers or areas that are continuously wet.
- Main building feed shall be NEC approved PVC
- Remote Electrical Power Shut down station located in front entrance shall be Knox-Vault #4544 and color shall be aluminum.
- Lighting and convenience outlets shall not be on the same circuit. Wiring for lighting and convenience outlets shall be run in separate raceways.
- Avoid outlets closer than six ft to sinks and/or bubblers (omit unnecessary GFI applications).
- Device plates and cover plates shall be oversized Stainless Steel
- In all classrooms, general use wall receptacles shall be approximately 12 ft on center, with a minimum of two on each wall. Receptacles shall be of the Hard Use Specification Grade 20-amp minimum. Toggle switches shall be Specification grade 20-amp minimum. Backstabbed (quick wired) or decorative outlets and switches shall not be used.
- Provide 208 VAC for printers in all main office areas, mail rooms and teacher workrooms.
- Construction phasing and outage plans shall be included in the contract documents.
- 15% spare circuit capacity shall be provided for future use in all electric panels. Feeder size shall match panel board rating.
- Spare wires shall be capped and labeled as spare. Label shall indicate where the other end of the wire is located.
- Nameplates shall be engraved three-layer laminated plastic, black letters on white background. Nameplates shall be installed on all equipment, panels, transformers, safety switches, etc., denoting equipment name and/or number and “Fed From”. Embossed adhesive tape with 3/16 inch, black letters on clear background shall be adhered to all wall switches and receptacles to denote Panel and Circuit they are fed from. Nameplates shall not be screwed or riveted.

- A typed directory shall be provided for all electrical panel boards, with all circuits labeled. Labels shall show District approved room names and numbers. Handwritten directories are not permitted.
- Require signage reading “Electrical panels inside” if any space contains an electrical panel.
- Outlets in corridors for floor maintenance shall be at least every 50 ft. of corridor with a minimum of one per corridor.
- A duplex receptacle shall be within 25 ft. of both interior and exterior mechanical equipment. Also at least one receptacle at every stairwell landing.
- No stand-alone floor receptacles are permitted in any space. Floor fed circuits that terminate in lab tables or other affixed furniture are acceptable. Where power is fed from a floor penetration, provide floor sleeve extending one inch above floor slab.
- Dedicated outlet and ventilation shall be provided for the kiln in the art area. Owner shall provide AE with cut sheet on proposed kiln for each project. Coordinate ventilation requirement with Program Management.
- Coordinate electric booster heater power requirements with kitchen consultant.
- Lab emergency shut off for receptacles, gas, and water shall be provided on wall adjacent to teacher’s workstation. Empty conduits for future branch circuits shall be stubbed out to a secure location normally above ceiling heights.
- Plenum rated equipment shall be required in designated ceiling plenum areas and these areas shall be clearly indicated on drawings.
- Service clearance for electrical equipment shall be shown on plan views drawn to scale.
- Load tabulation shall be shown on the drawing for each service and each feeder.
- Indicate SCR and A/C rating for all equipment.
- Where load tabulation includes an allowance for existing facilities drawing shall show how the allowance was determined.
- Where a new switch or circuit breaker is added to existing service equipment, drawings shall show its relationship to existing main devices.
- Where an existing service is being utilized or modified drawing show the existing arrangement.
- Ensure rated walls with electrical panels are sufficient to maintain rating.
- AE shall consult with Owner to determine if an electric vehicle charging station is required.

GROUNDING

- Detailed grounding requirements shall be shown on project drawings.
- Ground main service by exothermic welding the grounding conductor to main cold water pipe, building steel, footing rebar, and at least three 3/4" diameter x 10' long ground rods driven 10' apart outside building in unpaved earth. The rods shall be loop interconnected with each other by a minimum No. 500 MCM AWG bare copper conductor thermal welded, using the proper style mold, to each rod below grade.
- Electrical Contractor shall provide designer of record with written documentation that service grounding system resistance measures no more than 5 ohms. Measurements shall be made

using The Fall of Potential Method. Supplemental grounding electrodes and / or soil supplements shall be installed as necessary to achieve the specified resistance.

- Service entrances shall be protected by ground rod.
- Metal water pipe shall be grounded to electrical service entrance.
- Grounding shall be permanent and electrically continuous, low impedance exothermic weld (cad-weld).

ELECTRICAL SERVICE AND DISTRIBUTION

- The design shall be to establish one electrical delivery point (metering point) for all facilities if possible. This excludes seasonal outdoor sport facilities.
- Service conductors from distribution transformers to service entrance or meter base shall be sized for a maximum of 3% voltage drop. Use the ampacity of the overcurrent protection device on the service disconnect equipment for calculations.
- A short circuit study shall be provided, including all interior and exterior lighting, service and feeder sizes and all circuits over 20 Amps. Voltage flicker analysis shall be performed on systems with motors greater than 40 hp to show that the voltage drop does not exceed 5%. Results/report shall be included in project closeout documents.
- Electrical design shall consider and provide adequate (standard of care) protection from the effects of harmonics and non-linear loads
- Provide dedicated neutrals for computer circuits and LED lighting.
- AE shall conduct a Breaker and fuse coordination study. Report shall be included in project closeout documents.
- Panels fed from a utility transformer shall be service rated. Panels fed from existing panel in a different building shall be service rated.

TVSS AND SURGE PROTECTION DEVICES (SPD)

- Transient voltage surge suppressors shall be provided at main switchboards, distribution panels and on major feeders and branch circuits serving personal computers and other electronics.
- TVSS and SPDs shall be mounted external to the Panel they serve in a separate enclosure and shall not be integrated into or manufactured by the Panel manufacturer.
- The specified equipment shall be designed, manufactured, tested, and installed in compliance with the following standards: U.L. 1449 current edition and IEC61643. It shall be labeled as an Electromagnetic Interference Filter.
- The qualified manufacturer shall have been engaged in the commercial design and manufacture of such products for a minimum of five years.
- Provide five years Limited Warranty from date of substantial completion for all TVSS.

SWITCHBOARDS

- The switchboard shall be designed, manufactured, tested, and installed in compliance with NEMA PB 2. Main section devices shall be individually mounted. Distribution section devices shall be group mounted. Auxiliary section devices shall be group mounted.

- Bus material shall be copper, standard size, fully rated and arranged for future extension. Bus shall be bolted or welded, accessible from front only for maintenance. Grounded and grounding bus shall extend the length of the switchboard.
- Fusible Switch Assemblies NEMA KS 1, load interrupter enclosed knife switch with externally operable handle. Provide interlock to prevent opening front cover with switch in ON position. Handle lockable in OFF position. Fuse Clips: Designed to accommodate Class J fuses.
- Fusible Switch Assemblies, 800 Amperes and Larger: Bolted pressure or high-pressure contact switches. Fuse Clips: Designed to accommodate Class L fuses.
- Molded Case Circuit Breakers shall be NEMA AB 1 with integral thermal and instantaneous magnetic trip in each pole. Provide circuit breakers UL listed as Type HACR for air conditioning equipment branch circuits, where applicable. Include shunt trip, under voltage release and phase loss where indicated.
- Current Limiting Molded Case Circuit Breakers: NEMA AB 1 molded case circuit breakers. Integral thermal and instantaneous magnetic trip in each pole, coordinated with automatically resetting current limiting elements in each pole. Interrupting rating in RMS amperes symmetrical let-through current, equal to or greater than the switchboard rating. Include shunt trip, and under voltage release and phase loss where indicated.
- Solid-State Molded Case Circuit Breakers: NEMA AB 1, with sensing, timing and tripping circuits for adjustable current settings. Ground fault trip, ground fault-sensing integral with circuit breaker. Adjustable short time trip. Stationary mounting. Include shunt trip, under voltage release, and phase loss where indicated.
- Mechanical type terminals shall be provided for all line and load terminators suitable for copper cable rated for 75 degrees C of the size indicated on drawings.
- Line and Load Terminations shall be accessible from the front of the switchboard.
- Ground Fault Sensor: Ground return type.
- Ground Fault Relay: Adjustable ground fault sensitivity from 200 to 1200 amperes, time delay adjustable from 0 to 1 second. Provide monitor panel with lamp to indicate relay operation, TEST and RESET control switches.
- All indicator lights shall be transformer – LED type.
- Ammeters and Voltmeters ANSI C39.1 direct reading, full range, with 4.5-inch square recessed case and 250-degree scale, white dial with black figures and pointer. Indicating ammeter, 5 amperes, 60-Hertz movement, and 1 percent accuracy. Indicating voltmeter, 120volt, 60-Hertz movement, and 1 percent accuracy. Coordinate with BAS provider and specify power metering and monitoring devices with digital output capability to transfer all data to BAS without special interface devices or translators. Provide digital meters for main service entrance and subpanels to allow sub metering of HVAC systems and lighting systems as a minimum.
- Meter transfer switches rotary multistage snap-action type with 600-volt AC-DC silver plated contacts, engraved escutcheon plate, pistol-grip handle. Ammeter four position including OFF. Voltage seven position including OFF.
- Microprocessor-based metering equipment shall be by switchboard manufacturers and have the functions of a Cutler-Hammer type Westinghouse IQ Data Plus II (Basis of Design). The MM&P shall be UL recognized, CSA certified and meet ANSI standard C37.90. Make provisions for an addressable communication card capable of transmitting all data, including trip data over a

compatible two-wire local area network to a central personal computer for storage and/or printout. The network shall also be capable of transmitting data in RS 232c format via a translator module.

- Metering transformers: Current transformers IEEE C57.13, 5 ampere secondary, bar or window type, with single secondary winding and secondary shorting device, primary/secondary ratio as required, burden and accuracy consistent with connected metering and relay devices, 60 Hertz. Potential Transformers IEEE C57.13, 120volt double secondary, disconnecting type with integral fuse mountings, primary/secondary ratio as required, burden and accuracy consistent with connected metering and relay devices, 60 Hertz. See control specification for current transformer assembly.
- A 4" high concrete housekeeping pad shall be installed for the main switchboard.

DISTRIBUTION AND BRANCH CIRCUIT PANELBOARDS

- Sizes of distribution panels and branch circuit panels shall be shown on drawings.
- Wires shall be labeled and organized in such a manner that maintenance can easily identify and access in panels.
- Wires shall not be spliced in panels and no wires shall be routed through panels to get to other panels.
- Minimum integrated short circuit rating as calculated.
- NEMA PB1 panel board with NEMA AB1 circuit breaker type.
- Buses and ground shall be copper.
- Neutral bus for panel boards being served by nonlinear load (k-factor) transformer shall be rated at 200 percent of the phase bus current.
- Cabinet shall be surface mount type only in electrical/mechanical/storage rooms, fastened with hinged door with flush lock, finished in standard gray enamel.

FUSES

- Spare fuse cabinet shall be wall-mounted sheet metal with shelves, suitable sized to store spare fuses and fuse pullers specified. Finish ANSI gray. One additional set of fuses shall be included as spare at the acceptance, by Owner, of the electrical system.

TRANSFORMERS

- Winding taps for transformers less than 15 KVA shall have six (6) 5 percent taps; two (2) above and four (4) below rated voltage, full capacity taps on primary winding. Transformers 15 KVA and larger shall also meet NEMA ST 20.
- Transformer shall be suitable for floor mounting if larger than 15 KVA and floor and/or wall for 15 KVA and below. Transformer shall be rated for 80-degree C rise above 40-degree C. Efficiencies shall meet or exceed NEMA TP-1 Class 1 efficiency.
- Provide K rated transformers for computer and electronic equipment circuits. Non-Linear Load Isolation transformers shall be used only for dedicated computer loads. Minimum of K-4.
- Housekeeping pads shall be a minimum of 6" high.
- Interior transformers shall be mounted a minimum of 6 inches from wall and secured to housekeeping pad. Provide manufacturer's recommended service clearance on accessible side of transformer.

EMERGENCY GENERATOR HOOK-UP FOR SCHOOLS WITHOUT GENERATORS

- A kirk key interlock system with an 800 amp back fed breaker and a portable generator connection box shall be installed for a portable generator.

PACKAGE ENGINE GENERATORS

- Whole building generators shall not be provided unless required.

ENCLOSED TRANSFER SWITCHES

- Switches shall be provided with the generator package. Substitutions are not permitted.
- If unit is floor mounted install a 4" high concrete housekeeping pad.
- Components:
  - Mount indicating lights in cover of enclosure to indicate NORMAL SOURCE AVAILABLE, ALTERNATE SOURCE AVAILABLE, and SWITCH POSITION.
  - Mount test switch in cover of enclosure to simulate failure of normal source.
  - Mount return to normal switch in cover of enclosure to initiate manual transfer from alternate source to normal source.
  - Transfer switch shall contain 2 each normally open and normally closed auxiliary contacts.
- Monitor each line of both Normal and Alternate source voltage and frequency. Initiate transfer (alternate inhibit transfer) when normal voltage (alternate voltage) drops below 85 percent or frequency varies more than 3 percent from rated nominal value.
- Neutral switching shall be simultaneous.
- Automatic Sequence of Operation:
  - Upon initiation by normal source monitor initiate time delay (0 to 60 seconds adjustable) to start alternate source engine generator.
  - Initiate transfer load to alternate source (0 to 10 seconds, adjustable) with permission of alternate source monitor.
  - Transfer back to normal source with permission by normal source monitor (0 to 30 seconds, adjustable). Bypass if alternate source failure.
  - Time delay before engine shuts down (0 to 60 minutes, adjustable) of unloaded operation.
  - Engine Exerciser shall start engine every 7 days. The engine shall run for 30 minutes before shutting down. Bypass exerciser control if normal source fails during exercising period. Transfer load to alternate source during engine exercising period.

LIGHTING

- Lighting systems shall be specified with a BACnet interface with Energy Management System specified in Division 25 (BAS).
- Lighting systems shall be controlled by the BAS. Parking and exterior building lighting shall be on separate controls. Owner shall provide lighting schedules.
- General Lighting systems using CAT 5 Power are NOT allowed.
- Lenses shall be .125" or 1/8" in thickness.

- Wall switch products shall be capable of withstanding current surge.
- Generally, spaces shall be lighted with 2 x 4 lay-in 120/277v LED fixtures. See Appendix A for approved LED Basis of Design Manufacturers.
- LED light fixtures shall have been available commercially for a minimum of three years.
- Where rebates are provided by SCE&G, such as their Energy Wise Program, light fixtures, ballasts, lamps and controls shall be specified to maximize the number of rebates available.
- Lighting design shall minimize the number of fixture types
- Custom built light fixtures or one of kind shall not be allowed.
- Areas such as atriums, coves and other difficult to access areas shall use LED lights. Light locations shall not require the use of scaffold or a lift to replace bulbs.
- All lighting systems shall be easily accessible for maintenance and service.
- All classroom lighting shall have dimmable fixtures and dimmers.
- All classrooms and conference rooms shall have line voltage occupancy sensors and shall have duel level switching installed.
- Gymnasiums and other multi-purpose rooms shall be lighted with LED fixtures and shall have safety chain to actual fixture and be controlled by remote dimmers lockable control panel. Gym lighting shall have two zones. One zone shall control fixtures over the playing area and one zone shall control fixtures around the perimeter.
- Elementary and Middle School Cafetorium stage lighting shall be simple LED track type systems. Theatrical lighting shall be LED type and be designed on a per school basis.
- Security and site lighting shall be controlled by and integrated into BAS via BACnet. Security lighting shall be defined as the wall packs on the perimeter of the school and selected parking lot and roadway lights to illuminate access points at the schools.
- All other site lighting including walkway, sign and non-security parking lot lighting shall be LED type and controlled by BAS via BACnet.
- Exterior lighting in stairways and sidewalks shall be flush mounted and easy to access for maintenance. Recessed lighting in concrete is not permitted.
- Exterior lighting for walkway and parking areas shall be LED type using cutoff reflectors and lens to reduce light pollution. Exterior lighting shall be controlled by BAS via BACnet – No photocell lighting.
- Canopy lighting conduit and lights shall be run below the roof deck and secured to the structure and not screwed through the roof.
- Emergency lighting shall be provided by dedicated wall mount and/or ceiling surface mounted LED fixtures. These shall be installed in all exit corridors, places of assembly, single restrooms in elementary school classrooms and all other areas required by the building code or OSF. Lighting performance of the fixtures shall be confirmed by a photometric design during design and as a shop plan submittal.
- Lighting for corridors, common areas, group toilets and all other areas not controlled by vacancy sensors shall be controlled by the BMS.

- An override button shall be located in each electrical room and in the main administration area shall allow after hours and weekend movement when automatic lighting controls are in override mode. The override in the main administration area shall allow for lighting to be turned on in several areas of the building simultaneously.
- Football, soccer, softball and baseball fields lighting shall be provided by MUSCO or owner approved equal and stadium lighting shall be positioned so that it is accessible for maintenance.
- Modular wiring is not permitted.
- The light fixtures in the individual spaces shall not be used as a junction box.
- Athletic playing field shall be lit by LED lighting with a 25-year parts and labor warranty.

OCCUPANCY SENSORS

- Occupancy sensors shall be specified for space lighting control.
- Line voltage occupancy sensors in the ceiling shall control lighting in classrooms and conference rooms.
- Restrooms shall not use ultrasonic occupancy sensors.
- The Media Center reading room shall use ceiling mounted ultrasonic occupancy sensors – each sensor shall cover no more than a 30 ft. x 30 ft. area with a 20% overlap of sensor coverage.

DIVISION 27 – COMMUNICATIONS

GENERAL REQUIREMENTS

- Information Technology Design Specifications are published on the CCSD Internet Site at: https://www.ccsdschools.com/cms/lib/SC50000504/Centricity/domain/115/contractsprocurement/technicalspecifications/TechDesignSpecs2012.pdf. Refer to the specifications for all details including but not limited to conduit, cable tray, cabling, grounding and bonding

- Facility Security Specifications are published on the CCSD Internet Site at: https://www.ccsdschools.com/cms/lib/SC50000504/Centricity/domain/115/contractsprocurement/technicalspecifications/FacilitySecuritySpecs2010.pdf

COMMUNICATIONS DRAWINGS

- The AEC team shall provide a set of communications documents for the project that will be used by CCSD's Communications cable contractor in addition to the electrical construction documents used during construction based on the International recognized ANSI/TIA 606 Administration Standard for Telecommunications Infrastructure as follows.

- The following drawings should be included as applicable:

T0 - Campus or Site Plans

- Physical and logical connections from the perspective of an entire campus, such as actual building locations, exterior pathways and inter-building backbone cabling pathways on plan view drawings and major system nodes and related connections on the logical system drawings.

- T01 - Overall Site Plan

- T02 - Site Riser Diagram with all site communication conduit quantity and size, cable pull points, telecom spaces identified

T1 - Layout of Complete Building Per Floor

- Layout of complete building per floor. The drawing indicates the location of serving zones, communication equipment rooms, access points, pathways and other systems that need to be viewed from the complete BUILDING perspective.

T2 - Serving Zones / Building Section Drawings

- The building is divided up by its serving zones. Drawing indicates drop locations, communication equipment rooms, access points and detail callouts for communication equipment rooms and other congested areas.

T3 - Telecommunication Rooms - Plan Views

- Detailed look at the communication equipment room. Drawing indicates technology layout (equipment racks, ladder rack, etc.), mechanical/electrical layout, rack elevation and backboard elevation. May also be an enlargement of a congested area of T1 or T2.

T4 - Typical Detail Drawings

- Installation procedures, detail racking, and Detailed drawings of symbols and typical such as faceplate labeling, faceplate types, raceways.

T5 - Misc. Drawings

- T5.1 - Schedules

- TS-1 - Specifications on Drawings
- T-Cover - Drawing set cover page listing all drawings in set

CAD LAYERS

- Communications devices and systems shall be on separate and distinct color-coded layers.
- Suggested layering as follows:
  - COMM - CLASSROOM AUDIO/VISUAL TECHNOLOGY
  - COMM - DATA
  - COMM - WALL PHONES
  - COMM - CABLE TRAY
  - COMM - INTRA BUILDING CONDUIT AND SLEEVES
  - COMM - INTER BUILDING CONDUIT AND SPACES
  - COMM - SURVEILLANCE CAMERAS - INTERIOR
  - COMM - SURVEILLANCE CAMERAS - EXTERIOR
  - COMM - KRONOS CLOCK
  - COMM - DIGITAL SIGNAGE - INTERIOR
  - COMM - DIGITAL SIGNAGE - EXTERIOR
  - COMM - GROUNDING AND BONDING
  - COMM - TELECOM ROOM EQUIPMENT
  - COMM - PUBLIC ADDRESS SYSTEM - INTERIOR
  - COMM - PUBLIC ADDRESS SYSTEM - EXTERIOR
  - COMM - WIFI ACCESS POINT - INTERIOR
  - COMM - WIFI ACCESS POINT - EXTERIOR
  - COMM - BACKBOARDS
  - COMM - CARD ACCESS
- Power receptacles shall be included on T2 serving zone drawings in addition to communication devices for better coordination in the field.

GENERAL TELECOM SPACE REQUIREMENTS

- Each school shall have only one Main Telecommunications Room (MTR).
- The MTR serves as the primary location for critical electronic equipment required for school operations and the main termination and cross-connection point of backbone cabling to other buildings and/or other communications spaces in the same building.
- Most schools will require one or more Telecommunications Rooms (TR) in addition to the MTR. A TR is a secondary location for sensitive electronic equipment and termination and cross-connection point for cabling.

- TRs shall not be used as a passageway to other rooms of any type, for power transformers, custodial equipment, or any other function that would require access for reasons other than service and maintenance of the communication equipment and cabling they house.
- Must be rectangular with no obstructions or protrusions (beams, columns, etc.) that decrease the usable area.
- Minimum clear ceiling height shall be 10'.
- Shall not have suspended, false, lay-in, or hard lid ceiling.
- Shall not have windows.
- Shall have walls that extend to the structure above.
- Water, sewer, chemical, or drain piping of any kind shall not be routed through or within the walls of the room. Measures must be taken to prevent water intrusion and shall be located away from all sources of liquid/ water carrying pipes.
- Lighting shall be a minimum of 50 foot-candles measured 3’ AFF and controlled by a motion detection switch located inside the room near the entrance door. Light fixtures shall be installed 8.5’ AFF.
- The floor shall be sealed. Acceptable floor finish shall be a colored concrete sealant applied prior to installation of equipment in the rooms.
- Shall have a dedicated HVAC system independent of other building HVAC systems located outside of the room, typically on the roof with ducted supply and ducted return.
- Designed for cooling 24 hours per day, 365 days per year.
- Shall have its own thermostat with room temperature maintained in the range of 68° F to 78° F.
- Room finishes shall be light in color to enhance room lighting.
- Plywood backboards in rooms, shall be 4 ft. X 8 ft. x 3/4 in. thick, A-C Grade certified / stamped as fire retardant and painted with two coats of white fire-retardant paint. Fire retardant stamps shall be visible after painting. Backboards shall be mounted securely to walls with 8’ length vertical. Bottom of sheet shall be at top of convenience power receptacles.
- Accessible only from interior public corridors and not through offices, other utility spaces or exterior doors and shall not be shared with electrical, mechanical, janitorial, storage, or any other type of room.
- When fire code requires wet pipe sprinkler systems piping and sprinkler heads shall be located away from the location of communication equipment racks. Sprinkler heads shall be caged to prevent accidental operation.
- Doors shall be 3 ft. 0 in. wide X 7 ft. 0 in. high solid door with a continuous hinge and provided with a dust sweep.
- Door frame shall be prepared on the hinge side for an electronic power transfer cut out at 42” AFF. per detail drawings provided by CCSD. A card reader will be integrated into the door latch. A separate box for a card reader in the wall will not be required.
- CCSD IT lock core shall be installed prior to network equipment installation

Location

- Located so that cable tray and conduit installed to support horizontal cable runs, including any elevation changes, shall not exceed 250'.
- Drawings shall indicate serving zone lines for the MTR and each TR delineating where conduit / cable tray should be installed to prevent cables from exceeding 250' horizontal distance limitations.
- The MTR should be located as close as practicable to main electrical room and elevator equipment room where fire alarm, intrusion detection and elevator equipment controls are located to facilitate installation of emergency phone lines and grounding and bonding,
- As close as practical to the center of the area/zone served.
- Locations that limit expansion such as structural steel, stairwells, and elevator shafts, outside walls or other fixed building walls should be avoided.
- Location and size of the MTR and each TR shall be assessed and approved based on accurate scaled drawings in the SD phase of the project by the CCSD IT Project Manager.
- In multi-story schools a minimum of one TR shall be provided per floor. Additional TR's per floor shall be provided if the maximum cable distance will exceed 250' on any floor as measured from the MTR/TR cable zone as measured to the furthest corner of the building following proposed cable tray and conduit pathways including elevation changes.
- TRs shall be vertically aligned in multi-story buildings whenever possible.
- Shall not service comm outlets on multiple floors.
- Emergency lighting and signs shall be properly placed per AHJ such that an absence of primary lighting will not hamper emergency exit from the MTR/TR.TR/TRs.

Telecom Room Signage

- Line 1 - MTR, TR02, TR03, TR04, etc.
- Line 2 - (Room #)
- Line 3 - Sensitive Electronic Equipment
- Line 4 - No storage Allowed

MTR Specific Requirements

- Size - 12' x 16' minimum
- Plywood backboards - cover 3 walls (do not cover wall with door) at 12" to 108" AFF.
- Corridor wall sleeves - six (6), 4" Hilti or EZ Pathway 4", or equal installed two-inches (2") above the cable tray in the corridor.
- Cable tray - same height as cable tray in adjacent corridor from location of corridor wall sleeves around the room to six inches (6") from the furthest point of the 16' wall where a waterfall device shall be provided at the end of the cable tray.

TR Specific Requirements

- Size - 6' x 9' (minimum)
- Plywood backboards - cover 3 walls (do not cover wall with door) at 12" AFF to 108" AFF.

MTR Power Requirements

- One duplex 120V/20A receptacle 6” AFF on each wall for convenience outlets.
- One quad 120V/20 receptacle on a separate dedicated branch circuit 48” AFF on the right side of a 4’ x 8’ backboard designated for use by the service provider.
- Two 208V/30A-L6/30R twist-lock receptacles on separate dedicated branch circuits at 18” AFF each on dedicated breakers secured to the rear of the equipment racks.
- Four quad 120V/20A receptacles at 18” AFF each on separate dedicated branch circuits secured to the rear of the equipment racks.
- The exact location of the equipment racks and equipment power receptacles shall be coordinated during installation with CCSD IT.
- One 208V/20A - L6/30R twist-lock receptacle on a separate dedicated branch circuit on a side wall at 48” AFF for emergency cooling unit power

TR Power Requirements

- One duplex 120V/20A receptacle 6” AFF at the center of 3 walls for convenience outlets
- One 120V/20A quad receptacle on a separate dedicated branch circuit, secured to the rear of the equipment rack, 18” AFF.
- Equipment racks will be provided and installed by CCSD. Exact location of the equipment rack and power receptacle shall be coordinated with CCSD IT.
- One 208V/20A - L6/30R twist-lock receptacle on a separate dedicated branch circuit on a side wall at 48” AFF for emergency cooling unit power

BDA and CCSD SECURITY RADIO TELECOM ROOMS

- All new schools will require the installation of a wall mounted security radio repeater in one top floor TR. Most new schools will require a first responder BDA distributed antenna system.
- Both systems require wall mounting space, power, and ground bonding in a top floor TR. The TR that will be nearest the roof penetrations for the systems antennas TR shall be increased in size to accommodate both systems and shall provide 3’ of working clearance around the equipment rack, riser cable wall field, and the both radio systems equipment.
- The security radio repeater shall be approximately 24” x 24” with 3’ of clear space in front of the 8” deep cabinet. The BDA shall be approximately 48” x 96” with 3’ of clear working space in front of the wall mounted cabinets that shall be approximately 12” deep.

GROUNDING AND BONDING FOR COMMUNICATIONS SYSTEMS

- In addition to the normal electrical ground system, a Telecommunications Main Ground Busbar (TMGB) and a Telecommunications Ground Busbar (TGB) system are required per ANSI/TIA-607.

Telecom Main Grounding Busbar

- A Telecom Main Grounding Busbar (TMGB) (.25” thick x 4” wide x 12” long) with TIA hole spacing and pattern shall be provided, and wall mounted by the electrical contractor near the location of the service entrance conduits 48” AFF in the MTR.

- Approved TMGB Manufacturers: Panduit, Herger, Chatsworth Products, Erica, or CCSD IT approved equal.
- Equipment racks, ladder rack, cable tray, conduits, and outside plant cables with metallic components shall be bonded to the TMGB with a minimum #6 AWG green insulated copper wire.
- All connections to the TMGB shall be made with correctly sized irreversible two-hole compression lugs with two bolts per lug. No exceptions. Screw type electrical ground lugs typically used in electrical panels are not acceptable.
- A telecom bonding conductor (TBC) shall bond the TMGB to the nearest power panel ground busbar and building steel with a minimum #6 AWG green insulated copper wire. The TBC size should be increased based on NEC and TIA standards depending on distance from the MTR/TMGB.
- A Telecom Grounding Busbar (TGB) (.25 thick x 2" wide x 12" long) with TIA hole spacing and pattern shall be wall mounted in each TR by the electrical contractor behind the location of the equipment rack at 48" AFF in each TR.
- Approved TGB Manufactures: Panduit, Herger, Chatsworth Products, Erica, or CCSD IT approved equal.
- All connections to the TGB shall be made with correctly sized irreversible two-hole compression lugs with two bolts per lug. No exceptions. Screw type electrical ground lugs typically used in electrical panels are not acceptable.
- A telecom bonding conductor (TBC) shall bond the TGB to the nearest power panel ground busbar and building steel with a minimum #6 AWG green insulated copper wire. The TBC size should be increased based on NEC and TIA standards depending on distance from the TR/TGB.

Labeling

- All ground attachments shall be properly tagged and labeled in accordance with ANSI/TIA-606.

Testing

- Test per ANSI/TIA-607 with an Earth Ground Resistance Tester used in the Two Point Test Method.

CONDUIT AND BACKBOXES FOR COMMUNICATION SYSTEMS

Communications Conduit

- Shall be Installed in the most direct and accessible route possible (parallel to building lines and located in and above accessible hallways).
- Reamed at both ends and have a plastic bushing installed on each end to prevent damage during cable installation.
- Contain no more than two 90-degree sweeps in any dimensional plane or exceed 100-feet in length between pulling points or interior pull boxes.
- A pull box shall not be used in place of a conduit sweep.
- Pull boxes shall be installed in easily accessible locations or at heights greater than 12' AFF and shall be accessible during working and non-working hours.
- A pull string shall be installed in all conduits with a minimum test rating of 200 lb. prior to CCSDs cable contractor's mobilization to begin work.

- Not be installed through areas in which flammable materials may be stored or over and adjacent to boilers, incinerators, hot water lines or steam lines.
- All conduits shall be bonded and grounded in accordance with the NEC (National Electrical Code) and ANSI/TIA-607.
- Electrical Metallic Tubing (EMT) fittings used for communications shall be insulated throat compression type fittings.
- Rigid Metallic Conduit (RMC) fittings used for communications shall be insulated throat type fittings.
- Flexible Metallic Conduit (FMC) for communications shall not exceed 25' in length and shall be supported off ceiling tiles and away from other trades by dedicated support wires.
- Shall be installed no less than 6" above suspended ceiling grid and no higher than 2" below a roof deck.
- All wall mounted communications outlets shall be located within 3' of a power receptacle. Exceptions are wall phones and time attendance clocks that receive power from the data cable.
- There shall not be more than one communication outlet box per 1" conduit unless pre-approved by CCSD IT. An exception is a wall mounted wireless access point at 96" with a comm outlet below it at 18".
- Telecom outlets shall not be daisy-chained without increasing the conduit size proportionally to accommodate additional cables and potential future growth without prior approval and design by CCSD IT.
- Bends in the conduit shall not contain any kinks or other discontinuities that may have a detrimental effect on the cable during pulling operations.
- All conduits shall have pull strings & insulating bushings installed. Failure to install bushing or pull stings will delay cable installation and the project. Cable will not be installed in any conduits that are not provided with pull string and bushings at both ends of the conduit.
- Conduit and comm outlet boxes in large open areas with ceilings greater than 12'AFF shall be installed below grade to the nearest cable tray and not routed overhead.
- All junction boxes and device mounting boxes shall have box covers provided and installed when the box is installed by the electrical contractor and shall remain covered throughout the project or the telecom outlet faceplates are installed.

Standard Voice/Data Communications Outlet

- 1" conduit to within 6" of cable tray in the corridor extended to a 4" square x 2-1/8" device box with a single-gang mud ring at 18" AFF unless noted otherwise on drawings.
- All interior and exterior single gang boxes and single gang mud rings used for communications shall be installed with the 4" dimension of the box / ring vertical and shall be installed flush with the wall surface.

Standard Classroom Configuration

- A typical classroom detail drawing will be provided by CCSD Information Technology

Gypsum Instructional Walls

- At the location designated for installation of an interactive display at 60” AFF provide an Arlington Industries (TVBS-810) 8” x 10” recessed steel TV outlet box with one 120V/20A duplex electrical receptacle on a separate dedicated branch circuit and one single-gang device box secured to the top of the TVBS-810 for a data outlet.
- Provide a 1” conduit to the cable tray in the nearest corridor from the single gang device box. This assembly shall be indicated on the floor plans as (Audio / Visual box 2) AV2.

Masonry Instructional Walls

- At the location designated for installation of an interactive display at 60” AFF, one 3-gang device box (Raco 263 or Equal), one recessed, clock type, 120V/20A duplex receptacle at 60” AFF on a separate dedicated branch circuit and one single-gang communication outlet at 60” AFF with a 1” conduit to the cable tray in the nearest corridor. This shall be indicated on the floor plans as AV2 (Audio / Visual box 2). ***At the time of this edit, FSR, Inc. is planning to have a box ready by mid-summer that will be the size of a single masonry block designed specifically for use behind wall mounted displays in masonry walls that can be used to support A/V, power and data.***

Masonry and Gypsum Instructional Walls

- On the side of the interactive display opposite the classroom entrance door at 18” AFF provide the following:
- Install one 4” square x 2 1/8” device box with a double-gang mud ring and blank cover no more than 48” from the side of the interactive display furthest from the classroom entrance door. This box shall be indicated on the floor plans as AV1 (Audio / Visual 1) Note: Interactive display’s dimensions vary as technology evolves. Contact CCSD IT Project Manager for display dimensions prior to rough in of device boxes.
- As close as possible to AV1 install one 120V/20A quad power receptacle on a separate dedicated branch circuit 18” AFF.
- As close as possible to the power receptacle install one 4" square x 2 ⅛” device box with a single-gang mud ring and blank cover at 18” AFF for data with a 1” conduit in the wall up to a 2nd 4" square x 2-⅛ “ device box with a single-gang mud ring and blank cover at 96” AFF for a wall mounted WIFI access point and 1” conduit extended directly to the cable tray in corridor.
- Adjacent to the data outlet box install a 2nd 120V/20A quad power receptacle on a separate dedicated branch circuit 18” AFF adjacent to the data outlet. The maximum horizontal distance from display should not be greater than 56”
- Install One 1.25” conduit concealed in the instructional wall between m AV2 to the AV1.
- One 3/4” conduit to within 18” of the location of a PA speaker backbox in the ceiling near the center of the room from the cable tray. Extend 18” of 3/4” Flexible Metal Conduit to the speaker back box that will be provided to the electrical contractor by the PA speaker contractor for installation.
- One 3/4” EMT conduit concealed in wall cavity from AV1 to 36” above the ceiling at the location indicated on the drawings for a sound enhancement speaker junction box above suspended ceiling near center of classroom and 3’ of Flexible Metallic Conduit(FMC) for attachment to the speaker enclosure to be provide and installed by the Sound System contractor.
- Four standard data outlet boxes, four (4) per room is a 4" square x 2 ⅛” electrical box with a single- gang mud ring and blank cover plate at 18” AFF unless otherwise noted.

- One single gang device box for a wall phone at 48” AFF with a 1” conduit to the nearest cable tray. A minimum of 18” clearance shall be maintained around the box and will be required for mounting the wall phone, Cabinets and/or cabinet doors should be located well away from wall mounted phones to meet clearance requirements.

Science Classrooms /Laboratories

- All infrastructure as specified for a typical classroom plus the following additional infrastructure to support a 2nd display as follows:
- A 1.25” conduit from the AV2 device box to 4” square x 2 ⅛” device box 80” AFF to be indicated on floor plans as AV3.
- One 120V/20A duplex receptacle on a separate dedicated branch circuit 80” AFF within 6” to the side AV3 at 80” AFF.
- Location of the 2nd display shall be approved by CCSD IT Project Manager and the Architect prior to design and installation

Computer Classrooms / Laboratories

- All infrastructure as specified for a typical classroom plus the following:
- 1.25” Electrical Metallic Tubing (EMT) from the nearest cable tray to multiple 4”square x 2 ⅛” device boxes with single-gang mud rings for data connections at 18” AFF located at the end of rows of tables that will have up to six computer workstations.
- Two quad 120V/20A power receptacles on separate dedicated branch circuits at the end of each row of tables within 6” on each side of the data device box. Power may also be hardwired to furniture based on type of furniture selected

ANCILLARY LOCATIONS

WALL MOUNTED TELEPHONES

- One 3/4” conduit from the nearest cable tray to a single gang electrical box at 48” AFF. Provide a minimum of 18” clearance around the box.
- Wall phones do not require an adjacent power receptacle.

KRONOS TIME/ATTENDANCE CLOCKS

- One 3/4” conduit from the nearest cable tray to a single gang electrical box and a single-gang device mounting bracket at 48” AFF. Provide a minimum of 12” clearance around the device mounting bracket.
- Kronos Time/ Attendance clocks do not require an adjacent power receptacle.

PUBLIC ADDRESS SYSTEM SPEAKERS

- The PA system contractor will provide PA speaker back boxes to the electrical contractor for installation.
- PA speaker cabling will be installed by CCSD’s low voltage cable contractor.
- PA speakers, tile bridges, speaker grilles and ceiling tile assemblies will be installed by the PA system contractor.
- The GC will provide ceiling tiles to the PA system contractor for mass production of speaker/bridge, tile/grille assemblies.

Exterior Wall Mounted PA Speakers

- One 3/4” conduit to a recessed flush mount 91/2” x 9 9/16” x 6” deep speaker back box installed flush with exterior wall surface 9’ to 12’ AFG.

Interior Wall Mounted PA Speakers

- One 3/4” conduit from the nearest cable tray to flush mounted single gang device box at 9’ to 12’ AFF.

Ceiling Mounted PA Speaker - Corridors with Acoustical Tile Ceiling (Less Than 12’ Off)

- One 3/4” Flexible metal conduit (FMC) to a speaker back box.

Ceiling Mounted PA Speaker - Gypsum Board Ceilings (Less Than 12’ Off)

- One 3/4” Flexible metal conduit (FMC) to a speaker back box.

Ceiling Mounted PA Speaker - (Less Than 12’ Off) beyond corridors

- One 3/4” Electrical Metallic Tubing (EMT) conduit to 18” above the ceiling grid location of the PA speaker and attachment to a backbox with 3/4” Flexible Metal Conduit (FMC).

Conference Rooms

- One 3/4” conduit from the nearest cable tray to 18” above the location of the PA speaker in the ceiling grid in the center of the room and extend 3/4” Flexible Metal Conduit (FMC) to a speaker back box near the center of the room. Additionally, extend a 2nd 3/4” EMT conduit to a single-gang electrical box at 48” AFF for a speaker volume control from the speaker back box.

Cafeterias, Multipurpose Rooms, Gymnasiums, and Other Rooms - Ceilings > 12’ AFF

- One 3/4” conduit to a 9-1/2” x 9-9/16” x 6” deep speaker back box installed flush with the wall surface at 9’ - 12’ AFF. All conduit except for corridor walls where the cable tray is located should route down and in the slab across the floor to the cable tray and not overhead.
- In rooms that will require more than one speaker the boxes shall be daisy-chained together with conduit and a single conduit extended to the corridor connecting a maximum of 10 speakers in a single zone.

PA Call Buttons

- Provide a ¾” conduit from the PA speaker back box in the room to a single gang device box at 48” AFF in the following rooms as indicated:
- Classrooms - next to corridor door
- Nurse's Clinic - next to corridor door
- Kitchen - next to the door leading to the serving area
- Auditorium - near the stage
- Multipurpose Room - next to corridor door
- Media Center - at/near circulation desk
- Principals' Conference Room - next to corridor door
- Teacher Workrooms - next to corridor door
- Enclosed small group/student spaces - next to hallway door

PA Volume Controls

- Provide a ¾" conduit from the PA speaker back box in the room to a single gang device box at 48" AFF in the following rooms as indicated on the drawings:
- Conference rooms
- Nurse's Clinic
- PA speaker volume controls shall not be provided in any other offices or areas. The Call Button and Volume control can share the same box and conduit.

SURVEILLANCE CAMERAS

Corridors - ceilings < 12' AFF

- One 3/4" Flexible Metallic Conduit (FMC) up to 25' in length to a 4" square x 2 ⅛ device box with a double-gang device ring flush with the ceiling supported with a "T-Bar type" tile bridge.

Interior Ceiling Mounted - Ceiling < 12' AFF

- One 3/4" conduit transitioned to Flexible Metallic Conduit up to 25' in length with a 4"-square x 2 ⅛ device box and double-gang device ring, flush with the ceiling, supported with a "T-Bar type" tile bridge.

Interior Wall Mounted - Ceiling > 12' AFF

- One 3/4" conduit from the nearest cable tray to a single-gang box, flush with the wall surface, mounted 9' to 12' AFF, with the 4" box dimension vertical.

Exterior Wall Mounted

- One 3/4" conduit from the nearest cable tray to a weatherproof single-gang box with the 4" box dimension vertical and flush with the exterior wall surface.

Surface Mounted External Locations (Canopies, parapet walls, etc.)

- One 3/4" conduit from the nearest cable tray EMT conduit transitioned to 3/4" PVC conduit at exterior wall to 4" square, deep, weatherproof, PVC with external screw mounting tabs.
- If camera locations will be daisy-chained conduit size shall be increased proportionally per NEC to accommodate the additional data cables.

Pole Mounted Cameras or Other Camera Locations Greater Than 250' From A TR/MTR

- One 2" Schedule 40 PVC conduit, 24", minimum, below finished grade in open landscape areas or below sidewalks and 36", minimum, below paved roads or parking lots to a centrally located 24" wide x 36" long x 36" deep maintenance hole.
- From the maintenance hole install 1.25" PVC conduit to each pole base. Above the pole base inside the pole transition conduit to 1.25" liquid tight flexible coated metal conduit to a 1.25" weatherhead 9' - 12' above finished grade.

DIGITAL SIGNS

Interior Wall Mounted

- One 120V/20A duplex receptacle on a separate dedicated branch circuit at 80" AFF.
- One single gang device box within 6" of the side of the power receptacle at 80" AFF and a 3/4" conduit to the nearest cable tray.

Site Marquee Signs

- One 2” schedule 40 PVC conduit 24” minimum below finished grade from the nearest telecom room to a weathertight 16” x 16” x 6” deep NEMA box with a hinged lockable cover secured in an accessible location to the sign structure
- From the 16” box install one 1” Liquid tight, PVC coated, flexible metallic conduit with insulating bushings into the interior portion of the sign structure to provide a sealed weatherproof pathway for data patch cords.
- Provide one 120/20A duplex receptacle on a separate dedicated branch circuit inside the NEMA box.

ACCESS CONTROL

- Hardwired 120V/20A power on a separate dedicated branch circuit and a 1” EMT conduit to the cable tray from the wall mounted location of the card access system power supply in TR locations. Locations in TRs to for power supplies to be provided by CCSD. Power Supply to be provided and installed by the card access contractor.
- Each door with card access will require a 4" square x 2 ⅛” junction box installed above accessible ceiling no more than 12’ AFF close to the door with a 1” conduit to the nearest cable tray for a door controller.
- From the controller junction box install 3/4” EMT to a single gang box at 48” on the RIGHT-SIDE of the door for a card reader.
- TRs and some other interior doors will have a card reader integrated into the door and will not require a separate conduit and box at 48” for a card reader. These doors should be determined early in the design and the door type assigned to assure conduit is correct.
- For doors with electronic push to exit bars and integrated card readers install a 3/4” conduit from the controller junction box above the door into the hinge side of the door frame to the location of the electronic power transfer device in the door frame at 42” AFF.
- For doors with electric strikes the 3/4” conduit from the controller to 42” AFF will need to be installed in the strike side of the door frame.

WIRELESS ACCESS POINTS

Ceiling Mounted in Corridors < Ceiling 12’ Off

- One-inch Flexible Metal Conduit (FMC) to a 4” square x 2-1/8” device box with a single-gang device ring and “T-Bar type” tile bridge centered in the tile. Exact locations of wireless access points will be provided by CCSD.

Ceiling Mounted Other Areas < Ceiling 12’ AFF

- One-inch conduit to a 4” square x 2-1/8” device box with a single-gang mud ring and tile bridge. Exact locations of wireless access points will be provided by CCSD.

Interior Wall Mounted (Ceiling > 12’)

- One -inch conduit to a 4” square x 2-1/8” device box flush mounted with wall surface and a single-gang mud ring, 9’ to 12’ AFF.

Exterior Wall Mounted

- One-inch conduit to a single-gang weatherproof electrical box flush with wall surface, 9’ to 12’ AFF.

Site Pole Mounted

- Two-inch PVC conduit buried 24” minimum below finished grade in open landscape areas and sidewalks and 36” minimum below paved roads or parking lots to a 36” x 24” x 36” hand hole located centrally to serve multiple poles.
- From the hand install 1.25” PVC conduit below grade at the same depth as the 2” conduit to each pole base. Turn the conduit up to 6” above the pole base and interior of the hollow poles.
- Transition the 1.25” conduit to PVC coated flexible metallic conduit to a weatherhead mounted in the side of the pole 9’ - 12’ above finished grade.
- Other pole types may require 2” Rigid Steel Conduit (RSC) to a 2” weatherhead at 9’ - 12’ above finished grade on the exterior of the pole.

SCHOOL SECURITY RADIOS

- A detail drawing of a Dual Antenna Roof Mast will be provided by CCSD Information Technology.
- Location shall be indicated on floor plans for two 2” Rigid Steel Conduits (RSC) with weatherheads through roof, bonded to the building steel and extended to the nearest cable tray close to the TR on the top story nearest to the reception area on the ground floor.
- One 1” conduit from the nearest cable tray to a 4” square x 2-1/8” device box with a single-gang mud ring, 6” above the counter. Exact location at reception desk. Location to be approved by CCSD IT.

VERTICAL / RISER FLOOR SLEEVES

- Core bore to install four 4” rigid steel conduits between vertically aligned TRs.
- Sleeves shall be in the left corner of the room 2” from each wall with 2” separation between each hole.
- The four 4” rigid steel conduit sleeves shall be supported with open channel strut and strut clamps secured to the floor.
- Sleeves shall extend 4” AFF with insulating bushings at each end and be bonded to the TGB in the MTR/TR.
- All conduits or sleeves over three feet in length shall be bonded to telecommunications ground with grounded (bond) insulating bushing.

CABLE TRAY FOR COMMUNICATION SYSTEMS

- Shall be installed no higher than 12’ AFF.
- Shall be steel wire basket suitable for hallways and above acoustical tile ceiling areas.
- Cable tray’s carrying capacity shall accommodate horizontal cable and riser cables.
- Shall be a minimum of 6” wide and 4” deep.
- The use of carbon steel, electro zinc plated wire basket tray is preferred.
- Refer to manufacture fill charts for correct sizing.

- Shall be secured on 10’ centers and within 18” of a splice using a wall support or a standard trapeze support system with 1/2-inch threaded rod in accordance with manufacturer specifications and applicable Building and Electrical codes.
- Single center-mounted steel supporting rod and bottom “T” connector style of support shall not be used.
- Shall meet seismic design category bracing standards required by OSF.
- Shall be sized to accommodate future installations and building growth. Initial cable fill not to exceed 25% of tray capacity.
- Shall be installed only in accessible ceiling areas.
- A minimum of four 4” conduits shall be installed over fixed, hard and inaccessible ceiling spaces at a height < 12’ AFF.
- Cable tray shall transition to a fire rated assembly to penetrate walls. Where conduits require cables to drop down onto cable tray provide plenum rated conduit waterfalls (Panduit CWF400 or equal) installed onto the end of each conduit to prevent kinking of the installed cable bundles.
- Each section shall be grounded and bonded in accordance with ANSI/TIA-607 and manufacturers requirements (bonded to building steel approx. every 60 feet). All splices, T-Sections and bends shall be bonded together. Cable trays shall not be used as an equipment ground nor seismic support or bracing.
- Cables installed in cable trays shall not contain, nor be fastened with Velcro, tape, or plastic type cable ties (tie-wraps) above ceilings.
- Shall meet the requirements in ANSI/TIA-569 and applicable addendums.

Cable Tray Clearances

- Cable trays shall not be placed within 5” of any overhead light fixture nor within 12” of any electrical ballast.
- A minimum clearance of 8” above and 12” to one side of the cable tray shall always be maintained. All bends and T-joints in the cable trays shall be fully accessible from above (within 12”).
- Cable trays shall be mounted no higher than 12’ above the finished floor to the top of the tray or extend more than 4’over a fixed ceiling area.
- Required minimum clearance around cable tray for maintenance access:
- Wall clearance - 6”
- Horizontal Clearance - 6”
- Tray Support and tray above suspended ceiling - 6”
- Above Tray - 8”

Cable Tray in Corridors

- The CCSD IT Project Manager shall approve the design of the cable tray system prior to construction.
- Approved Manufacturing: WBT, Hubbell, Cooper B-Line, Mono Systems, Cablofil Husky.

- Waterfall devices shall be provided and installed, to guard against cable damage, where elevation changes occur from cable tray to ladder rack in MTR and TRs and at any other discontinuous section of tray where there is elevation change.
- Cable tray and/or large diameter conduits, used in lieu of cable tray, shall not pass over classrooms or other occupied spaces that could be disrupted during cable adds, moves, or changes.
- All metallic cable tray sections and conduit shall be bonded together per NEC article 392.60 to form an electrically continuous system and shall be bonded to the telecom ground bar in the MTR or TR and all sections bonded in accordance with the listing requirements of the particular type of system. Cable tray shall be bonded to ground per NEC article 250.96.

Cable Tray- MTR/TRs

- Shall be installed at the same height as the bottom of the wall sleeves, no further than six inches from the point where the sleeves enter room to six inches from the furthest corner of the MTR/TR in an L shape.
- Cable tray shall be supported within six inches of each end and every 5’ in the MTR/TR with wall angle brackets. Trapeze or other types of support are not acceptable in the MTR or TRs.

SURFACE RACEWAYS FOR COMMUNICATIONS SYSTEMS

- Used only in areas where cabling cannot be placed within walls, ceilings, or cable trays.
- Secured using mechanical fasteners, double sided sticky tape is not acceptable.
- Comply with the most restrictive requirements of Division 27 for wiring of the applicable class in the applicable location.
- At a minimum, provide a raceway with cross-sectional area equivalent to 1” diameter trade size conduit for communication station cabling.
- Install complete raceway system including track, cover plate, device boxes, radiused inside and outside elbows and manufacturer’s category and fiber cabling guideway fittings, splice plates, T’s, transitions and extension rings and end caps as required.

FIRE-STOPPING SYSTEMS

- Fire stopping is intended to prohibit the spread of a fire and smoke from one location within a building to another. This means restoring the integrity of rated walls, floors, and ceilings when these barriers are penetrated. The rating of the firestop assembly must meet or exceed the rating of the structure penetrated.
- MUST be a UL listed system/assembly
- Approved Firestop Assemblies for Horizontal Communication Pathways
- All fire rated sleeves shall be UL listed and contain non-removable intumescent fire sealant enough to maintain the hourly fire rating of the barrier being penetrated.
- Fire rated sleeves shall be used in rated and non-rated MTR and TR walls
- Acceptable Fire Rated Sleeves: STI Firestop Products EZ Path Series 44+, Hilti Firestop Speed Sleeve CP 653 or equal.
- The quantity of sleeves per wall penetration shall be based upon the size of the cable tray and the number of cables proposed to pass through the wall initially and in the future.

- The sleeve capacity area shall be equivalent to the area of the cable tray at each side of the wall.
- Non-rated corridor walls - pass cable tray through a slot in wall.
- Approved Firestop Assemblies for Floor Penetrations
- Rock wool and intumescent putty applied filling annular space around cables or spare conduits by a certified firestop contractor after cable installation is complete.

UNDERGROUND DUCTS AND RACEWAYS FOR COMMUNICATION SYSTEMS

GENERAL

- All designs must be coordinated with and approved by CCSD IT Project Manager
- Conduit shall be Polyvinyl-Chloride (PVC) Schedule 40 or 80 (dependent upon concrete encasement requirements), corrosion-resistant plastic with a 4" inside diameter for underground installations and Galvanized Rigid Steel (GRS) or PVC Externally Coated (GRS) for riser applications.
- Spacers shall be used in the trench to support the conduits.
- A solid core #10 AWG copper wire shall be installed externally along any conduit run for the purpose of locating and tracing the conduit route.
- Fabric multi-cell type of inner duct shall be considered for conduits that will contain multiple cables.
- All installed conduits shall be cleaned and verified with a flexible mandrel and a stiff brush. Mandrels shall be 12" in length and sized to within ¼" of the inside diameter of the conduit.
- All conduits shall be provided with foot-marked mule tape with a minimum of 200 pound pulling tension.
- All unused entrance conduits shall be capped/plugged with expandable type duct plugs, Jackmoon or equal, inside the building to prevent rodents, water, or gases from entering the building.
- Conduit stubs entering the building shall extend beyond the foundation and landscaping to a hand hole to prevent shearing of the conduit and allow for access.
- Conduit entering from a below grade point shall extend 4" above the finished floor in the MTR/TRs. Conduit entering from ceiling height shall terminate 4" below the finished ceiling.
- All future conduit stubs shall be flagged for easy identification and an electronic ball marker shall be placed.
- All metallic conduit and sleeves shall be reamed, bushed, and capped when placed.
- The minimum depth of a trench shall allow for 24" of cover from the top of the conduit to final grade. Warning tape containing metallic tracings shall be placed a minimum of 8-inches above the underground conduit/duct structure to minimize any chance of an accidental dig-up. Both ends of the metallic warning tape shall be accessible after installation.
- There shall not be more than the equivalent of two (2) 90-degree bends (180-degrees total) between pull points, including offsets and kicks. Back-to-back 90-degree bends shall be avoided. All bends shall be manufactured long sweeping bends with a radius not less than 6 times the internal diameter of conduits 2" or smaller or 10 times the internal diameter of conduits larger than

2". Bends made manually shall not reduce the internal diameter of the conduit. All branch conduits exiting a MH/HH shall be designed as subsidiary conduits only (exit from the end wall of the MH/HH, not from the side wall). Lateral conduits entering/exiting MH/HH's are not allowed. The lowest conduit knockouts shall be used first when adding new conduit to a MH/HH.

- The CCSD IT Project Manager shall observe and inspect utilities trenching, excavation, backfilling, and compaction as appropriate. Design shall include Contractor instructions to schedule all inspections prior to commencing trenching and backfilling operations. All installations are subject to satisfactory inspection by the CCSD IT Project Manager.
- Conduits shall be secured with rebar when covering conduits with concrete.
- All conduit bends and sweeps shall be concrete encased to prevent movement and "burn-through" by the pull rope during cable installations.
- Concrete encasement shall comply with State of South Carolina, Department of Transportation standard specifications.
- An orange colored additive shall be raked or trowel-worked into the wet concrete or cement slurry to identify the duct structure as communications.
- Reinforcing bars within the concrete shall be sized accordingly for the load and stress at each location.
- Contact the CCSD IT Project Manager to inspect and approve all conduits prior to encasement.
- Conduit shall be encased in concrete or cement slurry when the following conditions exist
- Minimum conduit depth cannot be attained.
- Conduits pass under sidewalks, roadways, driveways, railroad tracks and at bend points.
- Note: The American Public Works Association has adopted orange for communications, alarm cables or signal lines, cables, or conduit.

Directional Boring

- High-density polyethylene (HDPE) conduit to be used for directional boring.
- A swivel shall always be used to prevent rotation of the product pipe.

Conduit Separation Requirements

- The minimum recommended separation between telecommunications conduit systems and outside surfaces of foreign structures as required by the National Electrical Safety Code (NESC) for personnel safety and the protection of telecommunications equipment shall always be maintained.
- All plastic underground piping shall be kept at a 10' distance from steam/condensate lines unless approved by the CCSD IT Project Manager. When crossing is necessary within the 10' distance limitation, transition to galvanized rigid pipe for at least 10' on either side of the intersection.
- Communications conduits may also require a pipe insulation treatment to be installed.
- If required separation cannot be obtained, an engineered solution shall be submitted to the CCSD IT Project Manager for review and approval prior to the beginning of any installation work.

MAINTENANCE HOLES / HAND HOLES

GENERAL REQUIREMENTS

- MH/HH's are required where maximum cable reel lengths are exceeded, at the intersection of main and branch conduit runs and at other locations where access to the cable in a conduit system is required.
- The maximum distance allowed between buildings and MH/HH's or between two MH/HHs' is 600 feet.
- No more than (2) 90-degree bends in conduit between MH/HHs'.
- MH's and HH's shall be constructed to withstand a minimum of AASHTO-H20-44 full traffic loading.
- All MH/HH covers shall be rated for heavy and constant vehicular traffic, regardless of placement location.
- All hardware in MH/HH's shall be galvanized.
- Pulling eyes shall be a minimum of 7/8-inches in diameter and located at opposite ends of each conduit entrance point.
- All MH/HH covers shall be marked for easy identification (Communications) and have a permanently attached embossed label/plate indicating the assigned MH/HH number. (Contact the CCSD IT Project Manager for MH/HH numbers).
- MH locations where the distance between the ceiling of the manhole and the street level exceeds 24" shall require the installation of permanent steps in the neck of the MH. These steps shall be installed in the neck rings at the same time as the MH is being installed, per manufacturer instructions. Steps shall not be cut and cemented in place after the installation of the neck ring.
- Provide (4) L-Cable Racks HH and (8) L-Cable Racks per MH.
- Where placement location is a roadway, driveway, bike path, fire line, loading dock or trash pickup area, provide only a MH.

Additional HH Requirements

- Minimum hand hole is 36" x 24" x 36" deep.
- All Hand Holes (HH) shall be equipped with slip resistant covers with height adjustment brackets, torsion assist openings, guard bars and hex head type bolts.
- HH's shall not be placed in a main conduit route between two MH's. MH/HH's shall be placed at strategic locations in a conduit system to allow installers to pull cable through the conduit with minimum difficulty and to protect the cable from excessive pulling tension.
- Step rungs are to be installed within a pull box installed deeper than the standard 3-feet and extension rings are required to match grade.
- Coordinate the installation with the CCSD IT Project Manager.

MH/HH Conduit Entry Requirements

- If the total number of conduits being placed is significantly less than the capacity of the termination MH or cable entrance, conduit shall enter at the lower level. The upper space shall be reserved for future additions.
- Conduit servicing buildings or other MH/HH's shall be installed using the subsidiary conduit method. Lateral conduits entering/exiting MH/HH's are not allowed.

- Twenty-two-degree and 45-degree conduit angles are preferred. Regardless of depth, all bends and sweeps shall be concrete encased or coated rigid steel to prevent movement and "burning through" by the pull rope during cable installations.
- Conduits installed between MH/HH's and buildings and between other MH/HH's shall be sloped per ANSI/TIA-758 to ensure proper drainage of water.
- All conduits entering buildings shall be plugged with expandable type duct plugs, Jackmoon or equal, inside the building to prevent rodents, water, or gases from entering the building. MH/HH conduits shall be plugged with duct seal material to prevent the entrance of water and gases.

UNDERGROUND SERVICE ENTRANCE CONDUIT

- Underground conduit shall be Schedule 40 PVC. All 90-degree bends shall be electrical grade, schedule 40 PVC or Rigid Galvanized Steel (RGS) sweeps with minimum bending radius of 36".
- Three 4" Schedule 40 PVC conduits, minimum of 24" BFG below a sidewalk or in open landscape areas, 36" minimum below a roadway, from the nearest right of way to a 36" long x 24" wide x 36" deep composite concrete hand-hole located 6' from the building's exterior wall.
- Trenches to be as straight and a direct line as possible. Routes through unstable soil such as mud, shifting soils, or other hazards should be avoided.
- From the hand hole extend located 6' from the exterior of the building three 4" PVC coated rigid steel conduit, 24" BFG to 4" AFF in the left corner of the 16' wall of the MTR wall where the service provider's equipment will be wall mounted.
- Conduit pathways shall slope down away from the MTR and from the mid-point between any two hand holes to prevent accumulation of water in conduits.
- Additional hand holes should be provided and installed at intervals not to exceed 200'. If the distance from the right of way to the point of entrance into the building is less than 200' then only a single maintenance hole will be required 6' from the exterior wall of the building.
- A ¼" diameter polypropylene pulling rope shall be installed in each conduit from the MTR to the right of way.
- The ends of all conduits shall be plugged during construction to prevent entrance of foreign matter.
- The General Contractor shall assure that all conduits are sealed gas tight in the MTR/TR to prevent ingress of water and noxious gas after the service provider has installed cables.
- A continuous no. 10 AWG copper grounding conductor shall be buried in the bottom of the trench, (or pulled with bore pipe) prior to installation of any conduit, with adequate length at each end for connection to ground system.
- All ends, joints and internal finish of conduit shall be free of sharp edges or burrs which could damage the cable.
- All buried joints shall be glued with cement as recommended by the conduit manufacturer.
- A yellow traceable warning tape shall be installed above each conduit pathway 8" below finished grade. This is applicable to all conduit installed in a trench or bored in.

DIVISION 31 – EARTHWORK

- Division 31 Sections will vary with each project. Renovation projects may have little site work, whereas a new facility or addition may have significant or extensive site work.
- Bind the subsurface reports in the Project Manual.

SITE DEVELOPMENT DESIGN CONSIDERATION

- There are many issues to be addressed in the site design of a school. These considerations include:
  - Allowance for future building expansion and accommodation of future mobile classrooms.
  - Development of circulation patterns that separate pedestrian and bike traffic from vehicular traffic, the bus drop/parking from the parent drop off and staff parking from student parking.
  - Main building entrances are readily identifiable
  - Utilization of exterior terraces/patios for outdoor learning areas.
  - Providing disability access to all buildings and play areas in accordance with State and Local Codes and ADA requirements, including auditorium and cafeteria stages.
  - Minimize the building's environmental impact on the site per the SCDHEC-OCRM Storm Water Management Program
    - run-off control (watershed issue)
    - minimize excavation
    - protect trees at drip lines from construction activities and grade changes
    - minimize grounds maintenance
    - protect wetlands; follow setback requirements set by SCDHEC-OCRM or local jurisdiction, whichever is more restrictive.
    - promote onsite infiltration through the use of pervious concrete, pervious asphalt and/or subsurface retention devices

DEWATERING

Specifies permanent-dewatering requirements not covered in other Division 1 sections. Require Contractor to prepare and submit a Dewatering Plan for approval by the AE and Program Management.

EARTHWORK

- Coordinate this Section with Division 1 Sections, including Allowances, Unit Prices, and Temporary Facilities.
- In general, the site shall be graded to balance cut and fill.
- Specify and adequately define all materials to be encountered or brought to the job site in the course of the earthwork operations. This shall include but not limited to the various soil classifications, sub-base materials, drainage fill, and backfill materials. Clearly define rock materials in both open excavation and trenches. Explosives shall not be used without written approval from Program Management.

- Contractor and Program Management shall obtain written acceptance of final grading from Owner prior to seeding/sodding grounds.
- Rock Definition: Rock material in beds, ledges, non-stratified masses, and conglomerate deposits and boulders or rock material and pit excavation that cannot be removed by rock excavating equipment without systematic drilling, ram hammering, and ripping shall not be removed until it has been cross-sectioned by a South Carolina Registered Land Surveyor. The AE shall classify and verify quantities prior to removal.
- Include by reference, the geotechnical report for the site in the contract documents.
- Undercutting and removing unsatisfactory soils from excavations and recommendations for replacement soils shall be described in the Construction Documents if the amounts can be clearly defined in the documents.
- Specify compaction procedures and requirements to suit the Project.
- Program Management shall coordinate cut and fill needs/supply between current and nearby CCSD projects.

TERMITE CONTROL

- All new construction requires termite treatment of all buildings on the site.
- Initial soil treatment shall be by applying chemical termiticides to the soil (not bait systems). Termiticides shall be registered with and applied in accordance with the Environmental Protect Agency and the South Carolina Department of Fertilizer and Pesticide Control.
- Post warning signs in treated areas.
- Termiticides shall not be applied when soil is excessively wet or frozen, or when rainfall is predicted as imminent.
- Capital Building Program shall pay for the first years' bond.
- Pest Control Operator/Applicator (PCO) shall be licensed with the South Carolina Department of Fertilizer and Pesticide Control. PCO must have an office in the tri county area to service the bond and perform retreatment as required to keep the bond in force.
- Final surface preparation shall be provided by the PCO prior to treatment to include the removal of foreign matter and debris; and loosen, rake, and level soil if it is highly compacted or uneven.
- Treatment of soil adjacent to exterior foundation walls shall be done after all required grading, excavating, and final landscaping and filling operations are completed.
- Voids in block wall construction shall be treated as close as possible to the footing and foundation.
- Trenching or trenching combined with rodding shall be used to treat soil adjacent to the foundation walls.
- A compatible dye shall be used in the termiticide to provide visible evidence or treatment.
- A quality control inspection shall be conducted after treatment and a report submitted to AE and Owner. The report shall include a copy of the bond.
- **Warranty:**
    - Warranty Period starts at the date of Substantial Completion.

- Special Warranty: Manufacturer's standard form, signed by Applicator and Contractor certifying the termite control work, consisting of applied soil termiticide treatment, will prevent infestation of subterranean termites. If subterranean termite activity or if damage is discovered during warranty period, retreat soil and repair damage caused by termite infestation at no cost to owner.
- Applicator shall issue a one-year contract, performance of which is insured by an insurance company licensed to do business in South Carolina.
- Re-treatment upon evidence of subterranean termite activity during warranty period shall be at no charge to the owner.
- The contract shall provide a reinspection of the structure at least once annually and application of chemical found necessary for continued control of subterranean termites.
- The contract shall provide for repairs and/or replacement of all subterranean termite damage to the structure and its contents in the amount minimum of $250,000 and shall extend for five (5) year from the date of substantial completion. The damage contract shall have a renewal clause by which the owner may, at his/her option, may extend the contract by at least 15 years.
- It shall be the Applicators responsibility to inform the owner at least 90 days in advance of warranty expiration date(s). Failure to properly notify the owner will indicate continued coverage of the optional warranty period at no additional cost to the owner.

- **Maintenance Service**
  - Continuing Service: Beginning at Substantial Completion, provide 12 months continuing service including monitoring, inspection, and re-treatment for occurrences of termite activity. Provide owner a standard continuing service agreement. State services, obligations, conditions, and terms for agreement period; and terms for future renewal.

SITE CLEARING

- Site must be fully cleared of all debris in any finished landscaped, hardscaped, or built area.
- Contractor and Program Management shall obtain written acceptance of final grading from Owner prior to seeding/sodding grounds.
- Burning trash or construction debris on site is not permitted.
- Burying of construction debris on site is not permitted.
- Photograph the site conditions prior to site clearing. Photographs shall be included in project closeout documents.

DIVISION 32 – EXTERIOR IMPROVEMENTS

GENERAL

- Provide designated vehicular access to all outdoor athletic facilities, landscaped areas, and interior of tracks. Hardscape, paving materials should be able to withstand vehicular traffic in these areas.
- Require the contractor to maintain all landscaping until written notice of acceptance is received from Owner.

BUS DROP-OFF, PARENT DROP-OFF AND PARKING TRAFFIC

- These three functions shall be separated as much as possible.
- At all drop off areas that discharge or pick-up of students at the loading-unloading zones shall be from the side of the vehicle opposite the driver and toward the buildings. Vehicle stacking shall be accounted for in the design so as not to impede the flow of traffic off campus.
- Parking bays for full-service buses shall be a minimum of 15ft. wide
- Backing up of buses shall not be required or permitted.
- A minimum outside turning radius of 50 feet shall be provided at bus driveways and parking areas. The minimum inside radius shall be 32 feet.
- Lane width shall be such that if a bus goes out of service, the buses behind it shall be able to pass around it safely.
- Sidewalks shall be provided at each loading/unloading area.

BUILDING ENTRANCES

- All primary building entrances used for students shall be protected from weather by overhead cover or soffit and shall be readily identifiable from vehicle approaches and parking lots.
- Each loading/unloading area shall have a covered canopy and covered walkway leading into the building. The canopies shall not drain across sidewalks and shall be sloped away from the building.
- For larger schools the bus drop canopy shall be a minimum of 12 ft. wide and 100 ft. long and walkway canopy to the building be a minimum of 8 ft. wide.
- Bottom of canopy soffits shall be a minimum of 10 ft. above finish grade at bus drops.
- Columns supporting canopies shall be set back from the curbs a minimum of 4 ft. to allow car or bus doors to open.
- Canopies shall be designed to avoid roosting of birds.
- Where canopies and covered walkways block access to courtyards and other areas, coordinate with Fire Department, Emergency Services and utility companies and provide for access to that area.
- Canopy lighting is required on all entrances, bus loop and car rider loop structures. The conduit and lights shall be run below the roof deck and secured to the structure and not screwed through the roof.

SERVICE DOCKS

- Service docks shall be covered or partially covered.
- Dock height shall be at 48 in. Use concrete, not asphalt, for dock surface.
- Specify installation of dock pads and dock leveler.

RETAINING WALLS

Retaining walls with a height of 5 ft. or greater or walls subjected to surcharge loading (i.e. vehicle traffic, sloping backfill, or point loads) shall be designed and stamped by a professional engineer.

STORAGE BUILDINGS

Shall be provided if required by Owner. AE shall consult with Owner on storage need and shall use finish materials and colors to match adjacent buildings.

EXTERIOR MECHANICAL AREAS

- Shall be enclosed with security fencing and vehicle stops.
- Provide reinforced concrete slab with fenced area with proper sized pads/curbs for equipment mounting.
- Slope slab away from building.

HOT – MIX ASPHALT PAVING

- Heavy-duty pavement as specified by SCDOT shall be used for car loading, bus loading, truck access, and delivery drives.
- Pavement marking paint complying with FS TT-P-1952, applied to a minimum wet film thickness of 15 mils.
- Specify field quality control tests to be coordinated by contractor and provided by Owner's testing agency.

CEMENT CONCRETE PAVEMENT

- Concrete shall be specified for service pads and walkways. Stamped, patterned, and colored concrete are not permitted in these areas.
- Control joints, isolation joints, and expansion joints shall be shown on the drawings.
- Expansion joints shall conform to ASTM D 1751, ASTM D 1752, or current SCDOT standards. All roadways, parking lot islands, and dumpster pads/enclosures shall have curb and gutters.
- Curbs shall be tapered (sloped). Blocked curbs are not permitted.

PAVEMENT JOINT SEALANTS

- Joint sealants shall be used for concrete-to-concrete and concrete-to-asphalt pavement joints outside the building. The type of sealant shall be appropriate for its intended use.
- Expansion and control joints in walkways and joints abutting the building at doorways and masonry walls shall be sealed.

UNIT PAVERS

Unit pavers when used shall be kept to a minimum. Setting method shall secure the pavers in place to prevent theft and vandalism.

TENNIS COURT SURFACES

- Use Textured acrylic surfacing for asphalt tennis courts and similar play areas.
- Surfacing shall conform to the Requirements of the ASBA for planarity.
- All surface coatings products shall be supplied by a single manufacturer.
- The Contractor shall record the batch number of each product used on the site and maintain it through the warranty period.
- The installer shall be an authorized applicator of the specified system.
- The manufacturer's representative shall be available to help resolve material questions.
- Do not install when rainfall is imminent or extremely high humidity prevents drying. Materials are to be only applied when ambient temperature is in compliance with manufacturer's recommended installation specifications.

ATHLETIC TRACKS

- All running tracks (high school) shall be designed for 400 meters. High schools shall have eight (8) lane tracks. Track shall be marked per NFHS or SCHSL standards.
- Use Plexitrac Lightening Polyresin running track surfacing system, as manufactured by California Products Corporation as a basis of design. The mixture of specifically gradated rubber granules and Polyresin binders shall be placed over the accepted bituminous concrete base.
- No part of the surfacing installation shall be conducted during rainfall or when rainfall is imminent. After a rainfall, sufficient time shall be given to allow the surface to dry thoroughly. Materials are to be only applied when ambient temperature is in compliance with manufacturer's recommended installation specifications.

ATHLETIC FIELDS

- Owner Plant Operations shall review and approve Athletic Plan.
- Contractor shall hold a current CSFM (Certified Sports Field Manager) Certification through the Sports Turf Managers Association or shall be a CFB (Certified Field Builder) through the American Sports Builders Association. If contractor does not hold either of the current certifications, they must submit experience in Athletic Field Construction (at least 3 prior projects) and list of references to the Owner (Plant Operations Designee) for approval.
- All drainage must be designed based on a herringbone system.
- Final grade shall be approved by Plant Operations Designee prior to sodding.
- Prior to sodding check slope, all foreign materials and stones shall be removed and the soil shall be leveled and rolled with a heavy (2000 – 4000lbs.) roller. Soil shall be kept damp, not dry or wet, when it is worked. Alternately contractor may drag and roll area until foot marks cannot be seen readily or they are less than ¼ in. deep.
- Sod netting must be removed during installation.
- If field is to be sprigged, 10 week grow-in program shall be submitted as part of the proposal
- Organic fertilizer shall be used as a pre plant application applied at a rate of 10-20 lbs. of product per 1000 sq. ft prior to sodding to enhance soil.

- During sodding, area shall continuously be drug/raked to ensure consistent smooth surface from start to finish.
- Sod seams shall be pulled tight and not show any gaps between seams.
- Post sod rolling with a 1-2 ton roller in 2 directions.
- Certified TifTuf Bermuda shall be used.
- Baseball/softball, bullpens areas shall consist of synthetic turf from front edge of mound through back edge of home plate area.

PLAYGROUNDS

General

- Playgrounds shall be designed based on the CCSD Playground Design Standard Designs – See Appendix H. The age groups for differing playground designs are 0-2 years, 2-5 years, and 5-12 years.
- The designer/company of the playground equipment and/or impact attenuating surfaces shall provide clear concise installation instructions and procedures of each play structure and impact attenuating surfaces prior to purchase.
- The designer/company shall include drawings, recommended maintenance specifications, warranty information, certifications, and a complete parts list prior to purchase.
- Playgrounds are divided into two distinct areas: 1.) Playgrounds are those with equipment (fall rated) and 2.) Play Areas are those for open play spaces (not fall rated). Size of surfaced area shall be dependent on equipment use zones from playground equipment design and minimum requirements set forth by the playground vendor/equipment manufacturer
- Play Areas are the flat open space with synthetic turf. Play areas shall be programmed at a minimum of 7500sf.
- Playground equipment Designer/Company/Installer shall have a current Certified Playground Safety Inspector Certificate.
- The overall design of the playground, site preparations and equipment location shall be the responsibility of the Architect and Civil Engineer.
- Playground layout and location shall be made based upon the building and site conditions.
- The design shall be conducive to encourage children to interact with each other in a safe environment and shall be developmentally and age appropriate for children of all abilities
- The design shall address ADA access, site preparation, under artificial turf drainage system, playground equipment layout, security and site fencing.
- Playground sites shall be accessible from the nearest access point/door of building and General Contractor to provide a connecting sidewalk from access point/door to the play area.
- 0-5 years old classroom doors shall exit directly on to the playground, have sidewalks surrounding the playground and shall have access control.
- Shade structures shall be included in the design and sized appropriately and be rated to withstand 155 mph winds or wind design conditions at site, whichever is greater. Quick release tensioning shall be required at each corner on all cables and be precut to size. No brackets or cable clamps on cables for tensioning are allowed.

- Shade structures shall be located outside of the equipment use zones or integrated into the post and platform structure. Shade structures shall be manufactured to meet International Building Code ratings for wind and live loads.

Equipment

- Equipment shall be IPEMA certified and meet current ASTM, CPSC, and DOJ ADA standards and compliance.
    - Plastic components shall be UV stabilized and rotomolded, HDPE or LDPE
    - Hardware shall be galvanized or stainless steel
    - All materials shall be proven to be durable
    - The Designer/ Company shall provide a warranty that meets or exceeds the comparable industry standard.
- Equipment selection preference shall be given to accessible features and play events.
- The A/E shall work with the Owner approved playground equipment vendors to ensure that the design and equipment meets Owner requirements. The Facilities Management Plant Operations Division shall have final approval authority on all aspects of the design. Program Management shall not have approval authority of playgrounds.
- Overhead activities shall not be permitted in equipment design/selection.
- Posts and rails of equipment shall be constructed of galvanized steel and contain a rust-resistant primer process prior to finishing with a super-durable polyester powder coating.
- CAD file shall be provided by the architect to the playground vendor to insure proper layout of equipment as per public playground standard & guidelines.

Surfacing

- Surfacing material shall be Synthetic Turf secured to a concrete curb with ground contact rated treated lumber. Owner must approve artificial turf.
- Surfacing system shall be IPEMA Certified, meet or exceed current ASTM, CPSC & DOD ADA standards and guidelines.
- The designer/company shall provide a current ASTM F1292 laboratory test report for a Critical Fall Height that meets or exceeds the Fall Height specified by a CCSD Plant Operations appointee prior to purchase for surfacing systems and wear mats.
- Infill materials and padding shall be approved by a CCSD Plant Operations and be IPEMA certified and meet current ASTM, CPSC, and DOJ ADA standards and compliance.
- All materials in the surfacing system shall be tested in the ASTMF1292 laboratory test report.
- Water Permeability: Turf, pad and sand infill shall drain at a rate of at least 150 inches per hour (ASTM F 1551)
- AE shall use the manufacturer's Basis of Design for compacted stone base requirements for the turf grass.
    - Depth shall be up to 4 inches of Number 57 and 89 washed stone
    - Shall maintain ¼" per foot slope and exhibit positive drainage.
    - Density shall be 90% compaction with final condition of stone level and stable
    - Shall maintain porosity to ensure direct drainage.

- Top of curb shall be elevated 2” above top of compacted stone (or recommended by the manufacturer.
- Holes drilled for play structures shall be concrete filled up to the level of the sub-base.

- All hardware shall be galvanized or stainless steel.
- Playground surfacing systems within the use zone and accessible routes shall meet current ASTM, CPSC, and DOJ ADA standards and compliance.
- Wear mats shall be provided on top of synthetic surfacing at all slide exits, swings, rotating equipment, and around high traffic areas.
- Where appropriate, use of recycled materials shall be considered where warranty would not be voided.
- HydroChill or equivalent shall be used on all artificial turf installations.

Site Considerations

- Site preparations (excavation, grading, drainage, concrete) provided by General Contractor prior to playground equipment installation company’s arrival on site:
- Excavation: the playground area shall be excavated to a depth of 6”-7” below finished grade of surrounding sidewalk.
- Grading: the playground area shall be graded away from the building toward yard drains @ no more than 2%.
- Concrete:
  - Contractor shall leave out an open section of sidewalk and/or curbing for equipment and surfacing installation machinery access.
  - Sidewalks surrounding the play areas for ages 0 – 5 years old shall be provided for accessibility and as tricycle pathway.
  - Curbing shall be provided around the perimeter of play areas for ages 5-12 years old. Please refer to the equipment vendor’s design drawing for size and linear footage.
  - Spoils shall be backfilled against outer edge of the concrete curb and sidewalk.
  - Accessible sidewalk shall be provided from nearest access point/door to the new play area and tied into/ramped up to the new concrete curb.
- Drainage:
  - Utilities located outside of the use zone of the playground equipment but within the surfacing area shall be at or below grade and meet current ASTM, CPSC, and DOJ ADA standards and compliance.
  - Storm drains, plumbing clean-outs, and surface catch basins shall not be permitted in the use zone of each piece of equipment or in the play areas.
  - A perforated sock pipe shall be laid in a stone bed on the interior of sidewalk on the low side of site
  - Drain outlets shall tie into the perforated sock pipe and run underneath of the sidewalk and tied into the roof or yard drain system outside of the fenced Playground.
- Soil Compaction: Site subsoils shall be properly compacted to honor equipment and surfacing warranties.
- Landscaping: Sod and landscaping shall be installed after the playground is completed or a pathway through new sod shall be left out for machinery access.

Fencing

- Fencing shall remain uninstalled at the access point for machinery until after playground and surfacing installation is complete.
- Fencing shall meet ASTM F2049 standard for fencing/barriers for playgrounds. Fencing for playgrounds housing equipment designed for 0-2 year old's and 2-5 year old's shall be 4 feet tall powder coated aluminum (confirm with Plant Operations) and shall be placed a minimum of 5 feet beyond the use zone of any playground equipment.
- Height of all fence construction except playgrounds shall be a minimum of 6ft.
- Posts and rails shall be constructed with powder-coated galvanized steel
- All exterior gates shall require panic hardware and locks. Locks shall be included in the hardware schedule.

Installation and Inspection

- Installation of play equipment and impact attenuating surfaces shall be completed by a Qualified Person as defined by current ASTM and CPSC standards and compliance.
- Prior to first use of the playground, the installer of the playground equipment and the impact attenuating surfaces, shall provide the CCSD Plant Operations appointee written verification from a Qualified Person that both have been installed per the Manufacturer or Designer's plans and specifications per CCSD Plant Operations plans and purchasing requirements.
- Prior to acceptance and first use of the playground, a CCSD Plant Operations appointee shall complete an Audit/Inspection of the play equipment and a surface impact test in accordance with current ASTM and CPSC standards and compliance for field testing.
- Audits/ Inspections and surface impact testing shall be completed by a CCSD Plant Operations Certified Playground Safety Inspector and Certified Playground Surfacing Technician.

IRRIGATION SYSTEMS

- SEE Appendix A - DIVISION 32 FOR SUPPLEMENTAL IRRIGATION SYSTEM REQUIREMENTS
- Irrigation systems shall be centrally controlled over the internet. The controller shall be compatible with Toro DXI Central Control system.
- Drip irrigation shall not be used.
- Drip irrigation shall only be considered for Trees with the use of bubblers. Prior approval must be given by Plant Operations.
- Irrigation system maintenance shall begin immediately following the installation of each portion for each plant(s) and shall continue until installation of planting is complete, all punch list work is complete and the planting is contractually accepted by the landscape architect and Owner. Owner shall be responsible for all required Irrigation system maintenance after all punch list work is complete and the irrigation is contractually accepted by the landscape architect/civil engineer and Owner.
- The irrigation system shall be designed in accordance with the latest edition of the Irrigation Association & American Society of Irrigation Consultants "Landscape Irrigation Best Management Practices"
- Temporary Irrigations systems shall be used to establish the plants.

- Permanent irrigation shall be defined as any underground irrigation systems. Temporary irrigation shall be defined as any above ground irrigation systems. Two wire systems are not allowed. The system must be compatible with current internet-based control system.
- Permanent irrigation systems shall have the following:
    - System ground
    - Master control valve
    - Flow sensor connected to control unit
    - Two data drops to each control unit
    - Toro Communication Cable R-7162D shall be used
- Wells and retention ponds systems shall require approval by Plant Operations.
- Irrigation systems can be installed to help establish plants for one year after the planting period but shall only be at the main, public entrance. The design team shall review the irrigation limits with Owner during the DD document review.
- Irrigation systems shall include piping, valves, sprinklers, sprinkler specialties, and controls Irrigation systems shall have timers, rain sensors, and moisture sensors.
- High School competitive sports fields, high school practice and band fields shall have permanent irrigation systems.
- Irrigation systems shall be metered separately from other site water use and utilize a backflow preventer.
- Maximum four (4) sprinkler heads per zone.
- All heads shall have adjustable swing joints and chrome sleeves.

CHAIN LINK FENCES AND GATES

- Fencing in high profile areas shall be ornamental or 9-gauge black vinyl coated, class 2b, PVC coating that is thermally fused and adhered onto the galvanized steel wire.
- All other fencing including those for the sports fields shall be 9-gauge galvanized steel chain link fence and gates with all accessories, fittings, and fastenings.
- All exterior gates shall require panic hardware and locks. Locks shall be included in the hardware schedule.
- Fencing for playgrounds housing equipment designed for 0-2 year old's and 2-5 year old's shall be 4 feet tall and be placed a minimum of 5 feet beyond the use zone of any playground equipment.
- Height of all fence construction except playgrounds shall be a minimum of 6ft.
- Fabric of fence shall have knuckled selvage at both top and bottom. Do not extend fabric above the top rail.
- All fenced areas, unless specified below, must have 12 feet wide gates to allow for vehicular access. Fencing is required for security around exterior mechanical equipment areas, for security and at exterior sport functions including tennis courts and high school baseball and softball fields. No enclosure fence is required in Middle School Softball Fields, however, a 10 ft. high chain link backstop with a 5 ft. high foul ball screen set at 45 deg shall be provided.

- The distance between the bottom of a sliding gate and asphalt shall not allow people to crawl under it. Sliding gates in areas with vertical curbs shall require the curb to be modified with a tapered area where it slides through. In addition, the area where the mechanism is located shall have a concrete pad or trough for the gate to slide into to keep grass and debris from collecting under the sliding gate.
- Vehicular gates configuration and location shall be coordinated with the security plan. Provide signage at each gate directing users about usage, hours of operation and stop signs. In addition, the gates shall have reflective materials on both sides to alert drivers to the gate's presence.
- Mechanical equipment areas shall be enclosed with fence construction a minimum of 6 ft. high. Provide clearance around equipment as required for service and operation. Gates shall be a minimum of 8 ft. wide utilizing double gate design. Where equipment enclosure fencing is adjacent to main buildings the fence construction shall match building construction.
- Tennis courts shall be enclosed with a 10 ft. high chain link fence with 4 ft. wide gates and wind screening.
- High School Baseball and Softball Fields shall be enclosed with a 6ft. high chain link fence with 14 ft. wide service and 4 ft. wide player gates. A fenced bull-pen area shall be provided. Crowd separation fences shall be 4 ft. high. A 12 ft. high chain link backstop with a 5 ft. high foul ball screen set at 45 deg. shall also be provided at softball fields. At baseball fields the backstop shall be 18 ft. high and the foul ball screen shall be 6 ft. high. Dugouts shall be a minimum of 8 ft. high and the fencing between the backstop wing and the dugouts shall be a minimum of 10 ft. high. All framework on backstops and hoods shall be welded. Outfield fence shall be installed with vinyl slats to match school color. Provide protective cover at top of outfield fences.
- Retention and Detention Ponds shall be fenced (6 ft high minimum) and gates a minimum of 12 ft. to allow mowing equipment to service the banks.
- A perimeter fencing plan is required in accordance with Crime Prevention through Environmental Design concept of "territoriality". The plan shall be approved by the Owner in writing.

FIRE TRUCK ACCESS

- Fire truck access lanes that cross play areas shall be defined with a low concrete curb on both sides that does not pose a tripping hazard.
- Fire truck access lanes in other areas shall be marked per OSF in the most unobtrusive way possible.

LANDSCAPING

- Owner Plant Operations shall review and approve landscape plan.
- Landscape maintenance shall begin immediately following the installation of plants for each portion of the landscape plan and shall continue until installation of all plants is complete, all punch list work is complete and the planting is contractually accepted by the landscape architect and Owner.
- Contractor shall maintain building grounds and retention ponds by cutting grass on a biweekly basis at a minimum until Project is accepted by Owner.
- Owner shall be responsible for all required maintenance after all punch list work is complete and the planting is contractually accepted by the landscape architect and Owner.

- The landscape maintenance budget and contracts are set up to edge, maintain turf, clean up in general. They are not set up to maintain beds or to replace mulch on a periodic basis.
- Specify safeguarding of all existing landscaping and monumental trees not identified to be removed due to the construction plans. Removal or damage to such protected areas, plants and trees shall result in chargeback from Owner and required replacement of similar landscaping features.
- Landscaping shall be minimal. Flower beds shall not be considered. A landscape plant list shall be included in the bid documents and project close out documents.
- At renovation/addition projects, the Design shall specify that the Contractor isolate and protect existing planting and lawn areas.
- Any devices such as stakes that are used to secure trees or other plantings shall be installed flush to the ground.
- Trees shall be provided with self-water devices and the contractor shall be required to keep them supplied with water as necessary to ensure survival of the tree during the warranty period.
- No existing trees shall touch the finished building or finished roof. Tree removal shall be evaluated based on full, mature canopy of tree species.
- The AE or Landscape AE shall strive for a Xeriscape design and select plants from commercially available native and adaptive species that thrive in the local climate without irrigation.
- All plants shall be native and non-invasive and shall be accompanied by a certificate stating, "certified under all applicable state and federal quarantines."
- Do not specify plants with thorns, thistles or toxic foliage, flowers or fruit.
- Specifications shall address submittals, quality assurance, delivery and storage, warranties, maintenance, general product requirements, and installation techniques.
- Beds that require mulch use shall be minimized in all landscape designs and will be restricted the area around signs or at the front entrance only or as required by local municipalities.
- Landscaping shall not obstruct weep holes and/or storm drains and shall maintain proper slope for drainage away from structures. Only turf is allowed directly up to the building exterior.

PLANTING

- If permitted.
- All planted beds of any type shall have sterile topsoil.
- No plants shall be planted closer than 4 ft. to the building, trees no closer than 15 ft. to the building. No trees shall touch or overhang the building or the roof. Tree placement shall be evaluated based on full, mature canopy of tree species.
- All shade trees shall be placed in a manner so that mature size limbs shall not touch or overhang buildings or power lines or encroach on adjacent trees. At driveway and parking areas all trees shall be at height at installation that they shall not obstruct motorists' line of sight.
- Use triple shredded hardwood mulch for slope plantings and low visibility and outlying areas.
- Landscape with trees and/or shrubs when slopes in high visibility areas or slopes greater than 3:1 grade. Slopes of lesser grade can be seeded with Celebration Bermuda and irrigated to get them

established. Where slopes exceed 5:1 grade, ground cover such as Parson Juniper shall be planted and mulched with a minimum of 3-inch compacted pine bark.

- Require tree/shrub protection fence that is placed at the drip line of the tree.
- Tree, shrub, and ground cover planting shall have a minimum of an 8 in. deep plant beds including 2 in. of decomposed organic matter. They shall receive an application of pre-emergent "herbicide" before area is mulched. A minimum of 3 in. of pine straw mulch shall be applied after herbicide. Islands in parking lots shall be mulched and shall not be planted with grass.
- All shrubs placed near buildings shall be selected from varieties so that at mature height of the planting shall not overgrow or obstruct vision from windows. At driveway and parking areas shrubs shall be selected from varieties so that at mature height of the planting shall stay below the motorists' line of sight.

GRASS SEEDING

- Grass seeding shall not be permitted without Owner approval.

SODDING

- Sod shall be Certified by Zeon or Empire Zoysia.
- Sod with netting or mesh not permitted.
- All rocks and debris to be removed prior to sodding.
- Areas immediately around the buildings and court-yard areas shall be sod unless areas are to be irrigated.
- Competitive athletic fields shall be sod
- Check slope, remove all foreign materials and stones larger than ½ in. Level soil and roll with heavy (250-300 lbs.) roller. Keep soil damp, not dry or wet, when it is worked. Alternately rake and roll area until foot marks cannot be seen readily or they are less than ¼ in. deep.
- Apply starter fertilizer at a rate that shall provide 1 to 1-1/2 lbs. of actual nitrogen/1000 sq. ft. Rake starter fertilizers into soil surface to about 1 in. deep and proceed with grass seeding. From time of seeding to substantial completion the Contractor shall keep maturing grass irrigated on a regular basis.

BUILDING EXPANSION AND RE-LOCATABLE CLASSROOMS

- The planning for future-building expansion and re-locatable classrooms shall consider grading, circulation patterns and utility stub outs.
- Require Mobile Classrooms to be located and installed in accordance with the OSF P&C Guide.
- Fire equipment access around the site will be an important aspect of structure location.

DIVISION 33 – UTILITIES

PIPED UTILITIES – BASIC MATERIALS AND METHODS

- Specify common pipe and utility materials and installation methods throughout project.
- Piping subject to freezing shall be provided with freeze protection.

INTERCEPTORS

- Coordinate with Division 22 – Plumbing.
- Concrete is acceptable.
- Interceptors shall be located outside the building.

SANITARY SEWERAGE

- Specify materials for sanitary sewerage outside the building as follows:
  - Cast Iron (or PVC if approved by Owner) shall be used under slab
  - PVC schedule 40 for pipe and fittings less than 4 inches. For sizes 4 inches or larger, use ASTM D 3034, SDR 26 PVC.
- Top loading classifications of cleanouts shall be as follows:
  - Light Duty: In earth or grass foot traffic areas.
  - Medium Duty: In paved foot-traffic areas.
  - Heavy Duty: In vehicular-traffic service areas:
  - Extra-Heavy Duty: In roads.
  - Sewer Pipe Fitting and Riser to Cleanout: PVC to match pipe. Provide cast iron inspection cover and frame for cleanout.
- Specify quality control testing requirements of sanitary sewer lines to be performed by the Contractor. Report to be included in project close out documents.

SEPTIC TANK SYSTEMS

Specify tank, distribution box, and drainage pipe for septic tank systems. Use of Septic Systems is not permitted unless no possibility of a permanent sewer system is available in the area. If used, attain all permits and adhere to SCDHEC requirements in design and during construction.

SUB DRAINAGE

Specify foundation, under slab, plaza deck, retaining wall, and landscaping sub drainage systems as required by site soil conditions. Materials shall be as determined by the civil and structural engineers.

STORM DRAINAGE

- Storm water discharges and erosion control are covered by SCDHEC under the NPDES Permits.
- Retention ponds shall have banks constructed to accommodate deck mowers to service the banks. Pond banks shall be solid sodded – grass seed is not permitted. The contractor shall irrigate as necessary to ensure the sod is established. Aeration pumps are recommended in all retention ponds.

- All retention ponds shall have a fore bay integrated into the design.
- Grated storm water inlets in grassed areas shall have a 36-inch-wide concrete collar around the entire perimeter. The collar will start at grade and slope down to the inlet. The collar will be a minimum of 4 inches thick and be able to withstand the loads of lawn equipment.

Appendix A: Basis of Design Manufacturers

Division 03 - Concrete

- Pre-Cast Architectural Panels
  - Metromont
  - Tindall
  - Old Castle Precast
- Concrete Admixture
  - Barrier One

Division 04 – Masonry

Division 05 – Structural Steel Framing, Steel Joists, Steel Decking, etc.

- Handrails
  - R & B Wagner, Inc.,
  - JG Braun Co.,
  - Superior Aluminum Products
  - Handrails and railings in shall be fabricated from aluminum - coordinate finish with Owner and Program Management.
- High Performance Coating – Sherwin-Williams
- Prime Coat - Macropoxy 646 (B58W610)
- Finish - 2 coats – Acrolon 218 (B65W651)

Division 06 – Wood, Plastics, and Composites

- Interior Architectural Woodwork
  - Transparent Finished Casework: Casework shall be natural maple and of a heavy-duty construction.
  - Countertops: Solid surface with solid surface backsplash and sealed joints.

Division 07 – Thermal and Moisture Protection

- Metal Wall Panels
  - The use of metal panel systems must be approved by the Associate of Facilities Management.
- Sheet Metal Roofing
  - Sherwin Williams Anti Corrosion Coating
  - Prime Coat – BondPlex (B71W211)
  - Finish – SherCryl (B66W351)
- Fluid Applied Membrane Roofing (polyurethane elastomeric fluid–applied system)

- Tremco, Inc.
- Sika Corp.
- Kemper
- Siplast
- Soprema

- Fiberglass Doors and Frames (FRP)
  - Special-Lite, Inc. SL-17
  - Chem-pruf
- Overhead Coiling Doors
  - Overhead Door Corporation
  - Wayne-Dalton
  - Cornell Iron Works, Inc.
  - The Cookson Company
- Overhead Coiling Grilles
  - Overhead Door Corporation
  - Wayne-Dalton
  - Cornell Iron Works, Inc.
  - The Cookson Company
- Sound Control Doors
  - Wenger

Division 08 – Openings

- Aluminum Storefront Doors/Systems
  - Kawneer.
  - Old Castle (Vista)
  - YKK

Door Hardware

- See Openings Studio Virtual Design for latest information

ITEM	MFG	ITEM NUMBER	LOCATION
HINGE(S)	MK	TB2314 32D	Exterior door
HINGE(S)	MK	TB2714 26D	Interior
HINGE(S)	MK	TB2314 NRP 32D	Exterior outswing
HINGE(S)	MK	TB2714 NRP 26D	Interior security

ITEM	MFG	ITEM NUMBER	LOCATION
HINGE(S)	MK	T4B3386 32D	3'6 exterior
HINGE(S)	MK	T4B3386 NRP 32D	3'6 exterior
HINGE(S)	MK	T4B3786 5 26D	4'0 interior
HINGE(S)	MK	T4B3786 5 NRP 26D	4'0 interior security
CONT HINGE	PE	CHS83-HD1	Exterior
CONT HINGE	PE	CHS83-HD1 PT	Exterior electric connection
CONT HINGE	PE	CFM83-HD1	Exterior
CONT HINGE	PE	CFM83-HD1 PT	Exterior electric connection
PERM CORES	CR	8000 6PIN GMK 626	Key cores
CYLINDERS	CR	1080-114-A02-6 CMK 626	Cylinder
CYLINDERS	CR	3080-178-6 CMK 626	Cylinder
O H HOLDERS	RX	10-336	Standard duty stops
O H HOLDERS	RX	9-336	Heavy duty stop
CLOSER	CR	DC6200/DC6210	Most doors
CLOSER	CR	DC6200 M71	
CLOSER	CR	DC6210 A3	Outswing doors
CLOSER	CR	DC6200 A3 M71	
CLOSER	CR	DC6210 A4	Outswing doors
CLOSER	CR	DC6210 A11	Entry doors
CLOSER	CR	DC6210 A12	Entry doors
CLOSER	CR	DC62940 ET	
CLOSER	CR	DROP PLATE 597F58 (M80)	
CLOSER	CR	BLADE STOP SPACER M77	
ADA OPER	NO	6920	Entry auto opener
ADA OPER	NO	6920 D	Entry auto opener
SWITCH	NO	685	ADA operator
SWITCH	NO	691	ADA operator
MAG HOLDER	RX	998	Fire corridor doors.
DEADBOLT	CR	ML2029 M19	Teacher corridor toilet
PASSAGE SETS	CR	ML2010 LWA 630	
PRIVACY SETS	CR	ML2030 LWA 630	Interior toilet
DEADLOCK	CR	ML 2017	Serving/kitchen
DEADLOCK	CR	ML2017	Locker room
LOCKSETS	CR	ML2051 LWA CT6R (+CYL)	Office

ITEM	MFG	ITEM NUMBER	LOCATION
LOCKSETS	CR	ML2055 LWA CT6 (+CYL)	General locking
LOCKSETS	CR	ML2057 LWA CT6 (+CYL)	Storage
LOCKSETS	CR	ML2057 LWA CT6 (+2CYLS)	Classroom
(FOR TEACHER TOILET USE ML2057 X D271)			
REM MULL	CR	907BKM CL6	Pairs of doors
REM MULL	CR	WS707AKM CL6	Exterior pairs
EXIT DEVICE / Card reader	CR	Ed 5200S M107 M54 MELR M802 TCRNE1 Th957 M52	Entry Door/Secure Door
EXIT	CR	ED5200	Standard panic device
EXIT	CR	ED5200A	Fire exit
CLSRM EXIT	CR	ED5202S CT6 (+CYL)	Classroom exit
CLSRM EXIT	CR	ED5202SA	Classroom exit fire rated
EXIT - ADD	CR	4' LENGTH WO48	4' exit door
EXIT - ADD	CR	SHIM KIT M58	Window kit - exit
EXIT	CR	ED5200S	Standard panic device
EXIT	CR	ED5200SA	Fire exit
EXIT - ADD	CR	WINDSTORM M107	Impact exit add
EXIT TRIM	CR	TH957 CT6R (+CYL)	Outside trim
EXIT TRIM	CR	TH595 CT6R (+CYL)	Outside trim
EXIT TRIM	CR	L955 CT6R (+CYL)	Outside trim
EXIT TRIM	CR	TH955 CT6R (+CYL)	Outside trim
EXIT TRIM	CR	TH950	Outside trim
EXIT	CR	ED5400	Vertical exit - pairs
EXIT	CR	ED5400A	Vertical exit - pairs-fire rated
EXIT	CR	ED5470	Vertical exit -pairs
EXIT	CR	ED5470B	Vertical exit -pairs
EXIT - ADD	CR	LESS BOTTOM ROD M55	xxx
EXIT - ADD	CR	LATCH PULL BACK M94	electric exit
EXIT - ADD	CR	SHIM KIT VR M58	window kit - vertical exit
EXIT - ADD	VD	98/99 RIM	
	HES	SMART PAC 2005 M3	Electric strike accessory
POW SUP	CR	BPS-24-1	Electric power supply
ELEC STK	HES	8500 852	Electric strike-admin entry
ELEC STK	HES	9600	Electric strike-admin entry
CONTROLLER	CR	781N-120	Elec exit power supply - entry
POWER TRSF	CR	EPTL	Wire transfer jamb to door
POWER TRSF	SEC	EL-SEPT	Wire transfer jamb to door
POWER TRSF	SEC	EL-CEPT	Wire transfer jamb to door

ITEM	MFG	ITEM NUMBER	LOCATION
A FL BOLT	RO	1945 SET	Locking bolt for inactive leaf
A FL BOLT	RO	1842 SET	Locking bolt for inactive leaf
FL BOLT	RO	557	Locking bolt for inactive leaf
FL BOLT	RO	555	Locking bolt for inactive leaf
SUF BOLT	RO	550-8	Locking bolt for inactive leaf
DP STRIKE	RO	570	
PUSH PL	RO	70C	
PULL PL	RO	106 X 70C	
COORD	RO	1700	Accessory for pair of interior doors
KICK PL	RO	K1050 10 X 34	
KICK PL	RO	K1050 8 X 46	
KICK PL	RO	K1050 E X 34	
ARMOR PL	RO	K1050 36 X 34	
KICK PL	RO	K1050 8 X 40	
MOP PL	RO	K1050 4 X 35	
FL STOP	RO	471	
FL STOP	RO	443	
WALL STOP	RO	406	
DR STOP	RO	462	
LOCK GRD	RO	321	Security guard for exterior lock
SILENCERS	RO	608	
VIEWER	RO	622	
COAT HOOK	RO	802	
ASTRAGAL	PE	305 CN 84"	
MULL SEAL	PE	5110BL 120"	
W/S	PE	303 AS 36 X 84	
W/S	PE	303 AS 72 X 84	
SMK SEAL	PE	S88D 17'	
SMK SEAL	PE	S88DD 21'	
ASTRAGAL	PE	355 84"	
DR SWEEP	PE	3452 CNB 36"	
DR SWEEP	PE	3452 CNB 48"	
THRESHOLD	PE	171 A 72"	
THRESHOLD	PE	171 A 36"	
THRESHOLD	PE	171 A 48"	
THRESHOLD	PE	2005 AV 72"	
THRESHOLD	PE	2005 AV 36"	
THRESHOLD	PE	2005 AV 48"	
THRESHOLD	PE	2005 AV 96"	

ITEM	MFG	ITEM NUMBER	LOCATION
KEY CAB	LU	1205	

Manufacturer
Key
MK - McKinney
PE - Pemko
CR - Corbin Russwin
RX - Rixson
NO - Norton
HES - Hes
RO - Rockwood
SEC - Securitron
LU - Lund
VD-Von Duprin

Division 09 - Finishes

- Resilient Wall Base
  - Refer to District IDC for an approved list of manufacturers and installers which can be obtained by contacting the District Procurement Office
- Resilient Tile Flooring
  - LVT
- Refer to District IDC for an approved list of manufacturers and installers which can be obtained by contacting the District Procurement Office
- Rubber Floor
  - Johnsonite raised round dot stair treads: color codes HNSP – LA7, HNSP – LH9, HNSP – LG6, HNSP – LD3 and HNSP – LB8
- Tile Carpeting
  - Refer to District IDC for an approved list of manufacturers and installers which can be obtained by contacting the District Procurement Office
- All Carpeting
  - Shall be solution dyed fibers
- Painting
  - Sherwin – Williams
  - Duron, Inc.
  - ICI Paints
  - Rose-Talbert
  - PPG

Division 10 - Specialties

- Electronic Digital Marquee Signs:
  - Contact Owner IT for direction
- Interior Signage
  - INPRO Standard Signage Package for CCSD
  - Submit options for approval
- Operable Wall Panels
  - Advanced Equipment Corporation
  - Hufcor
  - Modernfold, Inc.
- Toilet and Bath Accessories
  - Bobrick
  - ASI
  - Bradley
  - General Accessory Mfg. Co
  - Georgia Pacific
- These Products must be specified or as directed by Owner Plant Operations
  - Paper Towel Dispenser - Georgia Pacific Vista Hygienic Push Paddle Dispenser
  - Soap Dispenser - Spartan Lite ‘n Foamy # 9751 Foam Dispenser
  - Toilet Tissue Dispenser - San Jamar Reserva Jumbo Roll Dispenser #R3090TBK
  - Warm Air Dryer Surface Mount ADA compliant Excel ThinAir, World Dryer (Verdedri) and Saniflow Speedflow Plus
  - Recessed Automated Touchless Towel Dispenser-Georgia Pacific enMotion MFG Part # 59466

Division 11 - Equipment

- Residential Appliances
  - General Electric
  - Hotpoint
  - Maytag
  - Whirlpool
- Sound Systems
  - Contact Owner IT Projects for direction.
- Interior Score Boards
  - Daktronics

- Electro Mech
- Nevco
- OES Scoreboards

Food Service Equipment

The following is an equipment list (Elementary Schools):

EQUIPMENT SCHEDULE

ITEM NO	EQUIPMENT CATEGORY	MANUFACTURER	MODEL NUMBER	ITEM NO
1	FLY FAN	MARS AIR DOORS	42CH	1
2	TRACK SHELVING, 4–TIER	EAGLE GROUP/METAL MASTERS	2148E W/ CASTERS & TRACK	2
3	WALK–IN COOLER / FREEZER W/ ALARM, 8'–6" H	KOLPAK	–	3
4	WALK–IN SHELVING, 4–TIER	EAGLE GROUP/METAL MASTERS	2148E	4
5	PREP TABLE W/ SINKS & DRAWERS	FABRICATED	–	5
6	CUTTER, VEGETABLE	ROBOT COUPE	R602X	6
7	PREP TABLE W/ SINKS	FABRICATED	–	7
8	BIN, INGREDIENT	PIPER PRODUCTS	47–75	8
9	BAKERS TABLE	FABRICATED	–	9
10	40 QT. MIXER W/ 20 QT. ACCESSORIES	HOBART US FOODSERVICE	HL400–1STDDEL	10
11	HEATING & PROOFING CABINET	WITTCO	1826–15–BC–IS	11
12	STEAMER, CONVECTION, ELECTRIC	CLEVELAND RANGE	22CET6.1 / 22CET3.1 W/ MODIFIED ES263044	12
13	BRAISING PAN	GROEN	BPP–40E	13
14	FLOOR TROUGH	EAGLE GROUP/METAL MASTERS	FT–2436–SG	14
15	2–BURNER RANGE	CLEVELAND RANGE	450HPEM	15
16	OVEN–STEAMER, COMBINATION	CLEVELAND RANGE	OES–6.20 W/ CST–20–OB	16
17	EXHAUST HOOD W/ U.D.S.	CAPTIVE AIRE	–	17
18	WORK TABLE W/ SPLASH	FABRICATED	–	18
19	S.S. PASS–THRU WINDOW CAP	FABRICATED	–	19
20	REFRIGERATOR, PASS–THRU	DELFIELD	SSRPT1–SH	20
21	HEATED CABINET, PASS–THRU	DELFIELD	SSHPT1–SH	21
22	ICE MACHINE	HOSHIZAKI AMERICA	KM–515MAH	22
22.1	ICE BIN	HOSHIZAKI AMERICA	B–500SF	22.1
23	REFRIGERATOR, REACH–IN	DELFIELD	SAR1S–G	23
24	MILK COOLER	BEVERAGE–AIR	ST34N–S	24
25	TRAY / UTENSIL / NAPKIN CART	EAGLE GROUP/METAL MASTERS	CUSTOM	25
26	HOT FOOD UNIT, 4–WELL	EAGLE GROUP/METAL MASTERS	DCS4–HFU–C	26
27	COLD FOOD UNIT, 3–PAN	EAGLE GROUP/METAL MASTERS	DCS3–CFURN	27
28	FLAT TOP UNIT	EAGLE GROUP/METAL MASTERS	DCS2–STU	28
29	CASHIERS UNIT	EAGLE GROUP/METAL MASTERS	DCS–CUEL–36	29
30	ROLL–UP SHUTTER	BY G.C.	–	30
31	SOILED DISHTABLE	FABRICATED	–	31
32	GARBAGE PULPER W/ CONTROL PANEL & DISPOSAL	IN–SINK–ERATOR	WX–300	32
33	PANT LEG DUCT	FABRICATED	–	33
34	DISH WASHER	HOBART US FOODSERVICE	CLPS66E	34
34.1	BLOWER/DRYER	HOBART US FOODSERVICE	CLE	34.1
35	BOOSTER HEATER	HATCO	S–36	35
36	CLEAN DISHTABLE	FABRICATED	–	36
37	HOSE REEL W/ 15' HOSE	T & S BRASS	B–1432–01 MOD	37
38	HAND SINK	BY PLUMBER	–	38
39	POT & PAN DRYING RACK	CHANNEL	ATDR–3	39
40	3–COMPARTMENT POT SINK	FABRICATED	–	40
41	WALL SHELVES W/ POT HOOKS	EAGLE GROUP/METAL MASTERS	1448E W/ WALL BRACKETS	41
42	CHEMICAL SHELVING, 4–TIER	EAGLE GROUP/METAL MASTERS	2160E W/ P74 POSTS	42
43	MOP RACK	PRINCE CASTLE	936	43
44	LOCKERS	BY G.C.	–	44
45	DUNNAGE RACK	CHANNEL	MD2448CA	45
46	TRAY RACKS	CHANNEL	401A–011	46

Division 12 - Furnishings

- Blinds
  - By Owner
- Site Furnishings
  - By Owner

Division 14 - Conveying Systems

- Hydraulic Elevators Only – No traction type elevators

Division 21 - Fire Suppression

- All piping and fittings shall meet made in USA standards
- Piping
  - Wheatland Tube
  - Allied Tube
  - Northwest Pipe
- Fittings
  - Star
  - Victaulic
  - Viking

Division 22 - Plumbing

- Valves
  - Hammond
  - Nibco
  - Fairbanks
- Pumps
  - TACO
  - Grundfos
  - Armstrong
  - Peerless
  - Bell and Gossett
- Meters and Gauges
  - Ashcroft
  - Palmer
  - H.O. Trerice
  - Taylor

- Domestic Water Heater
  - State
  - Rheem
  - PVI
  - Lochinvar
  - A.O. Smith
  - Rennai
- Fixtures
  - American Standard
  - Eljer
  - Kohler
- Flush Valves
  - Zurn Aquasense AV ZER series
  - Sloan Regal XL
  - Sloan Royal
  - Sloan SFSM Flushometers with mechanical override
  - American Standard
    - Sensor operated flush valves shall use AA or C batteries
- Faucets
  - Chicago Faucets
  - Zurn Plumbing Products
  - T&S Brass
  - Moen 8884 and 8886 metered faucets
- Water Coolers
  - Elkay
  - Halsey Taylor
  - Acorn/Aqua
- Express Lavatories
  - Willoughby
  - Acorn
  - Meridian

Division 23 - HVAC

- Design Preferences

- Equipment for Elementary and Middle schools - Air Cooled DX.
- Water Source Systems shall be considered if presented to Owner in a BOD with a life cycle cost analysis or other analysis that indicates it is the best alternative for that facility.

- Dedicated Outdoor Air Units
  - Greenheck
  - Venmar
  - Governair - Nortek
  - Trane/KCC
  - Mitsubishi
  - Captive Air
  - Seasons 4
  - Valent
- Water Source Heat Pumps
  - Trane
  - Daikin
  - Florida Heat Pump
  - Carrier
  - ClimateMaster
  - York (JCI)
- Boilers
  - Riverside Hydronics, Model Centauri Plus 1500MBH to 2000MBH
  - Lockinvar
  - Bryan
  - Aerco
  - Patterson Kelly
- Cooling Towers
  - Evapco
  - B.A.C.
  - Stainless Steel only, no Fiberglass towers will be considered.
- Motors
  - Toshiba
  - Siemens
  - Century
- Controls

- Siemens
- Pipe / Fittings
  - All pipe and fittings shall meet made in the USA standards
  - Wheatland Tube (Steel)
  - Allied Tube
  - Northwest Pipe
  - Weldbend (Welded Steel Fittings)
  - Cerro Tube (Copper)
- Specialties Pumps
  - B&G
  - Taco
  - Armstrong
- Valves
  - Hammond
  - Nibco
  - Fairbanks
  - Stockham
- Fired Hot Water Boilers
  - Lochinvar
  - Bryan
  - Aerco
  - Patterson Kelly
- Factory Fabricated Evaporative Cooler
  - Evapco
  - BAC
- Packaged Roof Top Air Cooled Heat Pump Units
  - Trane
  - Lennox
  - Carrier
  - York (JCI)
  - Daikin
  - ICP
  - Rheem/RUUD

- Air to Air Split Systems and Heat Pumps
  - Trane
  - LG
  - Daikin
  - Mitsubishi
  - Lennox
  - Carrier
  - York (JCI)
  - ICP
  - Rheem/RUUD

Division 26 - Electrical

- Low Voltage Transformers
  - Eaton
  - GE
  - Square D
  - Siemens
- Switchboards and Panelboards
  - Eaton
  - Square D
  - Siemens
  - GE
- Wiring Devices
  - P&S
  - Hubbell
  - Bryant
  - Arrow-Hart
- Enclosed Switches
  - Eaton
  - Square D
  - GE
  - Siemens
- Enclosed Electrical Shut Down
  - Remote Electrical Power Shut down station shall be Knox-Vault #4500 and be recessed mounted with alarm tamper switch.

- Package Generator Set
  - Caterpillar
  - Cummins
  - Kohler
  - Detroit Diesel
- Automatic Transfer Switches
  - Russell Electric
  - ASCO
  - Zenith
  - Caterpillar
  - Cummins
- Transient Voltage Suppression
  - Innovative Technology
  - Liebert
  - Datek
  - Eaton
  - Square D
  - GE
- Lighting Fixtures
  - Cree
  - GE
  - Philips
  - Lithonia
  - Hubbell
  - Visionaire – Exterior
  - Emergency Light-Hubbel EVC12IDW-06L
  - Emergency Light-Lithonia ELM6L-UVOLT-LTP-SDRT

Division 32 – Exterior Improvements

- Irrigation System Supplemental Requirements
  - The irrigation system design plan must be approved by the Plant Operations Designee.
  - Contractor shall provide (3) hard copies, PDFs, and Autocad files of the new irrigation system As-builts to owner upon completion.
  - All zones must operate with efficient water pressure. The proper amount of sprinkler heads and the correct nozzle sizes installed in these heads must be achieved to ensure that each

zone installed runs with the correct PSI when activated. Spray head zones equipped with standard nozzles will run at 30 PSI, spray head zones equipped with MP rotator nozzles will run at 40 PSI, and rotor head zones will run at 40 PSI as well.

- All valve and wire connection boxes as well as sprinkler heads that are located in grass areas shall be installed at grade level so that they will not create trip hazards or be damaged by lawn equipment.
- All heads mounted in the lawn areas shall be mounted on polyethylene pipe flex swing joints composed of 3/8" I.D. poly pipe fitted with (3/8" insert by 1/2" M.P.T.) and/or (3/8" insert by 3/4" M.P.T.) elbows.
- All sprinkler heads designed adjacent to curbs or pavement shall be installed with a clearance of 1 ½" from the edges of all paved areas to provide for edging and maintenance operations. No heads shall be allowed to be installed on shrub risers without the consent of the Plant Operations Designee.
- All sprinkler heads installed in bed areas shall not have the top of the head more than ½" above grade and shall be installed with a minimum of a 6" clearance from paved areas.
- Minimum depth of cover over mainline piping to be 18".
- Minimum depth of cover over lateral line piping to be 12".

- Controllers
  - The controller installed shall be a Toro Sentinel. Substitutions will not be considered. Substitutions will not be considered. This is the control system by the Owner District wide.
  - Provide a mother board that is large enough to accommodate all of the zones that are to be wired to it.
  - Install less than 250ft. away from the internet hub.
  - Coordinate exact location of controller with the Plant Operations Designee.
  - Hard wire controller to the closest breaker panel that has space. Provide all necessary conduit and breakers as required.
  - Secure to wall using metallic fasteners made for wall type 48 inches above the finished floor.
  - Ground per the latest addition of the IEC.
- Flow Sensors
  - Irrigation systems shall be equipped with a flow sensor. Flow sensors must be Toro brand and appropriately sized for the application.
  - Flow sensors must be installed downstream of the master valve.
  - Must use direct burial telecommunication shielded cable that's 18 AWG or larger to connect the flow sensor to the controller.
  - Contractors shall not install more than 1000ft of telecommunication cable without proper signal amplification.
- Master Valves
  - All irrigation systems shall be equipped with a master valve.

- Preferred master valve shall be Rain Bird brand, model PGA –B and sized appropriately for the application.
- The master valve shall be installed no more than 6ft downstream from the water meter and no more than 2ft up stream of the flow sensor.

- Wiring
  - Irrigation control wire installed above grade shall be incased in PVC electrical conduit
  - All wire splices shall be made using UL approved direct burial connectors and waterproofing materials.
  - Wire runs shall be installed with enough slack and/or occasional expansion loops to prevent excessive strain due to thermal expansion/contraction.
  - Wire splices shall be kept to an absolute minimum. Where major concentrations of splices are necessary said splices shall be in an NDS pro-series 10” round or NDS Pro-series square valve box. Splices at valve locations shall be made inside of the valve box. All splice locations shall be noted on the AS built plan.
  - All 24VAC control wiring shall be single strand copper wire with polyethylene PE direct burial insulation rated for 300VAC.
  - Valve common wires shall have white insulation while valve hot wires shall have insulation red in color. Both common and hot wires shall be at least 14 AWG or larger.
  - Valve wiring shall follow mainline piping where feasible and shall be laid in a common trench line with the mainline piping and in the bottom of the trench. Wiring shall be bundled and taped at intervals of approximately 10ft. All wiring shall be installed in accordance with local code requirements.
  - All irrigation zone wires (hot and common) will be 14 AWG or larger.
  - All boxes used for electronic valves, isolation valves, ball valves and wire connections Preferred manufacturer is NDS Pro-series 10” round boxes or NDS Pro-series square boxes with bricks or equivalent installed at base of box for stabilization.

- Athletic Fields
  - When installing irrigation for athletic fields valves of any kind shall not be installed in the playing area.
  - Preferred sprinkler heads are stainless steel Rain Bird 6504 rotors attached to 1” swing joint riser assemblies.

Appendix B: Elevator Non-Proprietary Affidavit

The elevator equipment including controllers proposed for the project identified below shall be Non-Proprietary. It shall comply with the following provisions and be in compliance with all known standards for universal serviceability and maintainability.

- Equipment must be generally available for purchase by any qualified elevator contracting business
- Spare Parts must be available to any qualified purchaser at reasonable prices and based on a
- published price list.
- All equipment or tools necessary for diagnostics, maintenance, adjustment, or troubleshooting shall be available to any qualified elevator contracting business. Such tools shall provide access to all parameters and levels of adjustment that are necessary for the maintenance of the equipment. Control system shall be provided with all available diagnostic tool functions, either onboard or in a separate device. There shall be no expiring or degrading software that would prohibit proper maintenance.
- Factory and or on-site training for the installation, adjustment, maintenance, and troubleshooting shall be available for the manufacturer to any qualified elevator contracting business. Any training fees shall be reasonable and appropriate.
- Technical/Engineering support should be made available to any qualified elevator contracting business/owner by the equipment manufacturer. The equipment manufacturer shall provide a toll free phone line available for technical support.
- Documentation in the form of manuals, flash drives, circuitry diagrams, prints, engineering drawings, testing procedures, and parts lists shall be provided with the equipment at the time of installation. Replacement documentation shall be available to any qualified elevator contracting business or the owner at reasonable and normal cost.

AFFIRMATION: The undersigned swears and affirms that the conditions described above are hereby made a part of the equipment proposal. The building owner, elevator contractor, and/or consultant shall reasonably rely upon these provisions.

Project Name _____

Company _____

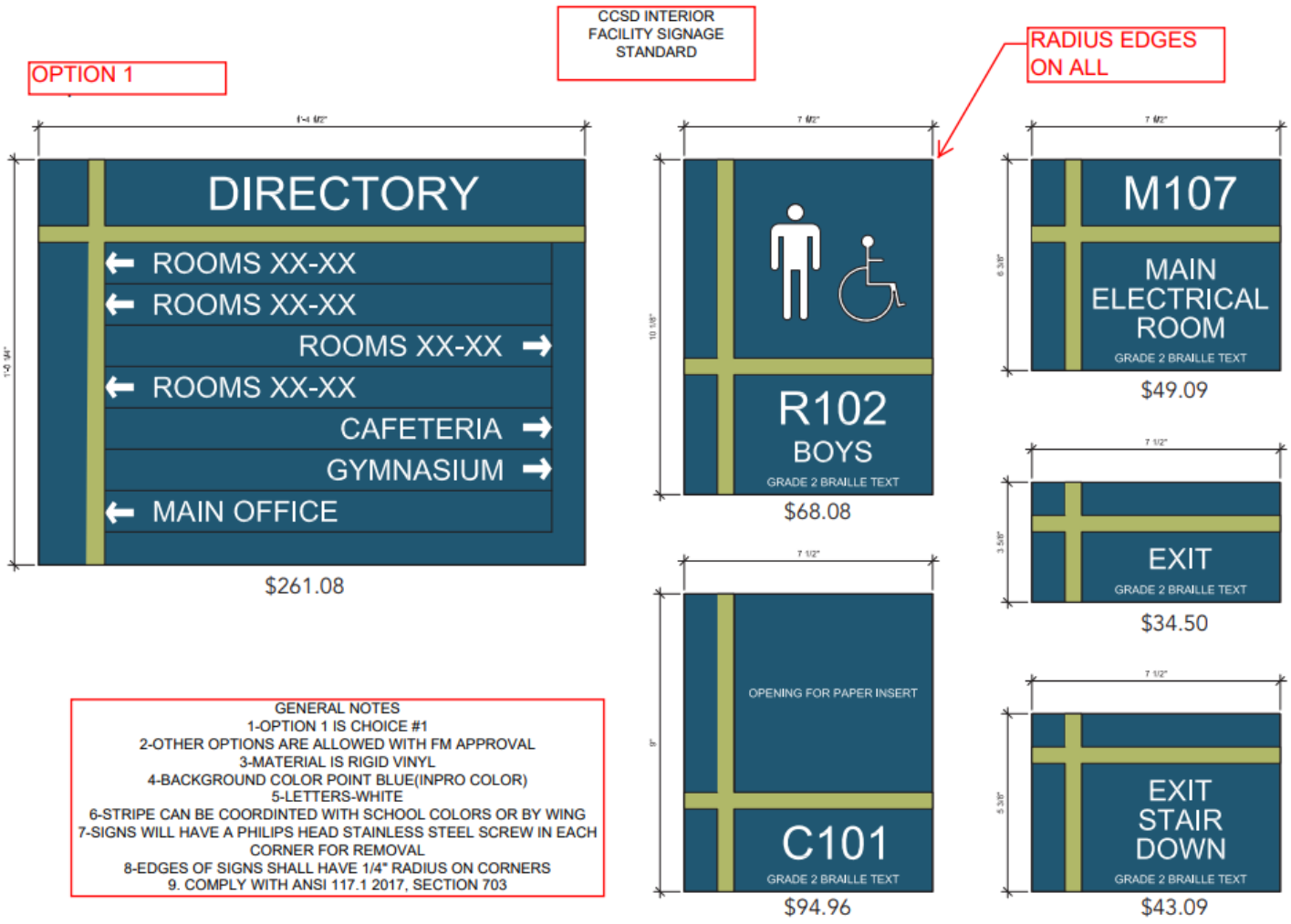
Company Representative Name _____

Company Representative Signature _____

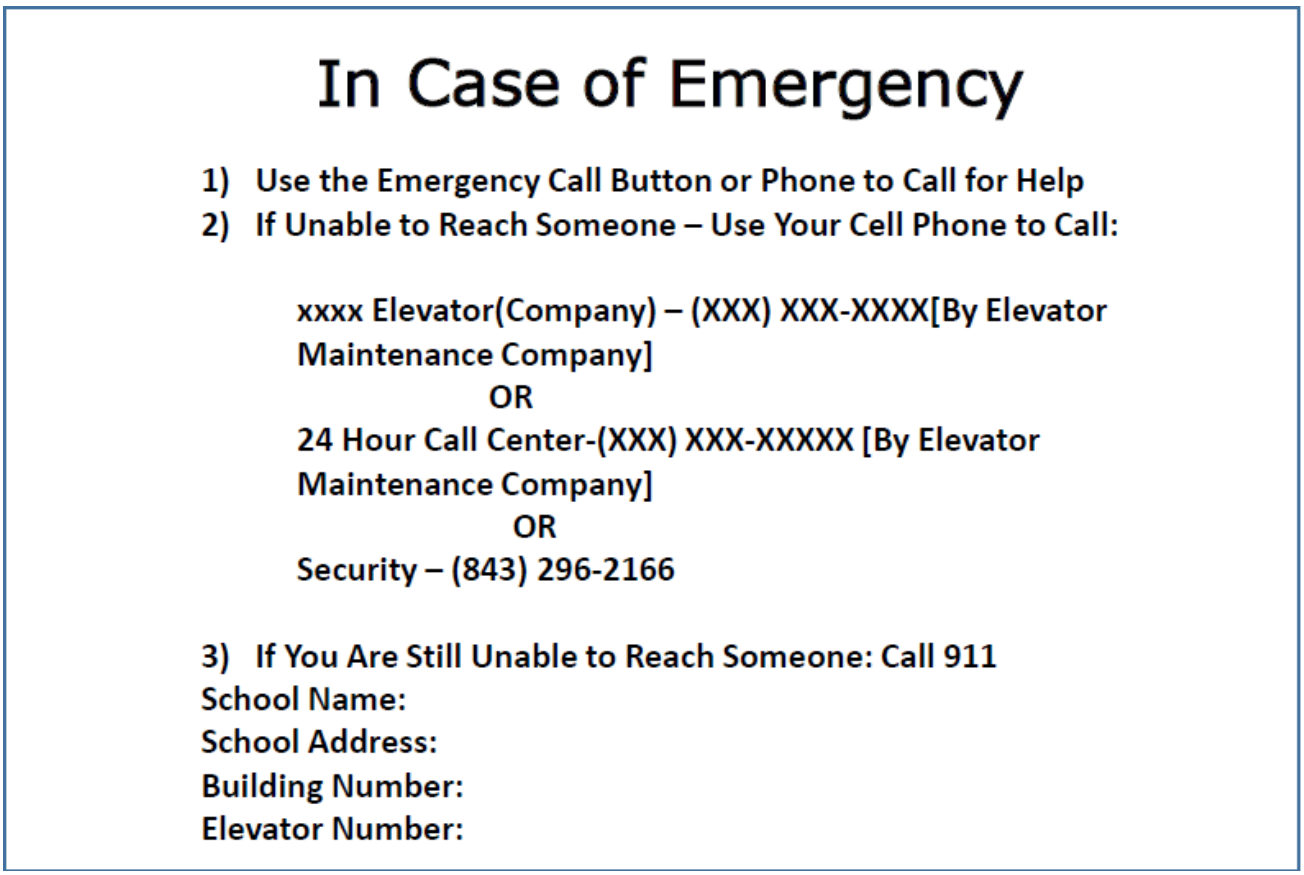
Appendix C: Room Numbering Scheme Example Chart

ROOM TYPE	EXAMPLE
1st floor classroom	102
2nd floor classroom	202
Sub-room	102A, 102B, etc.
Public toilet	T102
Private toilet	102T
Electrical room	E102
Main Corridor	CR102
Storage room	102S
Custodial room	C102
Telecommunications/Data room	D102
Vestibule	201V
Mechanical room	M102
Stairs	ST1

Appendix D: Interior Signage Standard



Appendix E: Elevator Signage



Appendix F: Asbestos/Lead Release

SECTION 00 XX XX

ASBESTOS/LEAD FREE WARRANTY

Owner: Charleston County School District
Building Number:
Project Title:
Project Address:
Project Manual Date:

Date of Substantial Completion: _____

Know all men by these present that we, _____
(Contractor, Subcontractor, Material Supplier or Equipment Manufacturer)

having furnished labor, materials, equipment and/or supplies; installed new [Describe project components i.e. sheet rock, ACT, plumbing piping/fixture etc.] installed system and/or miscellaneous roof system components; from, to and/or on the above referenced Project under contract between the Owner and Contractor, warrant to Owner with respect to said work that no materials containing asbestos fibers or lead containing paint or plumbing fixtures were incorporated into the work, and that, to our knowledge and belief, no materials containing asbestos or lead remain in or are covered by the work.

Exceptions: _____
If there are no exceptions, state "No Exceptions" here.

Signature: _____

Title: _____

_____State
_____County

I,_____, a Notary Public for_____County,
_____, do hereby certify that_____personally appeared before me this day and acknowledged the due execution of the foregoing instrument.

Witness my hand and official seal, this_____day of_____, 20_____.

_____ (OFFICIAL SEAL)
Notary Public

My commission expires_____, 20____.

END OF SECTION 00 XX XX

Appendix G: Red Zone Checklist

CCSD Red Zone (CCSD RZ) Checklist/POAM

- The CCSD RZ Checklist/POAM is a tool to track the status of critical activities required for substantial completion to help ensure their timely completion to prevent delays with the facility acceptance and turnover.
- The critical activities are organized by section according to the responsible party (i.e. Contractor, Client, and Program Management)
- Critical items missing from this list should be added as necessary to ensure the list is comprehensive. Likewise, unnecessary items should be deleted.
- Any critical items left off the CCSD RZ Checklist that are later identified after initial CCSD RZ meeting is conducted should be added immediately so their progress can be tracked.
- A copy of the CCSD RZ Checklist/POAM shall be maintained in the contract file.

Contractor Responsibility **Critical Activities**	**Point of Contact**	**Sched Comp Date**	**Actual Comp Date**	**Notes**
A. Required for Facility Delivery:				
Final Electrical Connections				
Final Water Connections				
Final Gas Connections				
Critical System Start-up:				
System:				
System:				
DALT (duct leakage) Testing				
TABS (air balancing) Testing				
ACATS (controls) Testing				
Electrical Systems Testing				
Generator Testing				
Superchlorination of potable water systems				
Plumbing/backflow Testing				
Elevator Testing				
Boiler Testing				
Crane Testing				
Fire Alarm/Sprinkler Testing				
Keying Plan Meeting				
Deliver Lockset Cores				
IT Systems Testing				
Telecommunications Connections & Test				
Final Commissioning				
System Training of CCSD/School Personnel				
System:				
System:				

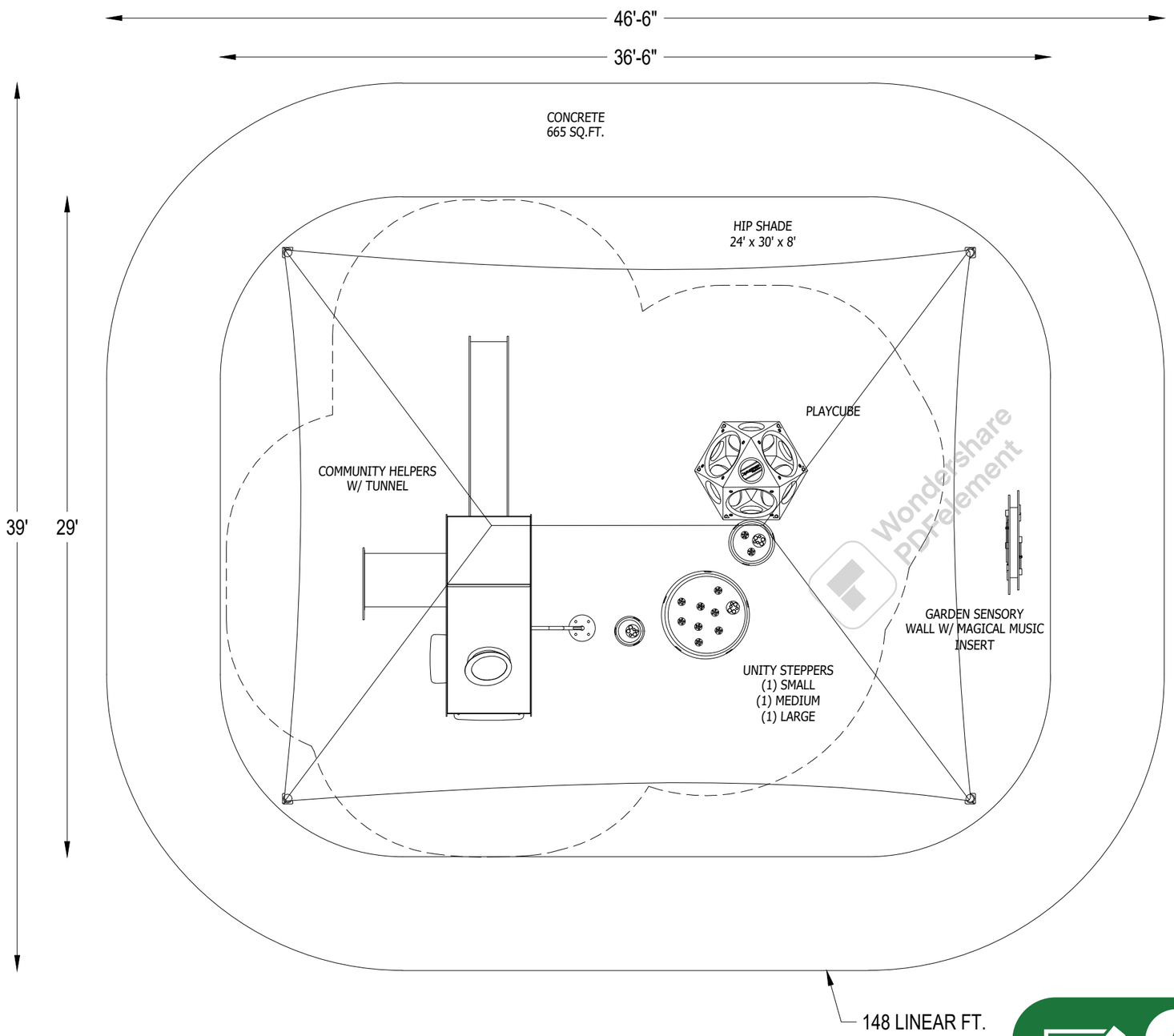
Pre-Warranty Conference				
Contractor's Pre-Final Punch List Complete				
Pre-Final Inspection				
Punch List				
Final Inspection				
BOD/Use and Possession				

B. Required for Contract Close-out:				
Delivery of O&M Manuals				
Delivery of Product Warranties				
Site Restoration				
Final Landscaping				
Spare Parts, Extra Stock, Special Tools, etc.				
As-Built Drawings				
Final Demobilization and Clean-up				
Temp Construction Fence Removed				
Project Close-out Meeting				
Close-out Storm Water Permit				
2nd Season TABS				

Client Responsibility **Critical Activities**	**Point of Contact**	**Sched Comp Date**	**Actual Comp Date**	**Notes**
A. Required for Facility Delivery:				
Keying Plan Meeting				
Telecommunication install				
Client provided equipment SELF installed				
Client provided equipment KTR installed				
Intrusion Detection Systems Test				
Secure Network Installations				
Attend Training				
B. Required for Contract Close-out:				
Planned Staff Move-in				
Planned on-site registration				
Planned Fact and Fee date				
Planned Open House				
Ribbon-cutting ceremony				

CCSD/PM Responsibility **Critical Activities**	**Point of Contact**	**Sched Comp Date**	**Actual Comp Date**	**Notes**
A. Required for Facility Delivery:				
Coordinate Final Utility Connections				
Generator Performance Verification				
Transformer Performance Verification				
DALT Verification				
1st Season TABs Verification				
ACATS Performance Verification				
Elevator Certification				
Crane Certification				
Boiler Certification				
Fire Alarm/Sprinkler Test				
Keying plan to contractor				
Lockset Cores installed				
Training Coordinated/Scheduled with FMS				
O&Ms to FMS				
Client walk-thru Inspection				
Pre-Final Inspection				
OSF Inspection				
Final Inspection				
Substantial Completion				
B. Required for Contract Close-out:				
Substantial Completion Letter to Contractor				
Acceptance Letter to Client				
Closeout permits (e.g., NPDES)				
Contractor Evaluations Complete				
Finalize Outstanding Contract Mods				
Inform CCSD of Substantial Completion				
Assist PM with AE Evaluation				
Warranty documentation to FMS				
As-Builts to FMS				
2nd Season TABs Report Review				
Annual Elevator Maintenance Complete				

Appendix H: Playground Requirements



*PLAYGROUND SUPERVISION REQUIRED

Approved

PLAYWORLD

PLAYWORLD PREFERRED
11515 Vanstory Drive
Suite 100
Huntersville, NC 28078
1-800-459-7241

EQUIPMENT SIZE:
NA

USE ZONE:
29' x 43'

AREA:
1003 SqFt.

PERIMETER:
117 Ft.

FALL HEIGHT:
4 Ft.

USER CAPACITY:
38

AGE GROUP:
2-5

- ✓ ASTM F1487-17
- ✓ CPSC #325

PROJECT NO:
22440GE-A

SCALE:
3/16" = 1'-0"

DRAWN BY:
TRAVIS MILLER

Paper Size
B

DATE:
9/30/22

HEAD START PLAYGROUND

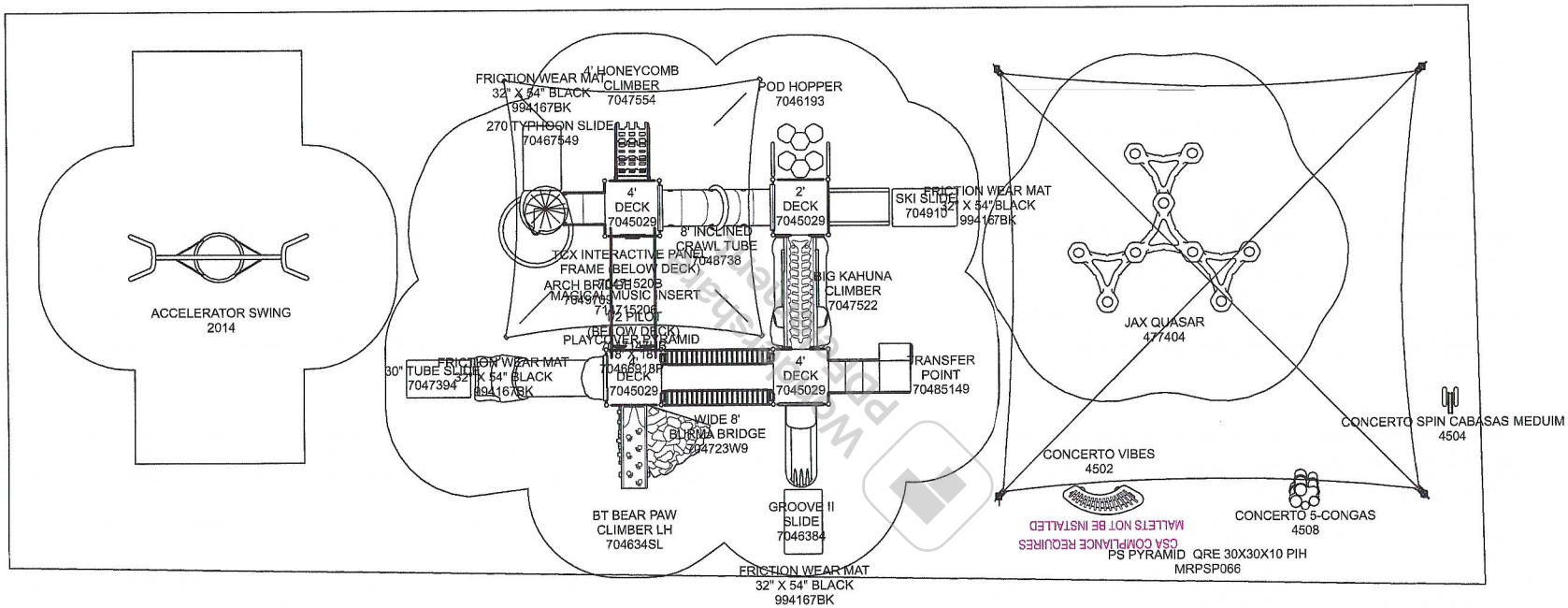
CCSD STARDARD DESIGN, SC

CCSD Kindergarten/Prek Area

AGE GROUP: 5-12	
ELEVATED PLAY ACTIVITIES - TOTAL: 8	
ELEVATED PLAY ACTIVITIES ACCESIBLE BY TRANSFER: 0	REQ'D 4
ELEVATED PLAY ACTIVITIES ACCESIBLE BY RAMP: 0	REQ'D 0
GROUND LEVEL ACTIVITY TYPE: 5	REQ'D 3
GROUND LEVEL QUANTITY: 10	REQ'D 3

FOR KIDS AGES 5-12 YEARS

FOR KIDS AGES 2-12 YEARS



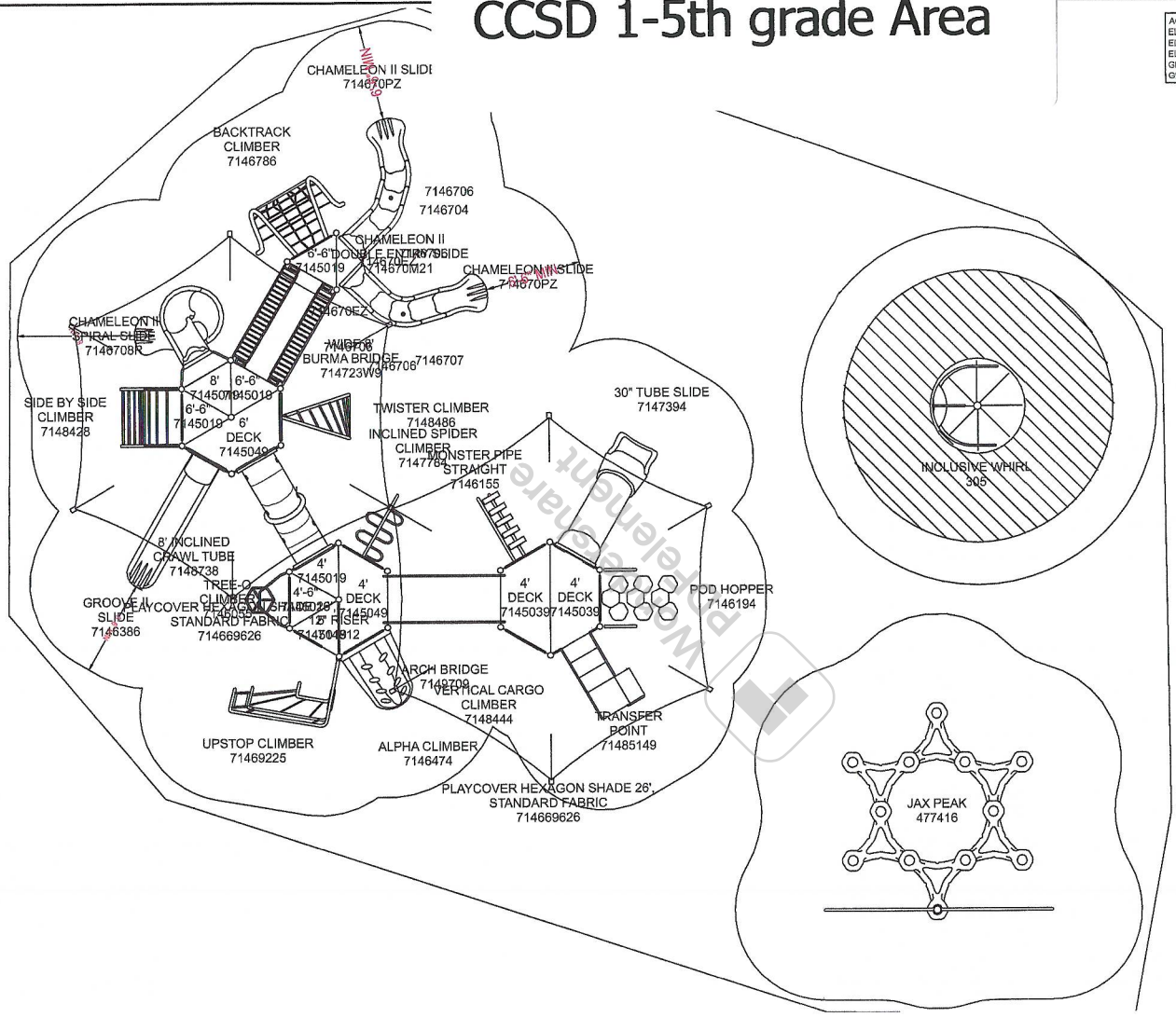
To verify product certification, visit www.ipema.org

Miracle

PlayPower 878 E. Highway 60 Monett,MO PHONE NO: (417) 354-2677 FAX NO: (417) 235-1713	R0002_44708491614	To promote safe and proper equipment use by children. Miracle recommends the installation of either a Miracle safety sign or other appropriate safety signage near each playsystem's main entry point(s) to inform parents and supervisors of the age appropriateness of the playsystem and general rules for safe play.	THE PLAY COMPONENTS IDENTIFIED IN THIS PLAN ARE IPEMA CERTIFIED. THE USE AND LAYOUT OF THESE COMPONENTS CONFORM TO THE REQUIREMENTS OF ASTM F1487.
GROUND SPACE: 94'-0" x 34'-6"	✓ COMPLIES TO ASTM/CPSC		AN ENERGY ABSORBING PROTECTIVE SURFACE IS REQUIRED UNDER & AROUND ALL PLAY SYSTEMS
PROTECTIVE AREA: 92'-6" x 38'-6"			
DRAWN BY: Cindi Pass DATE: 9/27/2022	✓ COMPLIES TO ADA		

CCSD 1-5th grade Area

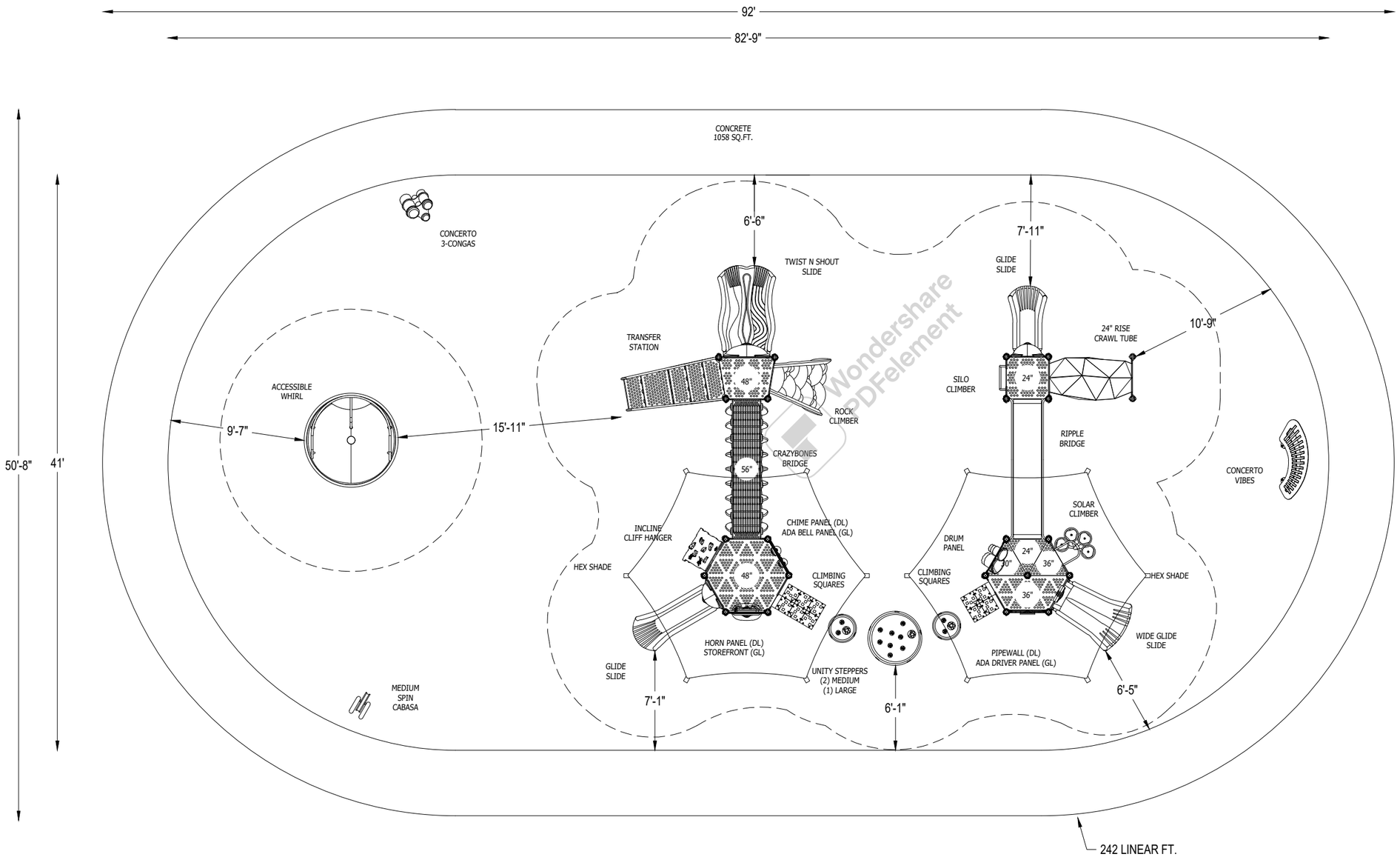
AGE GROUP: 5-12			FOR KIDS AGES 5-12 YEARS
ELEVATED PLAY ACTIVITIES - TOTAL: 17			
ELEVATED PLAY ACTIVITIES ACCESIBLE BY TRANSFER:	0	REQ'D 9	
ELEVATED PLAY ACTIVITIES ACCESIBLE BY RAMP:	0	REQ'D 0	
GROUND LEVEL ACTIVITY TYPE:	2	REQ'D 3	
GROUND LEVEL QUANTITY:	2	REQ'D 6	



IPEMA CERTIFIED TO ASTM F1487
To verify product certification, visit www.ipema.org

Miracle

CHURCHICH RECREATION & DESIGN 270 Belfair Oaks Blvd Bluffton,SC PHONE NO: (843) 757-3156 FAX NO: (843) 757-3150	R0002_44727626240	To promote safe and proper equipment use by children. Miracle recommends the installation of either a Miracle safety sign or other appropriate safety signage near each playsystem's main entry point(s) to inform parents and supervisors of the age appropriateness of the playsystem and general rules for safe play.
GROUND SPACE: 69'-6" x 57'-0"	✓ COMPLIES TO ASTM/CPSC	THE PLAY COMPONENTS IDENTIFIED IN THIS PLAN ARE IPEMA CERTIFIED. THE USE AND LAYOUT OF THESE COMPONENTS CONFORM TO THE REQUIREMENTS OF ASTM F1487.
PROTECTIVE AREA: 80'-6" x 70'-0"		AN ENERGY ABSORBING PROTECTIVE SURFACE IS REQUIRED UNDER & AROUND ALL PLAY SYSTEMS
DRAWN BY: Jeff Churchich DATE: 9/27/2022	✓ COMPLIES TO ADA	



*PLAYGROUND SUPERVISION REQUIRED

PLAYWORLD PREFERRED
11515 Vanstory Drive
Suite 100
Huntersville, NC 28078
1-800-459-7241

EQUIPMENT SIZE:
NA

USE ZONE:
82'9" x 41'

AREA:
3032 SqFt.

PERIMETER:
212 Ft.

FALL HEIGHT:
7 Ft.

USER CAPACITY:
88

AGE GROUP:
2-12

ADA SCHEDULE

	Total Elevated Play Activities: 16		
	Total Ground-Level Play Activities: 10		
	Accessible Elevated Activities	Accessible Ground-Level Activities	Accessible Ground-Level Play Types
Required	8	3	3
Provided	8	10	5

✓ ASTM F1487-17
✓ CPSC #325

PROJECT NO:
22439GE-B

SCALE:
NA

DRAWN BY:
TRAVIS MILLER

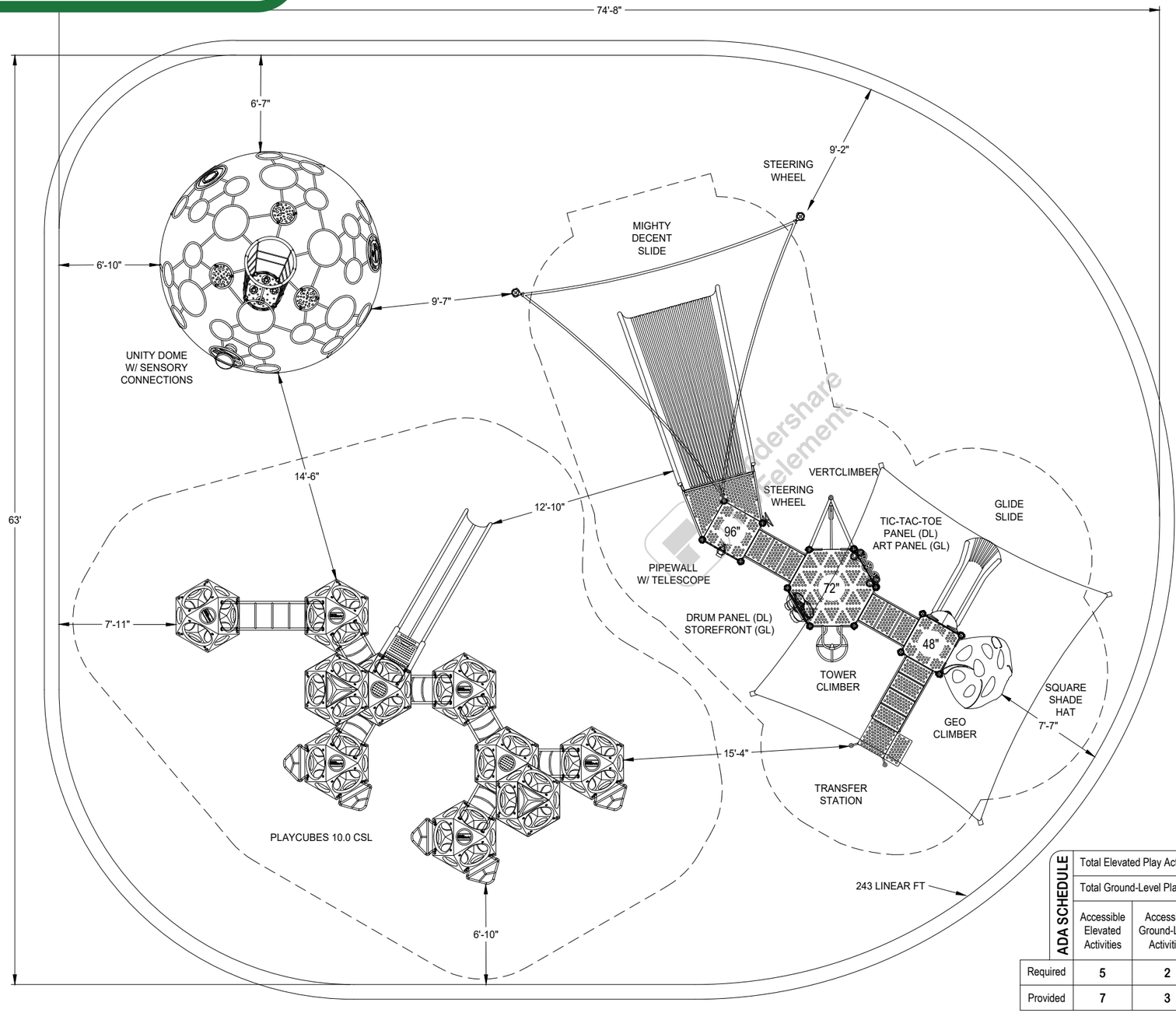
Paper Size
B

DATE:
9/30/22

KINDERGARTEN PLAYGROUND

CCSD STANDARD DESIGN, SC

Approved



ADA SCHEDULE	Total Elevated Play Activities: 7		
	Total Ground-Level Play Activities: 3		
	Accessible Elevated Activities	Accessible Ground-Level Activities	Accessible Ground-Level Play Types
Required	5	2	2
Provided	7	3	3

*PLAYGROUND SUPERVISION REQUIRED

PLAYWORLD®

PLAYWORLD PREFERRED
11515 Vanstory Drive
Suite 100
Huntersville, NC 28078
1-800-459-7241

EQUIPMENT SIZE:
NA

USE ZONE:
74'-8" x 63'

AREA:
4165 SqFt.

PERIMETER:
235 Ft.

FALL HEIGHT:
8'5"

USER CAPACITY:
131

AGE GROUP:
5-12

✓ ASTM F1487-17
✓ CPSC #325

PROJECT NO:
22441GE-C

SCALE:
NA

DRAWN BY:
TRAVIS MILLER

Paper Size
B

DATE:
9/30/22

SCHOOL-AGE PLAYGROUND

CCSD STANDARD DESIGN, SC

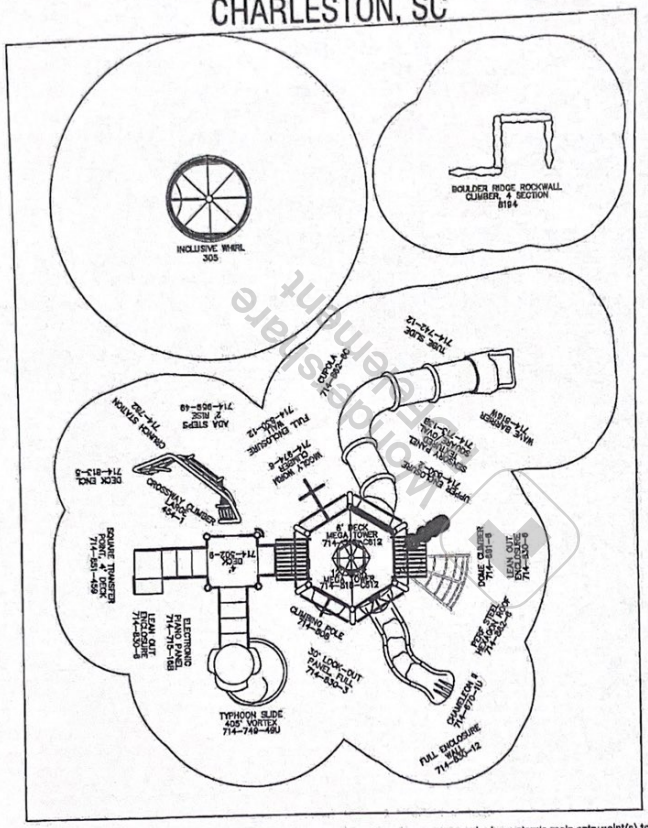
CCSD DOWNTOWN SCHOOLS
CHARLESTON, SC

AREA: 3015 sq ft
PERIMETER: 221 ft
The information provided is for estimation purposes only.

Play Area Capacity: 90-100

5-12 PLAY AREA

ELEVATED PLAY ACTIVITIES - TOTAL	7		
ELEVATED PLAY ACTIVITIES ACCESSIBLE BY TRANSFER	6	REQ'D	4
ELEVATED PLAY ACTIVITIES ACCESSIBLE BY RAMP	0	REQ'D	0
GROUND LEVEL ACTIVITY TYPE	5	REQ'D	2
GROUND LEVEL ACTIVITY QUANTITY	5	REQ'D	2



Miracle

To promote safe and proper equipment use by children, Miracle recommends the installation of either a Miracle safety sign or other appropriate safety signage near each playsystem's main entry point(s) to inform parents and supervisors of the age appropriateness of the playsystem and general rules for safe play.

THE PLAY COMPONENTS IDENTIFIED IN THIS PLAN ARE IPEMA CERTIFIED. THE USE AND LAYOUT OF THESE COMPONENTS CONFORM TO THE REQUIREMENTS OF ASTM F1487.

AN ENERGY ABSORBING PROTECTIVE SURFACE IS REQUIRED UNDER & AROUND ALL PLAY SYSTEMS.

CD226438

GROUND SPACE: 35' X 47'
PROTECTIVE AREA: 47' X 60'

✓ COMPLIES TO CPSC
✓ COMPLIES TO ASTM
✓ COMPLIES TO ADA

DESIGNED FOR AGES 5-12

ADDITIONAL GROUND LEVEL ACCESSIBLE ITEMS NEEDED FOR ADA COMPLIANCE

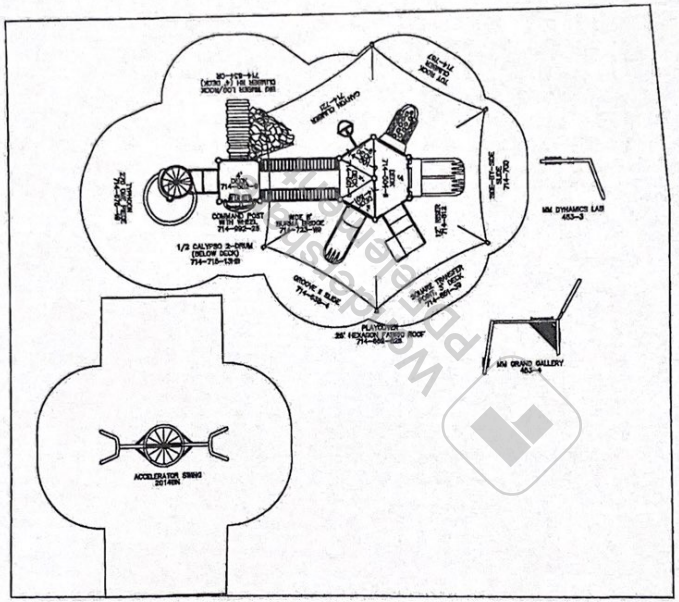
TYPE:	QUANTITY:
0	0

DATE: 7/5/2022
SCALE: 1/8"=1'-0"
TRIP

AREA: 3681 sq ft
PERIMETER: 243 ft
The information provided is for estimation purposes only.

Play Area Capacity: 85-95

CCSD DOWNTOWN DOWNTOWN 2-12 AREA
CHARLESTON, SC



IPEMA CERTIFIED to ASTM F1487
To verify product certification, visit www.ipema.org

To promote safe and proper equipment use by children, Miracle recommends the installation of either a Miracle safety sign or other appropriate safety signage near each playsystem's main entry point(s) to inform parents and supervisors of the age appropriateness of the playsystem and general rules for safe play.

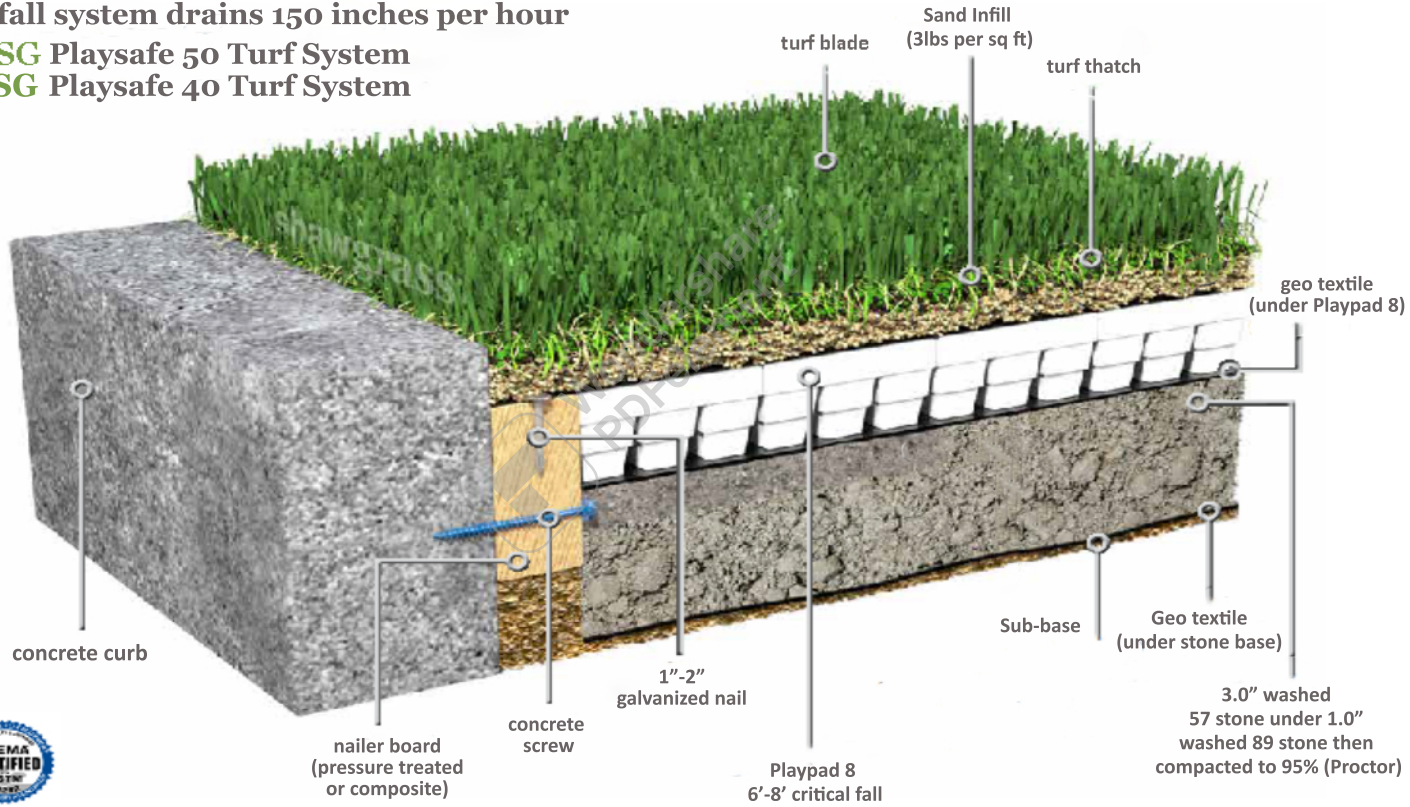
Miracle

THE PLAY COMPONENTS IDENTIFIED IN THIS PLAN ARE IPEMA CERTIFIED. THE USE AND LAYOUT OF THESE COMPONENTS CONFORM TO THE REQUIREMENTS OF ASTM F1487.	CD226437	✓	COMPLIES TO CPSC	DESIGNED FOR AGES 2-12		DATE: 7/5/2022
	GROUND SPACE: 51' X 53'	✓	COMPLIES TO ASTM	ADDITIONAL GROUND LEVEL ACCESSIBLE ITEMS NEEDED FOR ADA COMPLIANCE		SCALE: 1"=10'-0"
AN ENERGY ABSORBING PROTECTIVE SURFACE IS REQUIRED UNDER & AROUND ALL PLAY SYSTEMS.	PROTECTIVE AREA: 64' X 66'	✓	COMPLIES TO ADA	TYPE: 0	QUANTITY: 0	TRIP

shawgrass®

6-8’ fall system drains 150 inches per hour

054SG Playsafe 50 Turf System
139SG Playsafe 40 Turf System



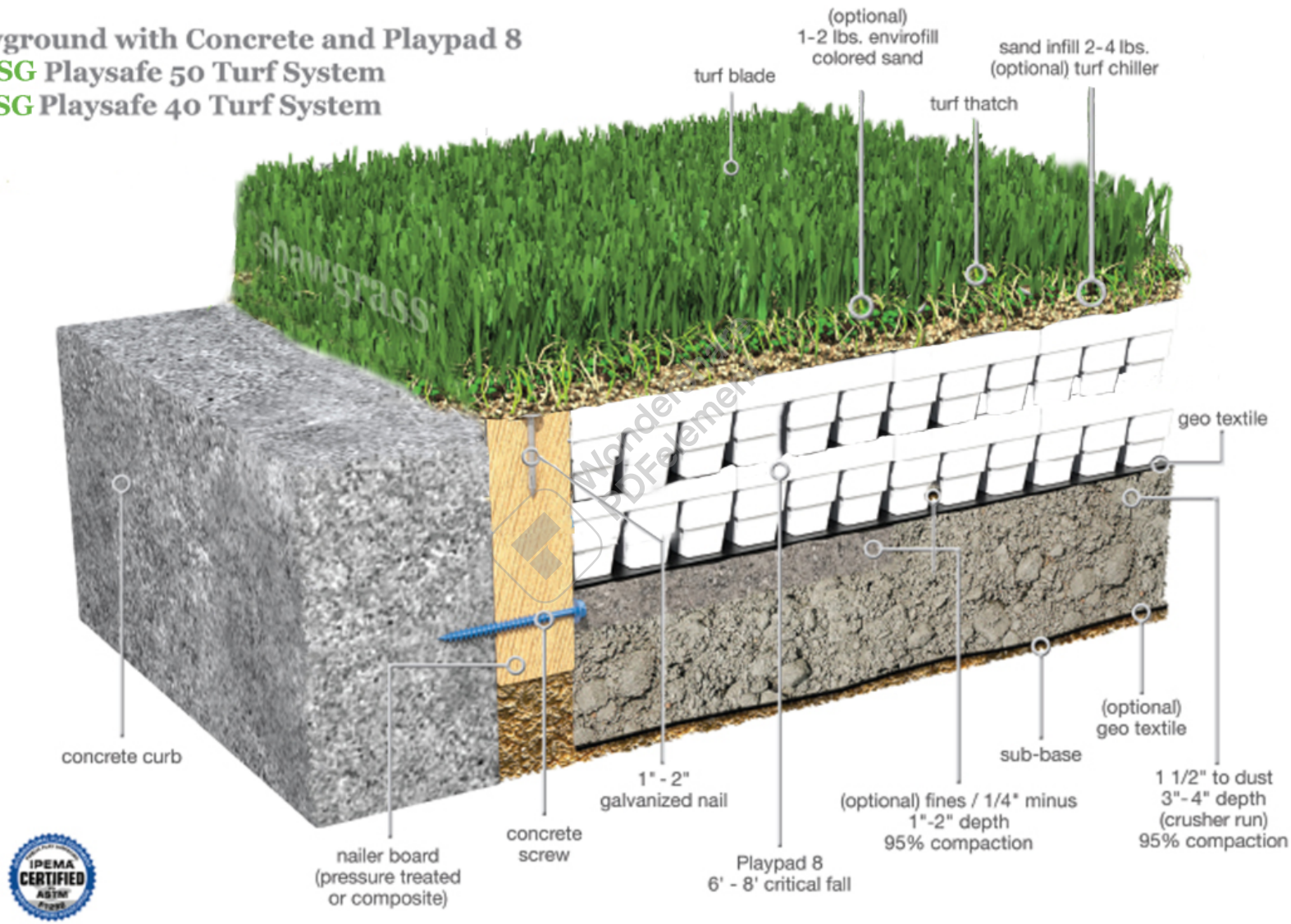
IPEMA CERTIFIED ASTM F2772

shawgrass®

Playground with Concrete and Playpad 8

054SG Playsafe 50 Turf System

139SG Playsafe 40 Turf System



IPEMA CERTIFIED

Appendix I: Sample Owner's Project Requirements

CCSD OWNER PROJECT REQUIREMENTS				
PROJECT TITLE:				
LOCATION:				
DATE APPROVED:				
GENERATED BY: CAPITAL CONSTRUCTION PROGRAM/FACILITIES MANAGEMENT				
"Documents any Project Specific Deviations to the CCSD Design Requirement. See 2.1.2 Paragraph 4"				
NUMBER	DATE OF CHANGE	PARAGRAPH	EXPLANATION FOR DEVIATION	APPROVED
1	4/20/2020	Div. 08	Access control (power over Ethernet) will be provided and installed as an integrated package that functions seamlessly with the door hardware and provided by one vendor. The devices will be fully compatible with the door hardware specified in this document. The door preparation at the factory will be coordinated by the access control vendor. Exit devices with panic hardware shall use a motorized latch release system. The card reader will be integrated into the door handle unless there is a structural reason to mount it beside the door. CCSD will review the design package for access control as a separate design and shop plan submittal to ensure compliance with our existing systems.	Y

Appendix J: Door Hardware Workflow

CCSD has adopted ASSA ABLOY's Openings Studio as the door and hardware (HW) management tool. The A/E must be able to work within the software requirements to ensure the needed data is provided to ASSA ABLOY (AA). Utilization of the Openings Studio™ software platform and Revit® "plugin" is required for streamlined project management of door and hardware product data, delivery, installation, and closeout. There is no charge to the A/E for the software and training. AA will support the A/E during the entire project as needed.

NEW AND RENOVATION TYPICAL WORKFLOW

A/E Deliverables

- Utilization of Openings Studio™ software platform and Revit® "plugin".
- Door Schedules with sizes, types, materials, ratings, and indication of special opening requirements.
- Door Types and Frame Elevations.
- Floor plans with door numbers and room names.
- Code sheets indicating Life Safety, Fire, and Model Building Code construction requirements.
- Security Drawings with noted opening requirements and access control requirements.
- Drawings and schedules made available in electronic formats (DWG, PDF, Excel) as requested.

A/E Workflow Conditions

- Clearly identified revisions and changes to the project scope, drawings, or specifications received in a timely manner in order to meet the agreed upon Project deadlines.
- Use agreed upon basis-of-design specification documentation and sections in the published Construction Documents.
- AA consultants to review and comment on product substitution requests relating to doors, frames, and door and access control hardware.
- Acceptance for AA consultants to review and comment on door and hardware submittals and RFIs for compliance with specification documents.

ASSA ABLOY Deliverables:

- Architectural Specification Documents
  - 87100 – Door Hardware + Hardware Schedule
  - Optional Sections:
    - 081113 - Hollow Metal Doors & Frames
    - Div. 28 - Contributions to sections provided as needed based on hardware.
- Door, Frame & Hardware Installation Training
  - Frame Install Preconstruction Meeting
  - Hardware Preconstruction Meeting
- Project Punch-Out/ Site Verification of Installation for doors & hardware.
  - PDF Punch Report
  - Excel Corrective Action Report
  - PlanGrid/ Procore Exports (If Applicable)
- Fire Door Inspection (if applicable)
  - PDF FDI Report
- Back-Punch / Re-inspection of deficient openings (Optional)
- Openings Studio Smart Tags

Project Phases

Project Kick-Off SD (Schematic Development)

1. CCSD & Construction Manager to notify ASSA ABLOY (AA) of upcoming projects and provide Architect contact info.
2. AA to engage with architectural team to establish project schedule and provide onboarding for Openings Studio as required.

DD (Design Development):

1. AA and Architect to begin project door & hardware coordination.
    a. An AA consultant will be available for up to **2** pre-specification onsite or virtual conference meetings. Two week advance notice required.
    b. An AA consultant will be available for up to **2** project coordination meetings with the Security Consultant/Engineer covering access controlled applications, product specifications, and elevations and drawings provided under Division 08 and 28.
2. Deliverables:
    a. Outline/ Guide Specification with opening function descriptions (i.e.. Stairway, Mechanical Room, Office, Unit Entry, etc.) HW Set numbers will not be assigned to each door at DD unless specifically required for the project
    b. CM to hold allowance for AA door & hardware inspections. Formal project proposal for inspections provided by AA with 95% deliverable.

50% CDs (Construction Documents) / Permit Set:

1. Continued project coordination between AA & Architect.
    a. Coordination and redline review of applicable Project "Door Opening" sections with the 087100 Door Hardware specification. Final editing of the Door Sections is the responsibility of **Architect**.
    b. Coordinate specified electronic access control door hardware components and applications with Division 28 and the Executive Director of Security and CCSD Access Control Contractor.
2. Architect to Analyze project with Openings Studio plugin for Revit (if applicable)
    a. A minimum of two weeks is required to complete the 087100 specification and hardware schedule.
3. AA Deliverables:
    a. Complete 087100 Specification documents & Hardware Schedule with HW Set assignments for each opening.

Door & Hardware Full Project Review

1. After 50% CD/ Permit Set is issued and prior to submission of 95% CDs/ Bid Set to CCSD – A/E, AA, CM & CCSD to schedule meeting to review doors, frames & hardware.

95% CDs (Construction Documents) & Bid Phase:

1. Architect to update drawings as required based on full project review.
2. Architect to Re-Analyze project at minimum 2 weeks prior to deliverable date.
3. AA to update specification / hardware schedule as required.

4. AA Deliverables:
    a. Complete Specification documents & Hardware Schedule. Final editing of the Door and Hardware specifications is the responsibility of Architect.
    b. Formal Proposal for Punch-Out & Fire Door Inspection – Confirmation of Allowance
    c. For Contract Hardware Distributor Only – Openings Studio Distributor Export (if applicable)

OSF Review

1. Submit Construction Documents to OSF for Review
    a. Notify AA of any comments that impact the doors, frames and hardware.

Construction Contract Administration:

1. AA to review door & hardware RFIs, Submittals and Substitution Requests.
    a. RFIs: 5 business days.
    b. Submittals: 10 business days.
    c. Substitution Request: 5 business days.

Addendums As Required:

1. Architect to update drawings as required. If needed, Architect to Re-Analyze project at minimum 2 weeks prior to deliverable date.
2. AA to update specification / hardware schedule as required.
3. AA Deliverables:
    a. Complete Specification documents & Hardware Schedule. Final editing of the Door and Hardware specifications is the responsibility of Architect.

Construction Phase:

1. Contractor & Contract Hardware Distributor to provide final hardware submittals and the BIM export for Openings Studio (if applicable).
    a. Compatible CHD Hardware Detailing Software:
        i. ProTech
        ii. Comsense
2. Construction Manager (CM) & General Contractor (GC) to schedule pre-installation training with AA
    a. Hollow Metal Frames
    b. Door Panel & Hardware
3. Frame Installation Pre-Con & Training
    a. Schedule w/ ASSA ABLOY (AA) two weeks prior to installation.
    b. Factory training and videos to be conducted on first day of install by General Contractor (GC). This training will cover frame installation.
4. Post Install Frame Inspection.
    a. General Contractor (GC) to verify frames are plumb, true & square.
    b. GC to provide letter confirming this has occurred to Construction Management firm and owner prior to closing the wall up.
5. Door & Hardware Pre-Con & Training

a. Schedule w/ ASSA ABLOY (AA) two weeks prior to installation.
b. Factory training and videos to be conducted on first day of install by General Contractor (GC). This training will cover door installation and hardware installation.

6. Construction Manager & Contractor to schedule Door & Hardware Punch-Out & Inspection with AA at substantial completion.
a. 3 – 4 weeks' notice is required for site mobilization.
b. A signed proposal or purchase order is required for site mobilization from the contractor.
c. AA to complete final Punch-Out and site verify installation of doors, frames and hardware. Rated openings will also be inspected for compliance with NFPA 80 requirements for fire rated openings.
d. Door, Frame & Hardware Remediation as required. (GC)
e. Back-Punch / Re-inspection of deficient openings (If Applicable)
    i. CM/GC Responsible for Back-Punch. AA can perform as additional service.

7. AA Deliverables:
a. Punch-Out Report – PDF
b. Fire Door Inspection Report – PDF (if applicable)
c. Corrective Action Report – Excel
d. PlanGrid / Procore Exports (if applicable)
e. For CCSD Only – Smart Tags applied to the door/door frame of each opening.
f. For CCSD Only – Project handover after complete for as-built records of door openings in OS.

Appendix K: Fire & Safety Requirements

SC CODE OF LAWS 59-17-160 (2018 ACT NO.256)		
REFERENCE PARAGRAPH ACT NO. 256	**RESPONSIBILITY**	**REQUIREMENT**
5a. Automatic Fire Sprinkler Systems	Contractor	Certified Report-SC Licensed Sprinkler Contractor
5c. Commercial Kitchen Requirements	Contractor	Certifed Report-SC Licensed Fire Equipment Dealer
5d.i Fire Rated Assemblies	Architect	As Built Rated Barrier Plan with photo documentation
5d.ii	Contractor	NFPA 80 Certification Document & ASSA ABLOY Inspection
5d.iii	Contractor	NFPA 80 Certification Document
5d.iv	Contractor	NFPA 80 Certification Document
5d.iv	Mechanical Engr	As Built Location Plan for all smoke & fire dampers
5e.ii Emergency Lighting	Contractor	Certified test of emergency lighting equipment
5e.ii	Electrical Engr	As Built Location Plan for all emergency lights and associated equipment
5f. Emergency Power Supply System Generators	Contractor	Certified test of emergency generator and all associated equipment
5g. Portable Fire Extinguishers	Architect	As Built plan of fire extinguisher cabinet locations
5h.	Contractor	Certified test of emergency responders system with proof of test letter
5h.	Electrical Engr	As Built Location Plan for all devices associated with the system
5i.	Contractor	Certified Report document testing per NFPA 204
6	Architect	Fire Evacuation plans(SCFC 404.2.1)
6	Civil Engineer	Fire Safety Site Plan(SCFC 404.2.2)
6	Architect	Floor Plans(SCFC 404.2.2)

Appendix L: Specifications for Front Vestibule Interior Glass

Specification for front Vestibule Interior Glass

25" Heat Strengthened Clear (on outside) Type A below

.06 " Clear Windborne -Debris-Impact-Resistant Laminated Glass (middle layer) Type B below

.25" Heat Strengthened Clear (on outside) Type A below

GLASS PRODUCTS

A. Heat-Treated Float Glass: ASTM C 1048; Type I; Quality-Q3; Class I (clear) unless otherwise indicated; of kind and condition indicated.

- Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
- For uncoated glass, comply with requirements for Condition A.
- For coated vision glass, comply with requirements for Condition C (other coated glass).

B. Windborne-Debris-Impact-Resistant Laminated Glass: ASTM C 1172, and complying with testing requirements in 16 CFR 1201 for Category II materials, with "Windborne-Debris-Impact Resistance" Paragraph in "Glass Products, General" Article, and with other requirements specified. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.

1. Construction: Laminate glass with one of the following to comply with interlayer manufacturer's written recommendations:

- Polyvinyl butyral interlayer.
- Polyvinyl butyral interlayers reinforced with polyethylene terephthalate film.
- Ionoplast interlayer.
- Cast-in-place and cured-transparent-resin interlayer.
- Cast-in-place and cured-transparent-resin interlayer reinforced with polyethylene terephthalate film.

2. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.

3. Interlayer Color: Clear unless otherwise indicated