AUSTIN
Independent School District

PROJECT DEVELOPMENT MANUAL

FOR MODERN LEARNING ENVIRONMENTS

Reinventing the Urban School Experience

Issued: April 2026

AUSTIN INDEPENDENT SCHOOL DISTRICT

PROJECT DEVELOPMENT MANUAL

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FOREWORD

The purpose of this Project Development Manual (PDM) is to outline technical design requirements and preferences for facilities in the Austin Independent School District (the Owner) to the consultants designing and administering the construction of facilities. This document is updated periodically to align with industry standards and preferences of the Owner.

Consultants shall use this document in conjunction with the Owner's Educational Specifications. Consultants shall access the most current versions of the PDM and Educational Specifications from the Owner's website. If a consultant identifies conflicts between the PDM and the Educational Specifications, the consultant is required to resolve these conflicts with the Owner prior to start of a project.

The Project Development Manual is divided into the following chapters:

Introduction
Chapter 1 - Professional Service Requirements
Chapter 2 - Land Development Standards
Chapter 3 – Energy, Water, and Sustainability
Chapter 4 - Facilities Design Standards
Chapter 5 - Performance Requirements
Chapter 6 - Furniture Standards
Appendix A – Full Specifications
Appendix B – Forms
Appendix C – Additional Materials

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This document was produced with the participation of the departments from Austin ISD:

- Academics
- Austin ISD Police Department
- Athletics / Fitness
- Career & Technical Education
- Construction Management
- Early Childhood Education
- Emergency Management
- Facilities Maintenance
- Health Services
- Library Media Services
- Network Support Services
- Nutrition & Food Services
- Performing Arts
- Physical Education & Health
- Professional School Counseling
- School Leadership
- Special Education
- Technology
- Visual Arts

STRATEGIC FRAMEWORK

Austin ISD's Strategic Framework provides high-level strategic direction for the district and is outlined on the district webpage.

GOAL ALIGNMENT

The *Project Development Manual* (PDM) is directly related to the district *Long-range Plan* (LRP), *Facility Master Plan (FMP),* and the *Educational Specifications for Modern Learning Environments*.

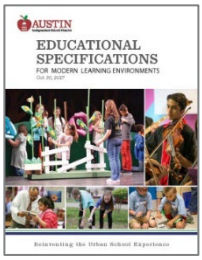
Long-range Plan (LRP)

The LRP focuses on improving facility conditions and programmatic strategies to address needs of historically underserved communities.

Facility Master Plan (FMP)

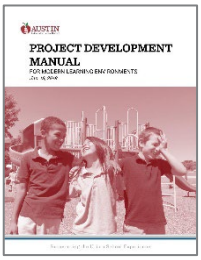
Three of the eight Guiding Principles of the FMP specifically address the educational and operational goals of Austin ISD.

1. Academics and Co-Curricular Support
2. Equity in Facilities
3. Communication and Community Engagement



Educational Specifications for Modern Learning Environments sets the performance goals for the incorporation of Academics, Facility, and Community and includes the Austin ISD Education Specifications. Within this vision document, measures of Success for Learning Principles are specifically directed in the areas of:

1. Academic
2. Facilities
3. Community



The Project Development Manual aligns to the *FMP* and the *Educational Specifications for Modern Learning Environments* and addresses design and performance standards for facilities and includes furniture standards.

PROJECT DEVELOPMENT MANUAL OVERVIEW

In support of the Mission and Strategic Plan, Austin ISD has adopted policies, procedures and practices that establish facility standards that produce quality physical learning environments, with the premise that every Austin ISD learner should have access to quality facilities that fully support academic and co-curricular programing, and that are inviting, stimulating, and inspiring places to learn.

Austin ISD Board Policy CS(LEGAL)-P: FACILITY STANDARDS require that all new facilities and major space renovations approved by the Board after January 1, 2004, shall meet the facility standards established by the Commissioner (of Education) as set out in 19 Administrative Code 61 1036 (Education Code 46 008; 19 TAC 61 1036).

Additionally, the policy requires that Austin ISD develop written documents constituting the "Educational Program" and "Educational Specifications" that provide the educational philosophy, instructional objectives and school design standards which are to be implemented in the construction of new facilities and major renovations.

Facility Design Standards

The Facility Design Standards will outline a set of standards reflecting the District's vision for 21st-century learning environments. These standards will serve as the baselines for each school modernization project.

In accordance with the Austin ISD Board Policy CS (LEGAL) these Facility Design Standards outline the District facility standards for educational programs and support areas, equipment and technology needs, and any special features needed on school campuses.

CURRICULUM REQUIREMENTS

As required by Austin ISD Board Policy CS(LEGAL)-P: FACILITY STANDARDS, the design of Austin ISD educational facilities must be instructionally driven and be able to successfully accommodate the engaging delivery of appropriate grade level curriculum to all Austin ISD learners. Further, the policy requires that the District include, as part of its facility standards, a written "Educational Program", summarizing Austin ISD's educational philosophy, mission and goals, and a description of the general nature of the District's instructional program in accordance with Texas Administrative Code (TAC), Title 19, Part II, Chapter 74 – Curriculum Requirements.

MODERNIZATION PROJECTS

The District is implementing innovative efforts to achieve excellence for all learners by delivering a high-quality education to every learner. Modernization projects feature new exploratory programming to expand access and equity across the district. Modernization projects include Montessori programs, Career Launch Schools in Health Science and Technology, an Autism Academy, and other specialized academic opportunities. Austin ISD will continue to offer, expand, and refine general education programs, such as dual language programs and Early College High Schools, to ensure learners are college-, career-, and life-ready. Austin ISD will embark on focused planning efforts for other general education programs such as Athletics, Career and Technical Education, Early Childhood, and Fine Arts to plan for programming, which includes full-day prekindergarten for 4-year-olds and an expansion of the District's pre-kindergarten program for 3-year-olds.

COMMUNITY

As outlined in the Austin ISD document, *Educational Specifications for Modern Learning Environments*, performance goals are set for the incorporation of the community into schools. Community and parent involvement in schools is proven to increase learner outcomes. By creating facilities that efficiently and effectively build community and parent involvement, all stakeholders benefit.

Designated community spaces are included in the Educational Specifications. These spaces are designed as flexible use areas, with an appropriate amount of storage, adaptable furnishings, and controlled access from outside the core facility. Community functions may occur throughout the day and evening and include festivals, community recreation, music events, and large group gatherings.

Community connections to the core learning spaces and the remainder of each campus are developed and implemented on a site-by-site basis. Community-based learning spaces and community resource spaces are included.

The general plan and design of individual campuses is to permit and facilitate use of appropriate school facilities by community agencies when spaces are not in use for the regular school program. Restrooms are available when facilities are used after hours.

The Austin ISD Environmental Sustainability Policy was established in 2011 to enhance a Districtwide culture of sustainability and to further its effective environmental stewardship of resources through innovative, results-oriented, sustainability initiatives.
The District embraces a commitment to:

- Stewardship of energy, water, and other natural resources
- Creating healthy environments for teaching and learning
- Supporting sustainability as an economic, environmental, and social priority

Sustainability requirements are integrated throughout this document. Refer to *Chapter 3 - Energy, Water and Sustainability* for a guide to specific topics.

TECHNOLOGY DEPARTMENT

The Technology Department is committed to a new digital learning environment that embraces transformational technology, as outlined in the strategic plan, to positively transform learning and teaching for all learners and educators at Austin ISD. We work to ensure that all learners, educators, parents, and administrators have online access to relevant educational resources and authentic experiences with transformational technology from anywhere and at any time. Technology includes family and learner network access and resources, the "everyone:1" device program, and cyber safety.

Austin ISD learners need:

- Access to relevant technologies, tools, resources, and services for personal instruction 24/7
- Access to information and communication technologies to collaborate, construct knowledge, and provide solutions to real- world problems.
- Explicit instruction and experiences around digital citizenship integrated into all content areas.
- Research-based teaching and learning strategies in all subject areas to improve academic achievement is foundational.
- Ability to communicate effectively in a variety of formats for diverse audiences.

Austin ISD educators need:

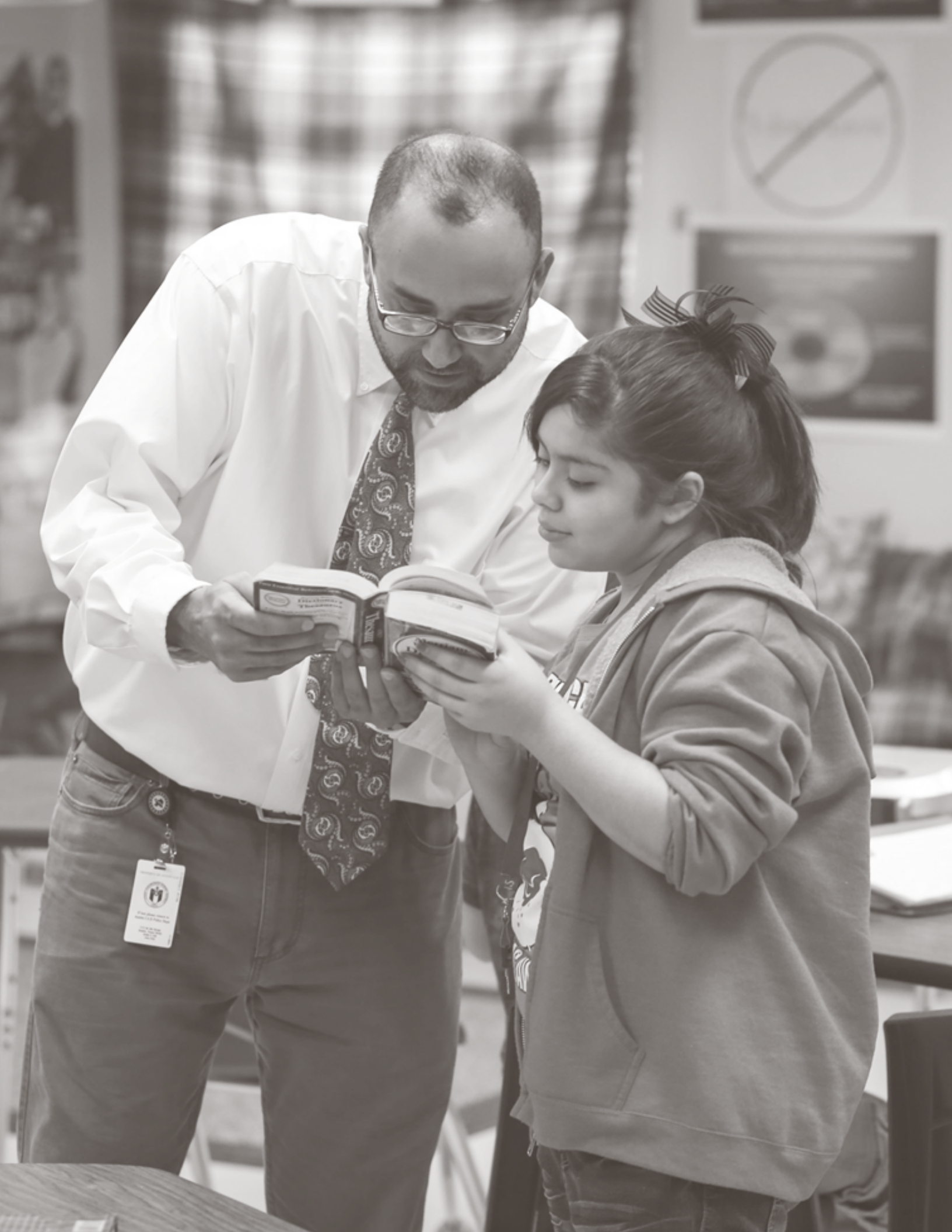
- Learning environments that use technology as a flexible tool for learning that is collaborative, interactive, and made personal.
- Professional learning to support the integration of transformational technology throughout all curriculum and instruction.
- Professional learning to develop and support skills in interpreting data to design instruction.

[END OF CHAPTER]

CHAPTER 1

PROFESSIONAL SERVICE REQUIREMENTS

AUSTIN
Independent School District



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PROFESSIONAL SERVICE REQUIREMENTS

Before executing any agreement with the Owner, consultants and subconsultants (the "design team") shall become familiar with the provisions of all sections of the PDM and shall incorporate those provisions into proposals for services. The design team shall identify any proposed deviations from these standards and issue to the Owner for consideration prior to the execution of a contract. The Owner expects that all provisions within the PDM, subject to approved exceptions, are carried through to completion. Prepare all deviations on the standard form in *Appendix B*.

After the execution of a contract, should the design team take issue with any requirement or discover a regulatory conflict with this document, the design team shall notify the Owner by documenting the conflict and proposed alternate solution on the form in *Appendix B*. The design team shall include a short explanation on how the alternate solution provides an improved result for the Owner. If the Owner agrees with the proposed deviations from the PDM, the exchange of electronic correspondence is considered an addendum to the PDM for the specific project referenced.

Before or after execution of a contract, if the design team discovers any standard in this document that could potentially limit modernization of facilities, the design team should notify the Owner, document the issue on the standard form in *Appendix B*, and propose a solution for consideration. If the Owner agrees to deviations from the PDM, the exchange of electronic correspondence is considered an addendum to the PDM for the specific project referenced.

During the modernization of its facilities, the Owner is seeking to improve building performance by reducing water consumption, reducing energy costs, improving indoor air quality, reducing waste, prioritizing sustainable materials, and providing educational opportunities. Design teams shall meet with the Owner to develop strategies to improve metrics for overall building performance.

The Owner anticipates significant public involvement during the design process, including posting of documents on the Owner's website. All documents available to members of the public or by the Austin Independent School District Board of Trustees require consistency with Web Content Accessibility Guidelines (WCAG) 2.0 standards and are available at www.w3.org.

OTHER DOCUMENTS

The Consultant is advised that these standards form part of the information resources applicable for projects. Additionally, other applicable documents provide guidance and are as follows:

1. Educational Specifications
2. Archive record drawings (PDF format)
3. Existing geotechnical testing and site surveys
4. Hazardous materials reports
5. Points of contact for relevant authorities having jurisdiction over the project
6. Consult with the Owner for additional information available to the design team.

GENERAL REQUIREMENTS

Design teams shall agree on the scope and phasing of professional services with the Owner immediately after selection of the consulting firm. The contract shall commence with Pre-Design and end with the Owner's acceptance of the completed project through the closeout and warranty periods. Due to the predefined periods of occupancy required for school facilities, it is mandatory that the design and construction schedule for services facilitates the successful delivery of educational programs and minimizes disruption.

Site and Landscape Design:

The Owner will provide all site survey and geotechnical data to the design team. To ensure project schedules are met, the design team shall request this data as soon as practical and provide any required documentation to facilitate procurement of these services.
Design teams shall visit the project site, review existing conditions, the site survey information provided, and shall:

1. Notify the Owner to initiate a site survey if no topography or site survey information exists and request any specific site data required for the project.
2. Assess site conditions to evaluate sustainable options and use this information to influence design decisions about the building's relationship to the specific site and local environment.
3. Prior to completion of schematic design, complete and document a site-specific study and incorporate findings into the building design, including evaluation of the following conditions:
    A. Local Climate
    B. Topography
    C. Soils
    D. Hydrology
    E. Vegetation (including Heritage or protected trees)
    F. Local Habitat
    G. Human Use
    H. Cultural or Historic Significance

I. Site Acoustics

4. Review size, characteristics, functionality, and location of: existing utilities, topography, existing drainage structures, creeks, swales, existing easements, building lines, parking, electrical, utilities, gas and oil transmission lines, irrigation, gates/fencing, and all existing building structures including playgrounds.
5. Notify the Owner to initiate geotechnical investigations and provide all recommended test boring locations to the Owner.
    A. The design team is required to coordinate with the geotechnical engineer and provide documentation for compliance with Geotech recommendations on sites with expansive soils having a plasticity index of 40 or more.
6. Determine traffic patterns and evaluate existing or proposed service parking and loading areas, separation of learners from vehicular circulation, pickup and drop-off areas, educator and visitor parking areas, safety of street crossings or drives, convenient access to entries, and safe bicycle routes and bicycle storage locations. Include requirements and facilitate a traffic study if required by the ILA in Chapter 2.
7. Evaluate potential construction phasing and staging areas, including on-site swing space.
8. Incorporate city-required standards for design of drive and parking areas, parking spaces, aisle widths, stacking requirements, and traffic circulation. Incorporate the required percentages of electrical vehicle (EV) charging or EV-ready spaces in accordance with PDM requirements. Design all pavement areas based on anticipated structural loads and recommendations from the geotechnical engineer.
9. Provide designs for site lighting that limit light pollution but include illuminating parking and major entrances.
10. Provide designs for outdoor athletic facility lighting that limit light pollution.
11. Provide a written description to the sustainability consultant that outlines the sustainable features of the site design in accordance with the sustainability objectives of the Owner for the specific project, including compliance with the requirements of one or more of the following rating systems:
    A. LEED
    B. Austin Energy Green Building
    C. Austin ISD Sustainability Scorecard

The scope of landscaping for projects is determined by the design team during the schematic design phase, based on the preliminary project budget and the Owner's Alternative Landscape

Compliance agreement with the City of Austin, and the options provided in any additional agreements with the City of Austin. The scope of the landscaping shall be finalized during the design development phase and included in a detailed estimate of construction cost that includes a list of plant materials, types and locations of irrigation systems, and an outdoor water use calculator.

REQUIRED DELIVERABLES

GENERAL REQUIREMENTS

Project Manual

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

All project team members will be utilizing the Owner's (PMIS) software for program management, project life cycle management, cost management, and document management. PMIS software is used to manage projects in one system that the Owner, third-party staff, and vendors will utilize to capture funds, budgets, contract, purchase orders, request for information, and submittal documentation into one system that allows for day-to-day management of project costs and collaboration of activities. The Owner will provide software licenses, system access, and training for software use.

Drawing Format

Provide all drawings in PDF format and AutoCAD version 2015 or higher at each phase.

For PDF files, packaged drawing sets must contain a fully-functioning set of bookmarks as part of the deliverables. Owner reserves the right to reject deliverables if requirements are not met.

For AutoCAD, package files in "DWG" format and include all external drawing references, linked documents, fonts, and plot styles to fully function without loss of information or referenced files. Design work completed in REVIT or other software is required to have compatibility with AutoCAD.

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

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

The design team is required to fill-out a "completeness checklist", available from the Owner, to facilitate upload of all phase deliverables by the Owner's procurement team to the Miller IDS plan room or as directed by the Owner.

The design team is required to respond to and subsequently incorporate all Owner review comments prior to issuing the next set of deliverables.

PRE-DESIGN

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

1. Provide a preliminary evaluation and recommendations for the following items:
    A. Space program with square footages, interrelationships, and functions of all components.
    B. Bubble diagram indicating interrelationships, adjacencies, including analysis on the project site.
    C. Project-specific requirements
    D. Project construction budget
    E. Furniture budget
    F. Existing site infrastructure and facilities
    G. Project schedule
        i. Include analysis and recommendation for project phasing, construction limits for the project, and analysis of impacts to the functions of the school, acquisition of long-lead items, testing schedules, daily learner activities, etc.
2. Evaluate and recommend proposed locations for facility additions and coordinate with any existing facilities.
3. Review space program and functional needs with department leadership (refer to *Introduction, Foreword* for list of departments).
4. Include a project narrative summarizing visioning activities with the campus team, anticipated space and academic alignment, and alignment of the campus vision with Austin ISD's standards and educational specifications.

5. Provide preliminary evaluation and recommendations for the following sustainability items:
    A. Preliminary Site Assessment as outlined under the General Requirements, Site and Landscape Design.
    B. Preliminary sustainability rating system evaluation and options.
    C. Occupancy estimates for learners broken down by grade level, full time and part time personnel, and visitors.
6. CAT meeting minutes relevant to Pre-Design.
7. Obtain written approval from the Owner prior to proceeding to Schematic Design.

SCHEMATIC DESIGN

The schematic design phase is the development of a conceptual design document and associated narrative descriptions of the building systems with recommendations to the Owner.

1. Minimum drawing requirements:
    A. Preliminary life safety plans including TAS/ADA requirements
    B. Site plan
    C. Landscape plan
    D. Composite demolition plans (if applicable)
    E. Composite floor plans at minimum 1/16” scale with square footages
    F. Preliminary furniture plans
    G. Preliminary roof plan
    H. Building elevations
    I. Building sections
    J. Typical schematic wall sections
    K. Structural conceptual plans
    L. Mechanical, Plumbing, and Fire Protection plans with primary space requirements for equipment and distribution systems
    M. Optional - One-line system schematics
    N. Electrical plans with primary space requirements for equipment and distribution systems, including routes to connect any new IDF to existing MDF spaces
2. Provide supporting design information and narratives as outlined below. Minimum requirements include:
    A. Space program with a comparison to Educational Specifications
    B. Preliminary code analysis
    C. Discipline narratives as described below that outline basis-of-design for building materials and systems. Other minimum requirements include design criteria, relevant codes and standards, primary systems, alternate options, and computations (if applicable). For existing buildings, include a full analysis of existing equipment, especially for mechanical and electrical.
        i. Civil narrative
            a. Include existing utility capacities and new demands

ii. Landscape narrative
iii. Outdoor learning narrative
iv. Architectural narrative
    a. Include descriptions of the history and cultural identities of the school community and relevant design implications
v. Interior narrative with diagrams communicating operability and transparency of walls and materials
vi. Structural narrative
vii. Mechanical narrative
viii. Electrical narrative
ix. Technology narrative
x. Security narrative
xi. Plumbing narrative
xii. Fire Protection narrative
xiii. Sustainability narrative with energy & water conservation analysis and documentation, including assessment of potential renewable energy opportunities. Provide updated sustainability checklist. Register project with selected rating system and provide access to EWaS team.
xiv. Narratives for any specialty CTE or academic program that require specific considerations and design understanding
xv. Furniture narrative
xvi. Universal Design narrative

D. Written statement of probable construction cost, including furniture, in a format as directed by the Owner
E. List of items that are included in the furniture budget
F. Design schedule including time for Owner review and approval

3. Additional Required Deliverables:
    A. Any architectural models, renderings, perspectives, etc. to describe the three-dimensional concepts of the buildings and proposed furniture solutions for review by the Owner.
    B. Educational Specifications deviation narrative and form (including justification for deviations)
    C. CAT meeting minutes relevant to schematic design
4. Obtain written approval from the Owner prior to proceeding to Design Development.

DESIGN DEVELOPMENT

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

1. Minimum drawing requirements:
    A. Life safety plans and analysis (for final design)
    B. Draft construction phasing diagrams including fire department access, temporary fire separation requirements (minimum 1-hour and in compliance with AHJ for stricter requirements), occupant egress, any applicable on-site swing space, and any additional documentation requested by the AHJ.
    C. Accessibility standards, clearances, and mounting heights
    D. Exterior and interior wall types, UL and STC assemblies, etc.
    E. Civil
        i. Site survey
        ii. Existing site conditions and demolition plans
        iii. Site Plans
        iv. Paving and striping plans
        v. Erosion and sedimentation control plans and details
        vi. Drainage area plans
        vii. Grading plans
        viii. Utilities plans
        ix. Water quality plans
        x. Water quality details and calculations
        xi. Details
    F. Landscape
        i. Landscape plans
        ii. Irrigation plans

iii. Typical details

G. Structural

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

H. Architectural

i. Demolition plans (if applicable)
ii. Architectural site plan
iii. Comprehensive floor plans for all levels
iv. Floor plans at minimum 1/8” = 1’-0”
v. Enlarged floor plans
vi. Typical plan details
vii. Reflected ceiling plans
viii. Typical ceiling details
ix. Roof plans
x. Typical roof details
xi. Building elevations
xii. Building sections
xiii. Wall sections and details
xiv. Stair plans, sections, and details
xv. Elevator plans and sections
xvi. Door and frame schedules
xvii. Frame details
xviii. Window details
xix. Storefront and curtainwall elevations and details
xx. General building details
xxi. Interior elevations at minimum 1/4” = 1’-0”
xxii. Special graphics concept elevations or images

xxiii. Millwork and casework elevations
xxiv. Finish plans and schedules
xxv. Signage plans and details (interior and exterior)

I. Furniture
   i. Furniture plans at minimum 1/8" = 1'-0"
   ii. Furniture schedules

J. Mechanical
   i. HVAC plans (with working and service clearance areas/zones shown for all equipment)
   ii. Piping plans
   iii. Enlarged equipment room plans and sections
   iv. Typical details
   v. Schedules
   vi. System diagrams
   vii. Controls Sequence
   viii. Controls Points List
   ix. Controls Schematics

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

L. Fire Protection
   i. Fire protection plans
   ii. Typical details

M. Electrical
   i. Lighting plans
   ii. Power plans
   iii. Special systems plans
   iv. Enlarged plans
   v. One-line diagrams
   vi. Schedules

vii. Typical details
viii. Lightning protection plan
ix. Fire alarm plans
x. Security plans
xi. System diagrams
xii. PV Calculations and Roof Plans

N. Food service
i. Food service plans
ii. Food service plumbing, electrical, and special conditions plans
iii. Enlarged plans
iv. Equipment elevations
v. Equipment schedules

2. Provide supporting design information as outlined below. Minimum requirements include:
A. Geotechnical report with soils investigation and general recommendations, based on proposed buildings or improvements.
B. Sustainability checklist including basis of design, integrative process, and site assessment information
C. Color palette of principal materials components
D. Imagery of special graphics
E. Furniture presentation showing proposed furniture products and proposed finishes
F. Furniture draft specifications
G. HVAC equipment cut sheets
H. Plumbing fixture cut sheets
I. Electrical power, lighting, and special system cut sheets
J. Fire alarm device cut sheets
K. Food service equipment cut sheets
L. Written statement of probable construction cost, including furniture, in a format as directed by the Owner
M. Design schedule
3. Project Manual including:
A. Draft technical specifications for Divisions 00 through 50 and including furniture specifications. Alternatively, provide an architectural material and building systems matrix. Refer to *Appendix C* for an example of a matrix.
4. Additional Required Deliverables:

A. Any architectural models, renderings, perspectives, etc. to describe the three-dimensional concepts of the buildings and proposed furniture solutions for review by the Owner.
B. Review design and functional needs with department leadership (refer to *Introduction, Foreword* for list of departments).
C. Preliminary energy model for projects with energy modeling required
D. CAT meeting minutes relevant to design development

5. Obtain written approval from the Owner prior to proceeding with Construction Documents.

CONSTRUCTION DOCUMENTS

The Construction Documents shall illustrate and describe the development of the approved Design Development Documents and consist of drawings and specifications setting forth in detail the quality levels and performance criteria of materials and systems and other requirements for the construction of the work. Issue all deliverables to the Owner for progress reviews at 50% completion, 95% completion, and at full completion of construction documents.

1. Minimum drawing requirements:
    A. Life safety plans and analysis (for final design)
    A. Construction phasing diagrams including fire department access, temporary fire separation requirements (minimum 1-hour and in compliance with AHJ for stricter requirements), occupant egress, any applicable on-site swing space, and any additional documentation requested by the AHJ.
    B. Accessibility standards, clearances, and mounting heights
    C. Exterior and interior wall types, UL and STC assemblies, etc.
    D. Fire rated systems and details
    E. Civil
        i. Site survey
        ii. Existing site conditions and demolition plans
        iii. Site Plans
        iv. Paving and striping plans
        v. Erosion and sedimentation control plans
        vi. Erosion and sedimentation control details
        vii. Drainage area plans
        viii. Grading plans
        ix. Utilities plans
        x. Water quality plans
        xi. Water quality details and calculations
        xii. Details
    F. Landscape
        i. Landscape plans
        ii. Irrigation plans

iii. Irrigation details
iv. Enlarged plans
v. Typical details
vi. Project specific details
vii. Planting schedules

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

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

xv. Project specific roof details
xvi. Building elevations
xvii. Building sections
xviii. Wall sections and details
xix. Project specific details
xx. Stair plans, sections, and details
xxi. Elevator plans, sections, and details
xxii. Door and frame schedules
xxiii. Frame details
xxiv. Window details
xxv. Storefront and curtainwall elevations and details
xxvi. General building details
xxvii. Interior elevations at minimum 1/4" = 1'-0"
xxviii. Special graphics concept elevations or images
xxix. Special graphics details
xxx. Millwork and casework elevations
xxxi. Millwork and casework details
xxxii. Finish plans and schedules
xxxiii. Finish details
xxxiv. Signage plans (interior and exterior)
xxxv. Typical signage details (interior and exterior)
xxxvi. Project specific signage details (interior and exterior)

I. Furniture
    i. Dimensioned furniture plans at minimum 1/8" = 1'-0"
    ii. Furniture schedules

J. Mechanical
    i. HVAC plans
    ii. Piping plans
    iii. Enlarged equipment room plans and sections
    iv. Typical details
    v. Project specific details
    vi. Schedules
    vii. System diagrams
    viii. Controls Sequence

ix. Controls Points List
x. Controls Schematics

K. Plumbing
i. Plumbing plans
ii. Enlarged plans
iii. Typical details
iv. Project specific details
v. Waste and vent riser diagrams
vi. Water riser diagrams
vii. Schedules
a. Include WaterSense compliance and flush/flow rates for each fixture

L. Fire Protection
i. Fire protection plans
ii. Typical details

M. Electrical
i. Lighting plans
ii. Lighting controls and details
iii. Power plans
iv. Special systems plans
v. Special systems details
vi. Enlarged plans
vii. One-line diagrams
viii. Schedules
ix. Typical details
x. Lightning protection plan
xi. Fire alarm plans
xii. Security plans
xiii. Security details
xiv. Security schedules
xv. System diagrams

N. Food service
i. Food service plans
ii. Food service plumbing, electrical, and special conditions plans
iii. Enlarged plans

iv. Equipment elevations
v. Equipment schedules
    a. Including Energy Star compliance and water usage
vi. Equipment details
vii. Serving counter details

2. Project Manual including:
    A. Technical specifications for Divisions 00 through 50 including furniture specifications.
3. Provide supporting design information as outlined below. Minimum requirements include:
    A. Written statement of probable construction cost, including furniture, in a format as directed by the Owner
    B. Design schedule
    C. Sustainability checklist
4. Additional Required Deliverables:
    A. Any architectural models, renderings, perspectives, etc. to describe the three-dimensional concepts of the buildings for review by the Owner.
    ~~B.~~ Final energy model, indoor and outdoor water calculators, and worksheets as required by the project's sustainability rating system.
    C. Advise and issue deliverables in order to facilitate the early purchase of long-lead items, equipment, etc.
    D. CAT meeting minutes relevant to construction documents
5. Obtain written approval from the Owner prior to proceeding with procurement or bidding procedures for construction services.

BIDDING & PROCUREMENT

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

Additionally, the design team is required to assist the Owner with procurement of furniture by providing:

1. Final furniture drawings, specifications, schedules and other required deliverables to furniture vendors for bidding.
2. Evaluation of proposed furniture alternate solutions by the furniture vendors
3. Finalization of furniture finishes with furniture vendors and with approval from the Owner
4. Assistance with the delivery of the purchase orders from the Owner to the furniture dealers

CONSTRUCTION ADMINISTRATION

Perform construction administration responsibilities as outlined in the professional services agreement and the Owner's standard specifications, including responsibilities for furniture as follows:

1. Observation of furniture installations
2. Coordination meetings on-site with all required parties to ensure all required building infrastructure is in place for furniture solutions
3. Developing a punch list for furniture and coordination for final completion

POST-CONSTRUCTION

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

Obtain and complete the closeout checklist from the Owner and provide at end of the phase.

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

Upload construction phase documentation to the applicable sustainability portal for project review. Respond to all comments received after the review.

[END OF CHAPTER]

CHAPTER 2

INTERLOCAL AGREEMENTS

AUSTIN
Independent School District

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OVERVIEW

The Land Development Standards Agreement is an interlocal agreement (ILA) between the City of Austin and Austin ISD regarding educational facilities (schools and the adjacent playgrounds and fields around the school). It is an agreed-upon set of land development standards for school construction and provides a way for both parties to plan and evaluate proposed school construction projects more efficiently. The ILA addresses things like site development plans, building permits, construction activities, etc. and can impact permitting timelines, payment of fees, inspections and site development standards, etc. A copy of the referenced ILA is included in this chapter. For additional information on this ILA, go to https://bond.austinschools.org/ila-faq.

The Safe Routes to School Agreement is an ILA between the City of Austin and Austin ISD to help children walk, bike, and roll safely to schools. Information on City of Austin's Safe Routes to School can accessed from https://www.austintexas.gov/saferoutes.

The Joint Use Agreement for Jointly Owned Facilities is an interlocal agreement that describes considerations around the development and improvement of jointly owned facilities, grounds, and open spaces between the City of Austin and Austin ISD. Jointly-owned facilities include, but are not limited to, school parks.

SCHOOL DISTRICT LAND DEVELOPMENT STANDARDS AGREEMENTS

LDSA SITE PLAN CONDENSED GUIDE

ILA Section	ILA Page #	AISD and COA Land Development Regulations (ILA)*		
1.1	2	Use LDC October 12, 2023 if not included in ILA		
1.3	2	Applies only to school sites		
4.2	4	FAR	no limit	
4.3	4	Lot Size	no min	
4.4	4-5	Lot Width	no min	
4.5	5	Setbacks	10'	
4.6	5	Bldg Coverage	no limit	
4.7/10.2	5/22	Impervious Cover (IC)	not including natural trails	
10.2.3	22	IC Urban Watershed	65%	≥ 10 ac site
10.2.3.1.1	22-23		75%	5-10 ac site
10.2.3.1.2	23		80%	≤ 5 ac site
10.2.4	23	IC Suburban Watershed	50%	≥ 10 ac site
10.2.4.1.1	23		70%	5-10 ac site
10.2.4.1.2	23		75%	≤ 5 ac site
10.2 & 10.3	24-27	See ILA for IC in Water Supply Watersheds, Barton Springs Zone, and IC Transfers		
4.8	5	Compatibility	exempt except ILA 4.10 & 6.6	
4.8.1	5	> 8 ac site	no recreational use within 25' of SF zoning	
	5		see 4.8 for details	
4.8.3	5	≤ 8 ac site	not subject to 4.8.1	
4.10	6	Height	100' except telecommunications towers 6.6	
4.10.2	6		45' (within 60' of SF zoning)	
6.1	7	Site Development Permitting		
6.1.1.1	7	Site Plan Exemption (SPE) allowed	< 10,000 sf disturbed area	
6.1.1.2	8		temporary classroom	
6.1.1.3	8		turning lanes	
6.1.1.4	8		LDC 25-5-3 small project	
6.2	8-9	Site Plan Correction	< 10,000 sf new IC	
6.2.6.3	9		no effect to water quality or drainage	
6.2.3	8		5 day review cycle	
6.3	9	Site Plan Revision	> 10,000 sf new IC	
6.3.3	9		same review time as new site development plan	
6.3.4	9		buildings may be added to the application	
6.3.5	9		area may also be added	
6.17	17	Site Development Plan (SDP) Review	5 days prior to submittal, notification to the City is req'd	
6.17.2.1	17-18		15 days Initial review	
6.17.2.3	18		10 day review cycle for updates	
6.17.2.6	18		if no approval after 2nd Update, a meeting with City Staff is required within 10 days	
6.18	19	Fees	no Review Fees or Impact Fees Req'd (excludes Inspection and Bldg Permit fees)	
6.19	19	Fiscal	no fiscal req'd	
10.1	22	ERI	ERI not req'd, waiver application may be necessary	
10.4	27-28	Waterway Setbacks	WQTZ IC=18%	
10.4.3	27		Buffer Averaging allowed in CWQZ and WQTZ	
10.5.1	28	Cut and Fill	no limits for bldg, roadway in ROW, WQ or detention ponds	
10.6	28	Construction on Slopes	25-35% permitted for bldg and parking (AISD owned prior to 01/01/94)	
10.7	28-29	Water Quality	green stormwater infrastructure req'd	
10.8	30-31	Artificial Turf	turf fields and tracks should not be IC if installation complies with 10.8	
6.9.6	13	Director may condition approval, not a prerequisite of SDP or BP		
6.9.6.1.1	13		Sidewalks and curb ramps on School District property;	
6.9.6.1.2	13		Traffic signs and markings;	
6.9.6.1.3	13		Urban trail improvements; and	
6.9.6.1.4	13		ROW dedication.	
6.9.6.3	14	Required for CO, not a prerequisite of SDP or BP		
6.9.6.3.1	14		Upgrades to signal infrastructure;	
6.9.6.3.2	14		Traffic calming devices;	
6.9.6.3.3	14		Bike lanes or upgrades to bike facilities;	
6.9.6.3.6	14		Neighborhood sidewalk improvements including completion of missing segments,	
	14		reconstruction of damaged or non-ADA-compliant segments, and/or adding	
	14		street trees or other shade devices;	
	14		Reference ILA 6.9.6.3 for additional items not required until CO.	
6.14	15	Alternative Design/Director's Approval		
6.14.1	15		**The Director may approve an Alternative Design to satisfy any requirement**	
	15		**of the City Code and/or of the ILA**	
12.3	31	Legal documents finalized prior to CO, not a prerequisite of SDP or BP		
	31		agreements including license, easement, encroachment, unified	
	31		development, Integrated Pest Management, and other legal documents	

*It is strongly recommended to review the corresponding sections of the ILA when utilizing the standards noted above. Exceptions and additional requirements may be applicable.

AMENDED AND RESTATED
SCHOOL DISTRICT LAND DEVELOPMENT STANDARDS AGREEMENT

This Amended and Restated School District Land Development Standards Agreement (the "Agreement") is entered into the 12th day of October, 2023 by the City of Austin ("City") and Austin Independent School District ("School District"). Where required, the provisions of this Agreement shall also be considered ordinances issued by the City in compliance with its general powers and under the Texas Local Government Code (LGC). This Agreement amends and restates that certain School District Land Development Standards Agreement dated September 22, 1994 and any amendments thereto.

WHEREAS, the voters of Austin covered by the School District boundaries voted overwhelmingly in support of the 2.44 billion dollar bond (the "2022 Bond") to bring new and modernized schools to the students of the School District;

WHEREAS, upon passage of the 2022 Bond, the School District has mobilized and is working to construct or rehabilitate these schools in an efficient and effective manner to assure the voters that such schools will be built and opened on time and on budget;

WHEREAS, the City recognizes that AISD owns its Educational Facilities where it prepares students with the knowledge and skills to thrive in college, career, and life for decades to come, and that ownership and longevity of use of these Facilities are major influential factors in agreeing to the terms contained within this Agreement;

WHEREAS, the City and the School District are both political subdivisions of the State of Texas such that certain limits apply to municipal regulation of school district construction of Educational Facilities;

WHEREAS, Section 212.902 of the Texas Local Government Code provides that a municipality and a school district may enter into an agreement to establish review fees, review periods, land development standards ordinances and to provide alternative water pollution control methodologies for school buildings;

WHEREAS, the City and the School District both desire that children living within their mutual jurisdictions should be educated in high quality Educational Facilities, as funded through the 2022 Bond and future bonds;

WHEREAS, the City and the School District acknowledge and agree that a uniform set of land development standards applicable to School District Educational Facilities both (i) allows for the School District to more effectively construct Educational Facilities in a timely manner at

a lower cost of taxpayer dollars, and (ii) provides superior protections for the health, safety, and welfare of City residents.

NOW, THEREFORE, be it resolved that the City and the School District, pursuant to the laws of the state, hereto agree as follows:

ARTICLE I: ORDINANCE COMPLIANCE AND MODIFICATION

1.1 City Ordinances and Rules

The terms of this Agreement and the exhibits attached hereto shall supersede any conflicting requirements of the city's code of ordinances and adopted rules ("City Code"). Otherwise, City Code shall apply to School District development, except that no School District Educational Facility complying with prior agreements or City Code shall be considered a nonconforming use or noncomplying structure by the City if it complies with the terms of any such prior agreement or City Code, including through the granting of any related permit. For the avoidance of doubt, the School District may construct or reconstruct any building or structure on an Educational Facility site that was entitled under previous land development standards agreements based on the entitlements provided in such agreement(s).

Except for Chapter 25-12 (Technical Codes) of the City's Land Development Code ("LDC"), the City Code as it existed on the Effective Date of this Agreement shall apply throughout the term of this Agreement. Chapter 25-12 of the City's LDC contains the City's adopted Technical Codes (Building Code, Fire Code, Energy Code, Electrical Code, Mechanical Code, Plumbing Code, etc.) and shall apply as amended from time to time. Notwithstanding any provision of this Agreement to the contrary, if State or Federal law or regulations require that City ordinances or rules be modified or updated to implement State or Federal law or regulations, the School District shall comply with the modified or updated City ordinances or rules.

1.2 Applicable Jurisdiction

This Agreement is applicable in the City's Planning Jurisdiction. Notwithstanding foregoing, this Agreement is not intended to impose additional requirements in the City's Extraterritorial Jurisdiction which are otherwise inapplicable under City Code or state law.

1.3 Applicable Only to Educational Facilities

The modification of the ordinance provisions set forth in this Agreement apply only to Educational Facilities, including performance art buildings and other accessory uses as defined in Section 2.1 (Definitions) and Section 4.11 (Accessory Uses), herein, that are used for School District Purposes. This Agreement does not waive any fee or modify any

ordinance of the City for an administration, service, or athletic facility not deemed an Educational Facility proposed for construction by the School District.

1.4 Fire Safety and Building Codes

Nothing in this Agreement shall be construed to limit the availability of, or waive fees imposed by fire, safety, health, or building code ordinances of the City prior to or during construction of Educational Facilities.

1.5 Public Engagement

The School District shall hold at least two noticed public meetings when applying for a change of use of any building, structure, or site to an Educational Facility from any other use. Public meetings required by this section shall be held within two miles of the building, structure, or site address listed on the change of use application. Notice required by this section shall be mailed by the School District to all property owners within 500 feet of the site at least 10 business days before such meeting(s).

ARTICLE II: DEFINITIONS

2.1 Definitions

Each term shall have the meaning assigned to it in the City Code. In addition, each of the following terms shall have the meaning assigned to it in this Article:

City Liaison: A designee of the City Development Services Department at the assistant director level who is specifically assigned to be the liaison between the School District and the City. The primary role of the City Liaison is that of facilitator of communications between the School District and the City, including as specifically described in this Agreement.

Educational Facility: Any building, structure, or site used for educational purposes including preschool, primary and secondary schools, activity facilities, temporary classrooms, and accessory uses owned, constructed, or operated by the School District. An Educational Facility is equivalent to a Public Primary Educational Facilities and/or Public Secondary Educational Facilities use as described in LDC § 25-2-6(B) and/or to a Preschool Facility as described in § 2.1 herein.

Effective Date: The date that this Agreement has been executed by both parties.

Major Revision: In this Agreement, the term "major revision" is synonymous with the term "site plan revision" as commonly used in the City's Development Services Department procedures for site plan permitting.

Minor Revision: In this Agreement, the term "minor revision" is synonymous with the term "site plan correction" as commonly used in the City's Development Services Department procedures for site plan permitting.

School District Liaison: A designee of the School District who is specifically assigned to be the liaison between the City and the School District. The primary role of the School District Liaison is that of the counterpart of the City Liaison.

School District Purposes: The use and development of a property by the School District for the furtherance of any constitutional or statutory purpose of a School District, including the construction of buildings and facilities for uses essential to or commonly associated with teaching, research, the preservation of knowledge, and all auxiliary enterprises, building, facilities, and uses, but for purposes of this Agreement only, not administration, transportation, or operations and vehicle maintenance facilities.

Temporary Classroom Building: A movable or modular building used for School District purposes constructed on a chassis and designed to be towed over public roads, designed for year-round occupancy, designed for use without a permanent foundation (but which may sit on a permanent foundation), and designed to be connected to one or more utilities. A temporary classroom may consist of one or more sections that can be telescoped when transported and expanded later for additional capacity, or if two or more sections, separately transportable but designed to be joined into one integral unit (otherwise known as "mega-portables" or "modular classrooms").

ARTICLE III: PLANNING COORDINATION

3.1 Planning Coordination

At the request of the School District or the City, the parties shall collaborate on specific planning efforts to the benefit of both parties. Examples of such planning efforts may include but are not limited to on-street parking, stormwater management, zoning and use of properties owned by the School District, and use of properties jointly owned by the School District and the City.

ARTICLE IV: ZONING

4.1 Site Development Regulations

The regulations of LDC § 25-2-492 (Site Development Regulations) shall not apply to Educational Facility sites developed pursuant to this Agreement. Instead, development standards are established by this Agreement.

4.2 Floor-to-Area Ratio

There shall be no floor-to-area ratio limitation on Educational Facility sites.

4.3 Minimum Lot Size

There shall be no minimum lot size requirement on Educational Facility sites.

4.4 Minimum Lot Width

There shall be no minimum lot width requirement on Educational Facility sites.

4.5 Minimum Setbacks

School buildings on Educational Facility sites shall be set back a minimum of ten feet from a lot line. There shall be no minimum set back for other structures except for telecommunications towers as described in Section 6.6.

4.6 Building Coverage

There shall be no building coverage limitation on Educational Facility sites.

4.7 Impervious Cover

All impervious cover restrictions shall be based on the requirements found in Section 10.2 (Impervious Cover Limits) and Section 10.3 (Transfer of Impervious Cover) of this Agreement.

4.8 Compatibility Standards

Development pursuant to this Agreement is exempt from the Compatibility Standards of LDC Chapter 25-2, Subchapter C, Article 10, except that there shall be compliance with the following standards, as well as the standards found in Section 4.10 and 6.6 of this Agreement.

4.8.1 Except as provided in Section 4.8.3 below, an intensive recreational use associated with a public primary or secondary educational facility, excluding a multi-use trail, and including a swimming pool, tennis court, ball court, or playground, may not be constructed 25 feet or less from adjoining property:

4.8.1.1 in an Urban Family Residence (SF-5) or more restrictive zoning district; or

4.8.1.2 on which a use permitted in an SF-5 or more restrictive zoning district is located.

4.8.2 Exterior lighting must be hooded or shielded so that the light source is not directly visible from adjacent property:

4.8.2.1 in an SF-5 or more restrictive zoning district; or

4.8.2.2 on which a use permitted in an SF-5 or more restrictive zoning district is located.

4.8.3 Development on a site 8 acres or less in size is not subject to the requirements of § 4.8.1 above.

4.9 Traffic Impact Analysis

There shall be no requirement for a Traffic Impact Analysis ("TIA") or Neighborhood Traffic Analysis ("NTA") as part of any zoning or rezoning of a School District Educational Facility site.

4.9.1 In the event that a TIA or NTA is under City review for an area that includes a property being developed by the School District pursuant to this Agreement, the TIA and/or NTA shall not be required to be completed as a requirement, condition, or prerequisite to approval of a Zoning Application.

4.10 Height Regulations

4.10.1 Except for telecommunications towers described in Section 6.6 of this Agreement, the maximum height of buildings or other structures constructed on Educational Facility sites shall not exceed 100' irrespective of the zoning or use of neighboring properties.

4.10.2 Except for telecommunications towers described in Section 6.6 of this Agreement, any portion of buildings or structures on Educational Facility sites that are within 60', inclusive of easements or other setback lines, of a property zoned SF-5 or more restrictive or developed with a single-family residential use are limited to 45' in height.

4.11 Accessory Uses

4.11.1 An accessory use is a use that is incidental to and customarily associated with a principal use, unless otherwise provided, is located on the same site as the principal use and may include parking for the principal use.

4.11.2 The following uses shall be considered accessory uses for Educational Facilities:

4.11.2.1 Refreshment stands and convenience food or beverage sales that serve a public assembly use;

4.11.2.2 Cafeterias, dining halls, and similar food services that are primarily for the convenience of students, employees, or visitors;

4.11.2.3 Parking facilities, including but not limited to structured and surface parking facilities;

4.11.2.4 Medical clinics and/or mental health services that are primarily for, but not limited to, the convenience of students, employees, parents, or visitors;

4.11.2.5 Gardens that are primarily for, but not limited to, the convenience of students, employees, parents, or visitors;

4.11.2.6 Sports and recreational facilities, if those facilities are used primarily for educational activities, and which are located on or are a part of an Educational Facility campus; and

4.11.2.7 Any other use so long as the accessory uses combined comprise no more than 25% of the square footage of the building(s) existing on an Educational Facility campus and such use is incidental to and customarily associated with the principal use.

4.12 Zoning Review Fees

The School District shall not pay to the City any fees for the review of applications for zoning or rezoning approval for Educational Facility building sites.

4.13 City Review and Comment of Zoning Application

4.13.1 Zoning Review Prioritization

4.13.1.1 In the rare instance that the School District finds it necessary to apply for a Zoning Application, the City shall prioritize and expedite School District zoning applications.

4.14 Dedicated Review Staff

4.14.1 Upon the submission of a Zoning Application, the City shall assign to the School District a dedicated zoning review staff person who is familiar with Educational Facilities.

ARTICLE V: PLATTING

The School District shall not be required to comply with the City's Subdivision Ordinance, LDC Chapter 25-4, notwithstanding the timing of the School District's acquisition, development, or redevelopment of property consistent with this Agreement.

ARTICLE VI: SITE DEVELOPMENT PERMIT

6.1 Site Development Plan Not Required for Certain Development (Site Plan Exemption)

6.1.1 The following are modifications to site plan exemptions as described in LDC § 25-5-2 (Site Plan Exemptions). Where no conflict exists between the provisions of this Agreement and LDC § 25-5-2, the School District may utilize the provisions of LDC § 25-5-2, as written.

6.1.1.1 A site development plan is not required for development on an Educational Facility site that disturbs 10,000 square feet of land or less.

6.1.1.2 A site development plan is not required for the addition, removal, or relocation of a Temporary Classroom Building without a permanent foundation on an Educational Facility site.

6.1.1.3 A site development plan is not required for the construction of turning lanes from each side of a median on a divided arterial.

6.1.1.4 If no conflict exists between provisions of this agreement and LDC § 25-5-3 (Small Projects), site development in that section will not require a Site Plan.

6.1.1.5 Any other minor site activities similar to those listed above as determined by the Director of Development Services.

6.1.1.6 The City shall designate dedicated review staff members familiar with the requirements of this Agreement within each discipline responsible for review of site plan exemptions.

6.2 Minor Revisions to Approved Site Development Plan

6.2.1 Minor revisions – administratively known as "site plan corrections" – may be submitted for any previously approved site plan unless expired by non-completion of construction, withdrawn, voided by approval of a new site plan on the same site, or otherwise voided, including after completion of construction and issuance of Certificate(s) of Occupancy.

6.2.2 The School District shall transmit to the City Liaison copies of proposed minor revisions to an approved site development plan.

6.2.3 Not later than the fifth working day after the School District's submittal of a minor revision application, the City shall approve the request, if, subject to modifications required by the City, the minor revision is consistent with this Agreement and applicable City Code. If after the fifth working day the City has not approved the request, the School District and City Liaison shall meet to resolve the remaining issues preventing such scheduling. Unless otherwise agreed to by the Liaisons, the above-described meeting shall occur within 2 working days of the 5th working day after the School District's submittal of the minor revision application.

6.2.4 Minor field revisions involving temporary erosion controls may be approved by the City environmental field inspectors.

6.2.5 The City shall designate dedicated review staff member familiar with the requirements of this Agreement within each discipline responsible for review of minor revisions.

6.2.6 Minor revisions are intended for alterations to an approved site development plan which are beyond the scope of a site plan exemption (detailed in Section 6.1 above) but less intensive than the scope of a major revision (detailed in Section

6.4 below). Alterations allowed to be processed through the use of a minor revision include those which generally:

6.2.6.1 Do not generate more than 25% additional site traffic above the overall approved site development plan, or significantly affect traffic or pedestrian patterns in an adverse manner;

6.2.6.2 Do not increase impervious cover by more than 10,000 square feet; and

6.2.6.3 Do not affect water quality or drainage patterns.

6.3 Major Revisions to Approved Site Development Plan

6.3.1 Major revisions – administratively known as "revisions" – may be submitted for any previously approved site plan unless expired by non-completion of construction, withdrawn, voided by approval of a new site plan on the same site, or otherwise voided, even after completion of construction and issuance of Certificate(s) of Occupancy.

6.3.2 Major revisions are intended for improvements which are beyond the scope of a site plan exemption (detailed in Section 6.1 above) and minor revision (detailed in Section 6.2 above).

6.3.3 Major revisions shall be given the same dedicated review times, review staff, and priority as site development permit applications under the provisions of Section 6.17 of this Agreement.

6.3.4 Buildings may be added to a site development permit through the use of a major revision and shall not require a new site development permit application.

6.3.5 Additions to limits of construction and overall site area, whether through extension of limits of construction within the existing site or through the addition of new land/property not originally included in the initial site development permit, shall be allowed so long as the additional site area is contiguous with the existing site.

6.4 Temporary Classroom Buildings

6.4.1 Temporary Classroom Buildings which are added to an existing Educational Facility campus are exempt from the provisions of the site development regulations contained in the LDC. Temporary Classroom Buildings which are added to an existing Educational Facility campus shall not be counted as impervious cover. Such Temporary Classroom Buildings shall comply with the setback requirements for Waterway Setbacks, Critical Environmental Features, Protected and Heritage Tree setbacks, City of Austin fully-developed floodplains, and limitations associated with construction on slopes. The Director may administratively approve reductions in setbacks from Waterway Setbacks, but in

no case shall such reductions be reduced to less than 50' measured linearly from the Waterway Setback boundary or Critical Environmental Feature.

6.4.2 Notwithstanding the provisions of Section 1.1 of this Agreement, all Temporary Classroom Buildings shall comply with building, fire, electric, energy, mechanical, plumbing, and other technical codes and criteria of the City in effect at the manufacture date of the Temporary Classroom Building and be approved by the Texas Department of Licensing and Regulation (TDLR). The relocation of a Temporary Classroom Building within the same campus or onto a different campus does not constitute a new manufacture date. Notwithstanding the above, if State or Federal law or regulations require that City ordinances or rules be modified or updated to implement State or Federal law or regulations, the School District shall comply with the modified or updated City ordinances or rules to the extent that such State or Federal law or regulations are satisfied.

6.4.3 The School District shall obtain any and all applicable permits for the movement of Temporary Classroom Buildings.

6.4.4 The City may inspect Temporary Classroom Buildings for compliance with applicable regulations.

6.4.5 No permit fees related to Temporary Classroom Buildings shall be charged by the City to the School District except for those permits which involve the provision of services by the City, such as inspections.

6.5 Educational Facilities on Public "P" District Zoned Tracts

Site plan review for School District Educational Facilities located in whole or in part on Public "P" District Zoned tracts shall be reviewed under the LDC §25-5, Article 2 – Administrative Site Plans.

6.6 Telecommunication Towers

6.6.1 A tower that complies with the requirements of this section is permitted on any Educational Facility site.

6.6.2 A tower may not exceed a height of 120 feet and the antenna array may not exceed the tower height by more than 10 feet.

6.6.3 A tower may not be located

6.6.3.1 within 120 feet of an abutting residential property zoned SF-5 or more restrictive or developed with a single-family, duplex, or two-family residential use;

6.6.3.2 on or within 300 feet of a property that is zoned as a historic landmark (H) or historic area (HD) combining district or included in a National Register District;

6.6.3.3 within 50 feet of a day care services (commercial) use; or

6.6.3.4 within 50 feet of a dwelling unit.

6.6.4 A tower must be of monopole construction and designed to accommodate at least two antenna arrays.

6.6.5 Guys and guy anchors must be at least 20 feet from an adjoining property.

6.6.6 A tower must be enclosed by security fencing and screened from street view by landscaping or opaque fencing at least six feet high.

6.6.7 A tower must be identified by a sign visible from outside the screening. The sign must state in letters at least two inches high the name and telephone number of the tower manager and the Federal Communications Commission license number.

6.6.8 A tower must be constructed in accordance with the most recent American National Standards Institute structural standards for steel antenna towers.

6.6.9 A site plan is not required for construction of a tower that complies with this Agreement.

6.6.10 A tower may not be located within a Critical Water Quality Zone.

6.6.11 Notwithstanding the above limitation, the Critical Water Quality Zone boundaries may be reduced within a Suburban Watershed to not less than 50 feet from the centerline of a minor waterway, 100 feet from the centerline of an Intermediate Waterway, and 150 feet from the centerline of a Major Waterway if the overall surface area of the Critical Water Quality Zone is the same or greater than the surface area that would be provided without the reduction, as prescribed in the Environmental Criteria Manual, to facilitate tower construction.

6.6.12 A tower may be allowed in the fully developed floodplain with attached equipment no lower than one foot above the 100-year floodplain in elevation. The School District shall provide the City with a study certified by a professional engineer in the State of Texas that indicates such placement will not cause an adverse flooding impact to other properties, and such study shall require the approval of the City before a permit may be issued.

6.7 Adjacent Street Widths

6.7.1 The parties' goal of adequate adjacent street widths is to ensure safe public access to Educational Facilities and efficient neighborhood circulation.

6.7.2 The requirements of LDC § 25-2-832 do not apply to development of School District Educational Facilities pursuant to this Agreement, as such Safe Public Access and Efficient Neighborhood Circulation shall be addressed in the Traffic Circulation Analysis and Access Management Plan described in Section 6.9 of this

Agreement. Furthermore, a Traffic Circulation Analysis and Access Management Plan shall be provided when an abutting street to an Educational Facility is less than forty feet (40') in width.

6.8 Landscape Standards

6.8.1 It is a goal and intent of both the School District and the City that newly constructed Educational Facilities adhere to the highest environmental, sustainability, and design standards. Landscaping shall accordingly be provided for each new Educational Facility according to City Code, except where modified by this Section.

6.8.1.1 No parking lot medians, islands, or peninsulas are required so long as parking lot perimeters include 1 tree per every 30', except where adjacent to a building or other structure.

6.8.1.2 Educational Facility sites need not comply with buffering or screening requirements to the extent such requirements interfere with school safety protocols and best practices as determined by the School District.

6.8.2 The School District shall complete the required landscaping of an Educational Facility site within eighteen months of the issuance of a certificate of occupancy for the Educational Facility. If the School District does not complete the required landscaping within eighteen months, the School District shall provide written notice of such failure to the City Liaison within 30 calendar days of such occurrence.

6.8.3 The City Arborist shall have administrative authority to consider and approve Heritage Tree removal, variance, or other requests based on the criteria in LDC §§ 25-8-642 and 25-8-643.

6.9 Traffic Impact Analysis

6.9.1 No Traffic Impact Analyses nor Neighborhood Traffic Analyses (NTA) shall be required for Educational Facilities site plans.

6.9.2 Rather, if a Traffic Impact Analysis would otherwise be required, the School District shall provide a Traffic Circulation Analysis and Access Management Plan, with the below information, to be evaluated by the Transportation and Public Works Department.

6.9.2.1 School Description;

6.9.2.2 Location/Study Area Map;

6.9.2.3 Site Layout(s);

6.9.2.4 Traffic Queuing and Circulation Analysis;

6.9.2.5 Safety and Connectivity Narrative;

6.9.2.6 Parking (locations, access, counts, and categorization of parkers);

6.9.2.7 Bike/Ped routes – (on site and off site - to/from the development site);

6.9.2.8 Drop-off/Pick-up schedules including on-site staffing and traffic management responsibilities;

6.9.2.9 Off-site parking (if off-site parking is to be provided, then the location of the parking must be provided along with the bike/ped routes from the off-site location to the Educational Facility must be included).

6.9.3 It is a goal and intent of both the School District and the City that—through Traffic Circulation Analysis and Access Management Plans—the parties can better plan for traffic issues commonly found at Educational Facilities.

6.9.4 The School District shall submit an electronic copy containing a PDF of the report, site plan exhibits, and calculations.

6.9.5 In the event where a TIA or NTA is under City review for an area that includes a property being developed by the School District pursuant to this Agreement, the TIA and/or NTA shall not be required to be completed as a requirement, condition, or prerequisite to approval of a zoning application, site development permit, building permit, or any other development-related permit, inspection or certificate of occupancy, sought by the School District.

6.9.6 Notwithstanding the provisions of LDC § 25-6-101 and/or LDC § 25-6-102, the Director may condition approval of a proposed School District development for an Educational Facility on construction or funding of system improvements as described in this subsection:

6.9.6.1 System improvements, limited to:

6.9.6.1.1 Sidewalks and curb ramps on School District property;

6.9.6.1.2 Traffic signs and markings;

6.9.6.1.3 Urban trail improvements; and

6.9.6.1.4 Right-of-way dedications.

6.9.6.2 System improvements required under this subsection must be located:

6.9.6.2.1 Within the boundaries of the development for which they are required; or

6.9.6.2.2 Along an immediately adjacent half of public right-of-way.

6.9.6.3 For other system improvements, planning and development efforts are to be conducted according to the provisions of this Agreement, but shall not be construed as requirements, conditions, or prerequisites for approval of a Site Development Permit. Such issues must be resolved prior to granting a Certificate of Occupancy. Such other system improvements may include but are not limited to:

6.9.6.3.1 Upgrades to signal infrastructure;

6.9.6.3.2 Traffic calming devices;

6.9.6.3.3 Bike lanes or upgrades to bike facilities;

6.9.6.3.4 Rectangular rapid flashing beacons;

6.9.6.3.5 Pedestrian refuge islands;

6.9.6.3.6 Neighborhood sidewalk improvements including completion of missing segments, reconstruction of damaged or non-ADA-compliant segments, and/or adding street trees or other shade devices;

6.9.6.3.7 Pedestrian hybrid beacons; or

6.9.6.3.8 Measures to limit transportation demand.

6.9.7 The Director shall allow the School District to pay a fee in-lieu of constructing one or more transportation system improvements required under subsection 6.9.3.1 or 6.9.3.2 at the request of the School District. A fee in-lieu collected under this subsection shall be placed in a dedicated fund and used solely for the purpose of constructing one or more system improvements required for a particular site development permit under Section 6.9.3.1 or Section 6.9.3.2 and shall be spent within 10 years from the date fee is paid to the City.

6.9.8 The School District may request a refund of any funds that remain unspent after the end of the ten-year period. A refund request under this section must be submitted in writing, on a form provided by the Director.

6.9.9 The School District need not pay a street impact fee (SIF) for any Educational Facility projects.

6.10 Parking Requirements

6.10.1 There shall be no minimum on-site parking requirement applicable to Educational Facilities, but to the extent parking shall be installed, it shall be included in the Transportation Circulation Study and Access Management Plan described in Section 6.9 of this Agreement.

6.10.2 Bicycle parking shall be provided as the School District deems appropriate.

6.10.3 Except for landscaping requirements, the layout of a parking lot must comply with the Transportation Criteria Manual.

6.11 Driveways

Up to four (4) driveways are permitted per School District Educational Facility site. Additional driveways are permitted if such driveway(s) are included on an approved Traffic Circulation Analysis and Access Management Plan.

6.12 Sidewalks

6.12.1 For development with existing public sidewalks that are compliant with the Transportation Criteria Manual (TCM) and the LDC, notwithstanding the requirements of Chapter 25-2, Subchapter E, as they exist as of the Effective Date of this Agreement, and in compliance with the requirements of the Americans with Disabilities Act, such sidewalks shall not be required to be reconstructed, except to address segments of such sidewalks evaluated by a Texas Registered Accessibility Specialist and deemed to be non-compliant with ADA requirements.

6.12.2 For sidewalks with missing segments or segments that are non-compliant with TCM and/or LDC requirements, only non-compliant segments shall be required to be constructed or reconstructed.

6.12.3 The School District may request to pay a fee in-lieu of constructing required sidewalk improvements in accordance with the provisions of Section 6.9 of this Agreement.

6.13 Interim Condition Compliance

In instances where development, redevelopment, construction, reconstruction, demolition, and/or phasing of such work may create interim non-compliance with any development regulation of the City and/or of this Agreement, the City will work with the School District to provide temporary alternative methods of compliance if the non-compliance will ultimately be resolved when the project is complete, according to the proposed final condition on the site development plans. Such temporary alternative methods of compliance shall not result in increased stormwater discharge from the site. Interim conditions shall not exceed six months and can be extended at the Director's discretion.

6.14 Alternative Design

6.14.1 The School District may request an alternative design ("Alternative Design") when strict compliance is not feasible. The Director may approve an Alternative Design to satisfy any requirement of the City Code and/or of this Agreement if the design meets the following standards:

6.14.1.1 The proposed Alternative Design is in general conformity with the intent of the regulation in question; and

6.14.1.2 The proposed Alternative Design will have no significant adverse impact on the health, safety, or general welfare of surrounding property owners or the general public, or such impacts will be substantially mitigated.

6.15 Water, Wastewater, and Reclaimed Water Service

6.15.1 Utilities Across Lot Lines

Water, wastewater, or reclaimed water infrastructure serving School District Educational Facilities located on multiple lots shall be permitted to cross lot lines in the event that the School District owns, in whole or in part, the tracts being developed, and the School District requests an Alternative Design and complies with all City terms and conditions.

6.15.2 Reclaimed Water

It is a goal and intent of both the School District and the City that Educational Facilities adhere to the highest environmental and sustainability standards, including with respect to the conservation of water. Although the School District need not strictly comply with the reclaimed water requirements of City Code (primarily located in LDC Chapter 25-9, including but not limited to dual plumbing, the City's Water Forward goals and requirements, and the use of non-potable water), the School District will cooperate with the City such that Educational Facilities are constructed in line with such requirements to the extent the School District determines that additional costs are appropriate.

6.15.3 Water Conservation

Any City water conservation requirements imposed during conservation periods regarding the use of potable or reclaimed water received through City wholesale services shall be applicable to School District Educational Facilities.

6.16 Demolition and Historic Review

6.17.1 Notwithstanding LDC § 25-5-2(B)(7), the City shall approve demolition permits with an approved site plan exemption, regardless of square footage, so long as the School District complies with any applicable required demolition notification processes.

6.17.2 Notwithstanding City Council Resolution 20160623-082 or its amendment in City Council Resolution 20180510-049, or any related policy of the Historic Preservation Office or Historic Landmark Commission, the Historic Preservation Office may review and release a demolition permit administratively per LDC Section 25-11-213(B)(7) without the requirement of a hearing before the Historic

Landmark Commission if the applicable project was included in a School District bond approved by voters.

6.17.3 City staff shall collaborate with School District and historic preservation stakeholders to identify Educational Facility projects that include buildings over 50 years of age that may require demolition permits and to develop recommendations regarding expedited scheduling at the Historic Landmark Commission.

6.17.4 Such scheduling can occur outside of any existing or planned permitting process and shall be tied to a site plan exemption that is undertaken for historic review purposes only.

6.17.5 The City shall place such requests on the agenda of the next available meeting for which the City can meet its notification deadlines.

6.17.6 A demolition permit shall not expire for a period of 5 years if it is for a project that was included in a School District bond approved by voters.

6.17 City Review and Comment of Site Development Plan

6.17.1 Review Scope

6.17.1.1 Review of site development permit application materials for Educational Facility sites with existing development which will be maintained and or modified shall be limited to those elements being newly developed or modified.

6.17.1.2 Existing development shall be treated as existing, conforming, and compliant development and shall not be required to be modified for purposes of compliance with regulations otherwise applicable to the site if such existing developed elements are not proposed to be modified.

6.17.1.3 Where existing development is proposed to be modified, only those specific elements proposed to be modified shall be reviewed for and be required to come into compliance with applicable regulations.

6.17.2 Review Schedule

6.17.2.1 The City Liaison shall notify the School District Liaison by telephone or email within 5 working days of site development plan submittal If the submitted site development plan and reports do not meet the minimum submittal requirements of this Agreement and applicable City Code. If the site development plan is insufficient for review, then the City Liaison shall provide written explanation of the application's deficiencies. After the submittal of a sufficient and complete application, the City shall have 15 working days to review a site development plan, each subsequent phase of an approved phased

site development plan, and accompanying reports, if any, and respond with complete comments from all reviewing city departments to the School District Liaison regarding the site development plan's compliance with this Agreement. Should complete comments not be returned within said 15 working days, then the City Liaison shall give a written response to the School District with a copy to the City Manager. Said response shall contain a detailed explanation of the reasons for the delay and an accurate timetable for when complete comments regarding the Site Development Plan will be issued.

6.17.2.2 After submittal of a sufficient and complete application, the City shall have 10 working days to review a small project site development plan and respond to the School District Liaison per written comments by all relevant City departments regarding compliance with this Agreement and applicable City Code.

6.17.2.3 The City shall have 10 working days to review submitted updates to a site development plan.

6.17.2.4 The School District shall give the City Liaison at least 2 working days prior notice of the School District's intent to submit a site development plan for initial review or a site development plan update based on prior City review.

6.17.2.5 The School District shall include with all update submittals a summary sheet listing each comment issued by the City and a brief description of how the comment was addressed.

6.17.2.6 If, after the City has issued comments to the second update to the site development plan the City has not approved the site development plan, the School District and City Liaison shall meet to resolve the remaining issues preventing site development plan approval. Unless otherwise agreed on by the Liaisons, the above-described meeting shall occur within 10 working days of the City issuing comments to the second site development plan update.

6.17.3 Final Approval

The site development plan shall be approved if the site development plan complies with this Agreement and all applicable City Code.

6.17.4 Effect of Approved Site Development Plan

6.17.4.1 If required, a building permit shall be issued by the City to the School District when the building construction plans are approved as

complying with the applicable building code and the approved site development plans.

6.17.4.2 The School District may begin site construction and utility construction in accordance with the site development plan after:

6.17.4.2.1 The approval of the site development plan;

6.17.4.2.2 A preconstruction conference; and

6.17.4.2.3 Installation of required environmental controls.

6.17.4.3 If applicable, water meter, reclaimed water meter, and wastewater tap(s) from the City may be purchased after approval of the Site Development Plan. All applicable inspections and testing must be completed prior to issuance of a certificate of occupancy.

6.18 Review and Impact Fees

The School District shall not pay to the City any fees for the review of site development permit applications for Educational Facility sites, or any impact fees related to the construction at an Educational Facility site. Notwithstanding the foregoing, the School District shall pay for inspection fees.

6.19 Fiscal Surety

6.19.1 No fiscal surety, cash escrow, letter of credit, bond, or any other form of financial guarantee, associated with development by the School District pursuant to the Agreement, shall be required prior to or during construction or as a condition of any acceptance, approval, or issuance of any permit or certificate by the City, including but not limited to fiscal surety for:

6.19.1.1 Erosion and sedimentation controls;

6.19.1.2 Off-site tree mitigation;

6.19.1.3 Parkland dedication or improvements;

6.19.1.4 Work in a public right-of-way and temporary use of right-of-way fees;

6.19.1.5 Water, Reclaimed Water, and Wastewater Improvements or

6.19.1.6 Subdivision infrastructure improvements.

6.19.2 By execution of this Agreement, the School District agrees that the performance otherwise secured by a financial guarantee under the City Code, will be made at School District cost.

6.19.3 The School District shall include in construction bid documents, construction contracts, and the bonding requirements of contractors, that the installation and

maintenance of temporary erosion controls and revegetation of disturbed areas will be done in accordance with City standards.

6.19.4 The School District shall hold the cost of revegetation as retainage until the City issues a letter approving the revegetation on the site. In this section, revegetation means permanent erosion controls and does not otherwise include landscaping.

ARTICLE VII: BUILDING PERMIT

7.1 Building Construction Plan Review and Building Permit Issuance

7.1.1 For an addition to an existing School District Educational Facility building, building code review shall be limited to the addition where the addition connects to the existing building and the accessible route(s) to the addition.

7.1.2 After the City Building Official has received information, all applicable City building permit review fees, and adequate evidence of the future availability of water and wastewater service, the City shall have 15 working days to review a building permit application for a new building and issue to the School District either a Building Permit or a complete written list of changes needed to bring the building construction plans into compliance with the Building Code and this Agreement.

7.1.3 After making the changes necessary to bring the building construction plans into compliance with the Building Code and this Agreement, as noted in the written list of changes provided by the City, the School District may resubmit the building construction plans to the City.

7.1.4 The City shall have 10 working days to review the submitted building construction plans and issue to the School District either a building permit or a second written list of changes needed to bring the building construction plans into compliance with the Building Code and this Agreement. The 10 working days review period by the City shall apply to each additional resubmittal of the building construction plans.

7.1.5 If the City fails to provide written comments to the School District within the required 10 working days, or if more than two resubmittals have been required without a permit being issued, then the City and School District liaison shall meet or communicate as quickly as reasonably possible to resolve outstanding issues. The City and School District may mutually agree to extend any of the required 10 working day review periods.

7.2 City Review and Comment of Building Permits

7.2.1 Review Schedule

7.2.1.1 The City Liaison shall notify the School District Liaison by telephone or email within 5 working days of receiving a building permit submittal ("Building Permit Application") if the building permit Application does not meet the minimum submittal requirements of this Agreement and applicable City Code. If the Building Permit Application is insufficient for review, then the City Liaison shall provide written explanation of the application's deficiencies. After the submittal of a sufficient and complete Building Permit Application, the City shall have 15 working days to review the Building Permit Application and accompanying reports, if any, and respond with complete comments from all reviewing City departments to the School District Liaison regarding the Building Permit Application's compliance with this Agreement. Should complete comments not be returned within said 15 working days, then the City Liaison shall give a written response to the School District with a copy to the City Manager. Said response shall contain a detailed explanation of the reasons for the delay and an accurate timetable for when complete comments regarding the Building Permit Application will be issued.

7.2.1.2 The City shall have 10 working days to review submitted updates to a Building Permit Application.

7.2.1.3 The School District shall give the City Liaison at least 2 working days prior notice of the School District's intent to submit a Building Permit Application for initial review or update based on prior City review.

7.2.1.4 The School District shall include with all update submittals a summary sheet listing each comment issued by the City and a brief description of how the comment was addressed.

7.2.1.5 If, after the City has issued comments to the second update to the Building Permit Application and the City has not approved said permit, the School District Liaison and City Liaison shall meet to resolve the remaining issues preventing such approval. Unless otherwise agreed on by the Liaisons, the above-described meeting shall occur within 10 working days of the City issuing comments to the second Building Permit Application update.

7.2.2 Building permits for Educational Facilities shall have priority review by the City.

7.3 Inspections

Building inspections shall be performed within 2 days of the School District having notified the inspector and the inspection being scheduled. The School District will arrange for the layout inspection to be performed by a Registered Professional Land Surveyor and the foundation inspection will be performed by a Registered Professional Engineer.

ARTICLE VIII: ANNUAL PERMIT

Certain authorized building, electrical, mechanical, and plumbing scopes of work at School District Educational Facilities covered under this Agreement shall be eligible for completion under an Annual Permit as described in Section 1.1.2.1 of the City Building Criteria Manual. Instead of an individual permit for each alteration to an already approved gas, electrical, mechanical or plumbing installation, including defined minor building alterations and repairs, the City Building Official is authorized to issue an Annual Permit upon application thereof to the School District if they regularly employ one or more qualified trade persons in the building, structure or on the premises owned or operated by the School District for the permit. The facility shall maintain records on all work performed and scheduled quarterly inspections under the annual permit in accordance with § 105.1.2 of the Local Amendments to the International Building Code (IBC) and DSD Annual Permit Inspections Policy (Annual Permit Records).

ARTICLE IX: CONSTRUCTION

The City shall provide site plan construction inspections within 5 business days of such request being made by the School District to the City Liaison.

ARTICLE X: ENVIRONMENTAL

10.1 Environmental Resource Inventory

10.1.1 It is the intent of the parties that an Educational Facility project on a built-out site with a validly existing site plan shall be eligible for a waiver under LDC Section 25-8-121(D).

10.2 Impervious Cover Limits

10.2.1 Impervious cover limits for Educational Facility development covered by this Agreement are established by this section.

10.2.2 Impervious cover calculated for School District Educational Facilities shall not consider natural trails or natural surface tracks as impervious cover, as such facilities are described in the Environmental Criteria Manual.

10.2.3 This subsection applies to impervious cover limitations for Educational Facilities in an Urban watershed.

10.2.3.1 In an Urban watershed, the maximum impervious cover is 65% of gross site area, or 70% of the gross site area if a transfer of impervious cover is available and utilized, except:

10.2.3.1.1 For Educational Facility campuses in an Urban watershed that are more than 5-acres but less than 10-acres in size, a maximum impervious cover of 75% gross site area will be

allowable and such limits shall apply to the site regardless of whether impervious cover transfers are utilized or not.

10.2.3.1.2 For Educational Facility campuses in an Urban watershed that are less than or equal to 5-acres in size, a maximum impervious cover of 80% gross site area will be allowable and such limits shall apply to the site regardless of whether impervious cover transfers are utilized or not.

10.2.3.2 Impervious cover transfers to an Educational Facility site in an Urban watershed, if utilized, must be from a site in the same watershed classification and otherwise meet the requirements of this Subsection.

10.2.3.3 To be eligible for the Urban watershed additional impervious cover described in this Section, water quality treatment shall be required for all impervious cover that is compliant with applicable sections of this Agreement.

10.2.4 This subsection applies to impervious cover limitations for Educational Facilities in a Suburban watershed.

10.2.4.1 In a Suburban watershed, the maximum impervious cover is 50% of gross site area, or 60% of the gross site area if a transfer of impervious cover is available and utilized, except:

10.2.4.1.1 For Educational Facility campuses in a Suburban watershed that are more than 5-acres but less than 10-acres in size, a maximum impervious cover of 70% gross site area will be allowable and such limits shall apply to the site regardless of whether impervious cover transfers are utilized or not.

10.2.4.1.2 For Educational Facility campuses in a Suburban watershed that are less than or equal to 5-acres in size, a maximum impervious cover of 75% gross site area will be allowable and such limits shall apply to the site regardless of whether impervious cover transfers are utilized or not.

10.2.4.2 Impervious cover transfers to an Educational Facility site in a Suburban watershed, if utilized, must be from a site in the same watershed classification and otherwise meet the requirements of this Subsection.

10.2.4.3 To be eligible for the Suburban watershed additional impervious cover described in this Section, water quality treatment shall be required for all impervious cover that is compliant with applicable sections of this Agreement.

10.2.5 This subsection applies to impervious cover limitations for Educational Facilities in a Water Supply watershed.

10.2.5.1 In a Water Supply watershed, the maximum impervious cover is 50% of net site area, or 60% of the net site area if a transfer of impervious cover is available and utilized, except:

10.2.5.1.1 For Educational Facility campuses in a Water Supply watershed that are more than 5-acres but less than 10-acres in size, a maximum impervious cover of 70% net site area will be allowable and such limits shall apply to the site regardless of whether impervious cover transfers are utilized or not.

10.2.5.1.2 For Educational Facility campuses in a Water Supply watershed that are less than or equal to 5-acres in size, a maximum impervious cover of 75% net site area will be allowable and such limits shall apply to the site regardless of whether impervious cover transfers are utilized or not.

10.2.5.2 Impervious cover transfers to an Educational Facility site in a Water Supply watershed, if utilized, must be from a site in the same watershed classification and otherwise meet the requirements of this Subsection.

10.2.5.3 To be eligible for the Water Supply watershed additional impervious cover described in this Section, water quality treatment shall be required for all impervious cover that is compliant with applicable sections of this Agreement.

10.2.6 Notwithstanding anything to the contrary in this Section 10.2, this subsection applies to impervious cover limitations for Educational Facilities in an uplands zone of the Barton Springs Zone.

10.2.6.1 For development in the Barton Springs Zone for which a no discharge water quality control or alternative control approved by the Watershed Protection Utility is utilized:

10.2.6.1.1 Except as provided in Subsection 10.2.6.1.2 or 10.2.6.1.3 below, development of an Educational Facility site shall be 25% impervious cover or comply with the impervious cover regulations established in Section 25-8-514 of City Code (the Save our Springs Ordinance), whichever is greater.

10.2.6.1.2 For an Educational Facility site described on **Exhibit A**, impervious cover may not exceed the impervious cover limit established in the exhibit.

10.2.6.1.3 For development of an Educational Facility site on a tract of land subject to a Conservation Easement to Restrict Impervious Cover (or instrument having similar intent and effect) entered into in connection with a development or settlement agreement between a developer and the City after March 15, 2000, which includes an allocation of impervious cover to identified tracts of land within the area covered by such agreement, the School District shall be governed solely by the terms and provisions of the applicable Conservation Easement to Restrict Impervious Cover (or instrument having similar intent and effect) regarding the impervious cover limits for such Educational Facility site.

10.2.7 Notwithstanding anything to the contrary in this Section 10.2, the following applies to development or redevelopment of an existing Educational Facility site in the Barton Springs Zone:

10.2.7.1 An existing Educational Facility site may achieve compliance with the impervious cover requirements of Subsections 10.2.6.1.1 and 10.2.6.1.2 above by transferring impervious cover under the provisions of Section 10.3, but an existing Educational Facility site may not exceed 50% of actual impervious cover on a net site basis.

10.2.8 Except in the Barton Springs Zone, for a site owned by the School District before May 18, 1986, the maximum impervious cover is the impervious cover established by the applicable watershed ordinance in effect on May 18, 1986, or the impervious cover established in this Section 10.2, whichever is greater.

10.3 Transfer of Impervious Cover

10.3.1 For every one acre of land in the Critical Water Quality Zone restricted from development and available for public use, the School District is entitled to an additional 20,000 square feet of impervious cover on lands in Uplands Zones on any Educational Facility site within the same watershed classification.

10.3.2 For every one acre of land in the Water Quality Transition Zone left undeveloped and undisturbed and not included in impervious cover calculations elsewhere, the School District is entitled to an additional 20,000 square feet of impervious cover on lands in Uplands Zones on any Educational Facility site within the same watershed classification.

10.3.3 Except as otherwise provided in this subsection, for every one acre of land or portion thereof in the Uplands Zone located within a buffer of a Critical Environment Feature and left natural and undisturbed, the School District is

entitled to an additional 20,000 square feet of Impervious Cover on lands elsewhere in Uplands Zones on any Educational Facility site within the same watershed classification. Such buffer area may also be included in the Net Site Are calculations for the Uplands Zone.

10.3.4 A maximum of 85% of the transfer credit otherwise available under Section 10.3.2 is permitted for grass play field within the Water Quality Transition Zone if restored using predominately native plants and grasses and if the School District provides and implements a plan for minimizing the use and impact of pesticides, herbicides, and fertilizers. A maximum of 50% of the transfer credit otherwise available under the Section 10.3.2 is permitted for land use for wastewater disposal.

10.3.5 Impervious cover may only be transferred to another site or tract owned by the School District within the same watershed classification and may only be used in conjunction with an Educational Facility constructed pursuant to this Agreement. Impervious cover may not be transferred unless the transferring tract has an approved site plan which covers the area from which impervious cover is transferred. The School District must file in the County Deed records restrictive covenants, in a form and substance approved by the City, running with both the transferring and receiving tracts and noting the transfer of impervious cover.

10.3.6 Notwithstanding anything to the contrary in this Section 10.3, and excluding Bowie High School except for Subsection 10.3.6.7, impervious cover can be transferred for development or redevelopment of existing Educational Facility sites within the Barton Springs Zone subject to the following conditions.

10.3.6.1 The tract from which impervious cover may be transferred (the "Transferring Tract") is more particularly described as follows:

Lot 60 in Block 6 of TRAILWOOD VILLAGE TWO AT TRAVIS COUNTRY, a subdivision on Travis County, Texas, according to the map or plat thereof, recorded in Volume 76, Pages 393-395 of the Plat Records of Travis County, Texas ("Transferring Tract One").

10.3.6.2 The impervious cover credits eligible for transfer from the Transferring Tract shall be calculated based on the allowable impervious cover under this Agreement.

10.3.6.3 Before a transfer of impervious cover is permitted, the Transferring Tract shall be restricted to prohibit development on the tract in a manner acceptable to the City, which may include a conservation easement, restrictive covenant, or similar instrument.

10.3.6.4 Except as provided in Subsection 10.3.6.7, once impervious cover credit is transferred from the Transferring Tract, such impervious cover credit is not available to be transferred to another Educational Facility site.

10.3.6.5 For the Transferring Tract, the School District shall submit a site plan in order to track the amount of impervious cover available for transfer and to document the conservation use of the site. The City shall waive all site plan submittal requirements for this site plan, other than those necessary to document the transferrable impervious cover and conservation use.

10.3.6.6 For each Educational Facility site receiving a transfer of impervious cover credit, the School District shall submit a site plan with a tracking table indicating the amount and source of transferrable impervious cover available, the amount of transferrable impervious cover used in the subject site plan, and the amount of transferrable impervious cover remaining. With each approved site plan under this subsection, the School District shall administratively modify the site plan described in Section 10.3.6.5 to reflect the transfer of impervious cover.

10.3.6.7 Impervious cover removed from the Akin Tract, described below, after January 22, 2018, and which has not already been credited, may be credited to the total impervious cover available from the Transferring Tract up to an amount equal to the impervious cover transferred to Bowie High School from the Transferring Tract under the Agreement Between the City of Austin and the Austin Independent School District Establishing Site Development Standards for Redevelopment of Bowie High School and Impervious Cover Transfers, effective January 22, 2018, as amended. The Akin Tract is more particularly described as follows:

Lot(s) 1, AKIN SUBDIVISION, a subdivision in Travis County, Texas, according to the map or plat thereof, recorded in Volume 91, Page(s) 110 of the Plat Records of Travis County, Texas.

10.4 Waterway Setbacks

10.4.1 Except as authorized in the LDC and in Section 10.4.2 and 10.4.3 below, development is not permitted in a Critical Water Quality Zone or Water Quality Transition Zone.

10.4.2 In a Water Quality Transition Zone, the maximum impervious cover is 18%, except that in the Barton Springs Zone, development is limited to the development allowed in a Critical Water Quality Zone.

10.4.3 Buffer averaging of both the Critical Water Quality Zone and Water Quality Transition Zone may be utilized in watersheds outside the Barton Springs Zone for Educational Facility sites. The buffer averaged must be adjacent and the areas contained within each respective buffer after buffer averaging shall remain the same as originally defined by the City.

10.5 Cut and Fill

10.5.1 No cut and fill limits shall apply to the building footprint area, roadway rights-of-way or the construction and maintenance of Water Quality Controls and detention ponds.

10.5.2 No cut and fill in excess of 4 feet shall be allowed in the Critical Water Quality Zone or the Water Quality Transition Zone.

10.5.3 Cut and fill in excess of 4 feet must be structurally contained in accordance with the City's Environmental Criteria Manual.

10.5.4 In the Uplands Zone, cut or fill between 4 and 8 feet may be administratively approved. Cut or fill in excess of 8 feet must be approved by the Land Use Commission.

10.5.5 Criteria for allowing cut or fill between 4 and 8 feet shall include, but not be limited to:

10.5.5.1 No adverse impact on a Critical Environmental Feature;

10.5.5.2 No adverse impact on water quality; or

10.5.5.3 The site has been previously disturbed by manmade activities.

10.5.6 The fill limitation shall not apply to:

10.5.6.1 Fill placed under foundations and containment walls perpendicular to the round, or with pier and beam construction if the fill is structurally contained; or

10.5.6.2 Back fill for utility construction or wastewater drain fields.

10.5.7 Cut and fill for roadways shall be contained within the right-of-way.

10.6 Construction on Slopes

10.6.1 Construction on slopes of 25% to 35% is permitted for construction of a building or parking area if the site was owned by the School District on January 1, 1994.

10.7 Water Quality Controls

10.7.1 Except as otherwise provided in this section, all Educational Facility sites shall contain water quality controls constructed and maintained in accordance with City Code.

10.7.2 Water quality controls shall use "green stormwater infrastructure" as defined by the Environmental Criteria Manual unless innovative water quality control measures are proposed and accepted by the Director of the Watershed Protection Department in compliance with LDC Section 25-8-151(C) (Innovative Management Practices).

10.7.3 This subsection applies to development or redevelopment of an existing Educational Facility site in the Barton Springs Zone.

10.7.3.1 An Educational Facility site must provide water quality controls that comply with LDC § 25-8-514 (Pollution Prevention Required) for all existing, new, and redeveloped areas on the site. Water quality treatment volume shall be based on the actual on-site impervious cover and not be adjusted by any transfer of impervious cover credit to the site.

10.7.3.2 Except as otherwise provided in this subsection, water quality treatment shall use on-site controls.

10.7.3.3 Off-site controls for water quality treatment for water quality controls may be permitted if the Director of the Watershed Protection Department determines that it is not technically feasible to provide all of the required water quality treatment using on-site controls.

10.7.3.4 If off-site controls are permitted, on-site controls will be used to the maximum extent technically feasible, as determined by the Director of the Watershed Protection Department.

10.7.3.5 The Director of the Watershed Protection Department has determined that it is not technically feasible to provide all of the required water quality treatment using the on-site controls at the following Educational Facility sites and that the pollutant load reductions stated below are the maximum extent technically feasible on each Educational Facility site.

10.7.3.5.1 Zilker Elementary shall use on-site controls to reduce pollutant loads to the level that would be created by 25% net site area impervious cover.

10.7.3.5.2 Barton Hills Elementary shall use on-site controls to reduce pollutant loads to the level that would be created by 15% net site area impervious cover.

10.7.3.5.3 Baranoff Elementary shall use on-site controls to reduce pollutant loads to the level that would be created by 10% net site area impervious cover.

10.7.3.6 Off-site controls for water quality treatment shall be provided for an equivalent area subject to approval by the Director of the Watershed Protection Department based on the following criteria:

10.7.3.6.1 The equivalent area shall be located on a property owned by the School District within the Barton Springs Zone portion of the Edwards Aquifer Recharge Zone or, if such a site in not available, within the Barton Springs contributing zone.

10.7.3.6.2 The equivalent area shall be an area that does not currently receive treatment and is not likely to be treated in the future.

10.7.3.6.3 The equivalent area shall be at least equal to the impervious cover area on the Educational Facility site that requires treatment.

10.7.3.6.4 If impervious cover is removed to meet treatment requirements, the site shall be permanently restricted from future development of an equivalent amount of impervious cover unless treatment can be provided in another acceptable form and approved by the City.

10.7.3.7 The School District shall submit the design for off-site controls to the City as part of the site plan for the Educational Facility site that requires treatment. The City will review the off-site controls and associated drainage areas only for compliance with the Agreement and other regulations applicable to the water quality treatment system.

10.8 Artificial Turf

10.8.1 Artificial turf fields and tracks on Educational Facility sites shall not be calculated as impervious cover if the installation complies with the following:

10.8.1.1 The installation may not include compacted subgrade or an impermeable liner;

10.8.1.2 The installation results in no significant change to the hydrologic flows from the artificial turf fields when compared to natural field hydrology;

10.8.1.3 The installation will maintain the existing ground water connectivity; and

10.8.1.4 Except in the Barton Springs Zone, where infiltration will be provided per SOS non-degradation water quality treatment standards, a sand filter or equivalent water quality treatment, as determined by the Director of the Watershed Protection Department, is provided.

10.8.2 The School District shall provide design calculation that confirms adequate infiltration of stormwater for approval by the Director of the Watershed Protection Department.

ARTICLE XI: JOINTLY OWNED LANDS

11.1 Jointly Owned Lands

Pursuant to the Agreement Between the City of Austin and the Austin Independent School District Regarding Development and Shared Use of Jointly Owned Facilities, Ground Improvements and Open Spaces (the "Joint Use Agreement"), the School District will consult with the City such that it may place Temporary Classroom Buildings on Joint Use Facilities during construction periods.

ARTICLE XII: LEGAL DOCUMENTS

12.1 Standard Legal Documents

The School District and the City shall collaborate on the development of standard license, easement, encroachment, unified development, Integrated Pest Management, and other legal documents applicable to activities undertaken under this Agreement. Once the School District and the City have negotiated such agreements, they shall be used for all projects undertaken under this Agreement, without the need for additional legal review by either party.

12.2 Waiver of Verification of Legal Entity

The City shall waive the requirement for documentation proving the legal entity status for the School District in all such documents.

12.3 Timing of Final Approval for Legal Documents

Any of the legal documents referenced in Section 12.1 and necessary for the granting of a Site Development Permit or a Building Permit from the City shall be required to be finalized only prior to the issuance of a Certificate of Occupancy for activities undertaken under this Agreement and shall not delay or otherwise impact the acquisition of said Site Development Permit and/or Building Permit.

ARTICLE XIII: SIGNS

Signs shall be allowed for any School District Educational Facility as follows:

13.1 Applicable Sign District

Notwithstanding the otherwise applicable sign district according to LDC § 25-10-82, and in addition to the other provisions of this Article XIII, signs shall be permitted at an Educational Facility site as if such property were a commercial sign district, and the restrictions of LDC § 25-10-130(G) related to sign height do not apply to an Educational Facility site. Notwithstanding the foregoing, roof signs shall not be permitted on Educational Facility sites, and LDC Section 25-10-124(F) shall apply to Educational Facility sites located in the Scenic Roadway Sign District.

13.2 Freestanding Signs

13.2.1 One freestanding sign shall be permitted along each street frontage at a School District Educational Facility that:

13.2.1.1 May not exceed 32 square feet in area; and

13.2.1.2 May not exceed a height of 8 feet above the highest grade directly beneath the sign or above the grade of the street directly adjacent to the sign, whichever is higher.

ARTICLE XIV: AUSTIN ENERGY

14.1 Austin Energy Liaisons

14.1.1 Liaisons. Austin Energy will have a dual contact approach, providing the School District with both (i) a general liaison ("General Liaison") and (ii) a technical liaison ("Technical Liaison"), for development on Educational Facility sites. The General Liaison and Technical Liaison will coordinate across Austin Energy departments. Coordination shall include design, purchasing, and construction. Upon the School District's request, the Austin Energy General Liaison shall schedule a predesign meeting. In the event an Austin Energy design standard is not aligned with other City requirements (i.e., differences between fire and energy requirements), the Austin Energy Technical Liaison and City Liaison will cooperate to provide a single standard. The Austin Energy General Liaison will:

14.1.1.1 Be the Austin Energy single point of contact and will ensure that both ESPA reviewers and design reviewers are present and providing comments to School District submittals;

14.1.1.2 Coordinate the scheduling of Austin Energy inspections;

14.1.1.3 Coordinate the ordering, lead times, and delivery of Austin Energy purchased equipment and materials;

14.1.1.4 Coordinate the scheduling of Austin Energy crews for equipment and material setting;

14.1.1.5 Coordinate the scheduling of the termination of secondary cables at the transformer; and

14.1.1.6 Coordinate the scheduling of meter setting.

14.1.2 Design Process. Austin Energy acknowledges and agrees that it will begin design upon acceptance of 30% design documents.

14.2 Equipment.

When equipment needs are determined, Austin Energy will engage with the School District to discuss procurement options to meet project requirements and material delivery times. Such procurement may include customer purchased equipment approved by Austin Energy.

ARTICLE XV: TERM

All provisions of this Agreement shall be in full force and effect for the term of 25 years from the Effective Date unless terminated sooner pursuant to this section. At any time after 7 years from the Effective Date, written notice of cancellation ("Notice of Cancellation") may be delivered by either party to the other party. This Agreement will terminate 60 calendar days after the date of the delivery of the Notice of Cancellation. A Notice of Cancellation must be authorized by majority vote of the School Board or City Council, as appropriate. In the event that a Notice of Cancellation is delivered by one party to the other, during the intervening 60 calendar day period before the Agreement terminates, the parties may, by majority vote of both the School Board and City Council, agree to extend the life of, or modify, this Agreement. The fact that negotiations are ongoing shall not affect the validity of the Notice of Cancellation or the termination date.

ARTICLE XVI: MISCELLANEOUS PROVISIONS

16.1 Liaisons and Dispute Resolution

The City Liaison will establish and maintain communication with the School District Liaison and will review and, if possible, resolve all issues and disputes relating to the Agreement. The City Liaison must have the authority to coordinate meetings and mediate resolutions, as needed, between all development-review-related City Departments and the School District.

The School District Liaison will establish and maintain communication with the City Liaison and will review and, if possible, resolve all issues and disputes relating to this Agreement. If the Parties cannot agree to a resolution, the Superintendent of the School District and the City Manager will make a good faith effort to come to a mutually agreeable solution that reflects the intent of this Agreement.

Prior to taking any legal action, the parties shall mediate any dispute using the services of a mutually agreed upon independent mediator. The parties shall equally split the

expenses of the mediator and the facility for the mediation. Each party shall otherwise pay its own expenses. If no agreement can be reached according to the procedures in this Agreement or as a product of mediation, the non-defaulting party shall have all remedies available at law and in equity.

16.2 Modification Procedure

Any amendment of this Agreement shall only be effective and binding if the amendment is in writing and signed by both parties, except otherwise described in this section. Notwithstanding any provision of this Agreement, the School District may take advantage of recorded subdivision plat notes, recorded restrictive covenants required by a regulatory agency, or any change to the laws, rules, regulations, or ordinances of a regulatory agency, or any change to the laws, rules, regulations, or ordinances that enhance or protect the School District, including changes that lengthen the effective life of the permit after the date the application for the permit was made, without forfeiting any rights under this Agreement. If the Superintendent of the School District or the City Manager requests an amendment to this Agreement, the counterparty will make a good faith effort to come to mutually agreeable terms that reflect the basis of the amendment request.

16.3 Entire Agreement

This Agreement contains the complete and entire agreement between the parties respecting the matters addressed herein, and supersedes all prior negotiations, agreement, representations, and understandings, if any, between the parties respecting the matters addressed herein, and supersedes all prior negotiations, agreements, representations, and understandings, if any, between the parties respecting such matters. No oral statement or prior written material not specifically incorporated in this Agreement shall be of any force or effect. The parties agree that in entering into this Agreement, they have relied solely upon the representations and agreements contained in this Agreement and no others. Any consent, waiver, approval, or authorization under this Agreement shall be effective if signed by the party granting or making such consent, waiver, approval, or authorization.

16.4 Interpretation

The singular form of any word used in this Agreement includes the plural, and vice-versa, unless the context requires otherwise. The use of a word of any gender in this Agreement includes all genders unless the context requires otherwise. This Agreement and all of the terms and provisions hereof shall be construed to effectuate the purposes contemplated hereby and to sustain the validity hereof.

16.5 Invalid Provisions

If any clause, sentence, provision, paragraph, section, or article of this Agreement is held by a court or competent jurisdiction to be invalid, illegal, or ineffective, that

invalidity, illegality, or ineffectiveness shall not impair, invalidate, or nullify the remainder of this Agreement; and its effect shall be confined to the clause, sentence provisions, paragraph, section, or article held to be invalid, illegal, or ineffective.

16.6 Third Party Beneficiaries

Nothing in this Agreement, express or implied, is intended to confer any benefits, rights, or remedies under or by reason of this Agreement upon any person other than the parties to the Agreement and their respective successor governmental entities. No assignment of this Agreement or of any right, duty, or obligation of performance under this Agreement, in whole or in part, shall be effective unless such assignment is approved in writing by both the School District and the City.

16.7 No Joint Venture, Partnership, Agency, Etc.

This Agreement shall not be construed as in any way establishing partnership or joint venture, express or implied agency, or employer-employee relationship between the parties hereto.

16.8 Other Instruments

The parties hereto covenant and agree that they will execute such other and further instruments and documents as are or may become necessary or convenient to effectuate and carry out this Agreement.

16.9 No Waiver

No consent or waiver, express or implied, by a party to or of any default of any covenant or provision of this Agreement by the other party shall be construed as a consent to a waiver of any other default of the same or any other covenant or provision of this Agreement.

16.10 Applicable Law

This Agreement shall be governed by and construed in accordance with the laws of the State of Texas.

16.11 Headings

The headings used in this Agreement are used for reference and shall not be used to interpret or limit the meaning of any provision of this Agreement.

16.12 Parties Bound

This Agreement shall be binding upon and inure to the benefit of the parties hereto and their respective administrators, legal representatives, and successor government entities.

16.13 Counterparts

This Agreement may be executed simultaneously in one or more counterparts, each of which shall be deemed an original and all of which shall together constitute one and the same instrument.

16.14 Successor Entities

Any reference to any governmental entity, governmental department or governmental official or employee shall include any succeeding governmental entity, governmental department, or governmental official or employee assuming the responsible or function described by this Agreement.

16.15 Diversity, Equity, Inclusion

Any activities undertaken pursuant to this Agreement shall reflect and promote an inclusive, healthy, and welcoming environment for all School District students.

16.16 Venue

Venue for any suit arising under this Agreement shall be in Travis County.

16.17 Amendment

No amendment of this Agreement shall be effective unless it is executed by the authorized representatives of the City and the School District.

IN WITNESS WHEREOF, we have hereunto set our hands as of the date appearing in the first paragraph of this Agreement.

CITY OF AUSTIN:

By: _____

Jesús Garza

Interim City Manager

Date: 10-12-2023

AUSTIN INDEPENDENT SCHOOL DISTRICT:

By: _____

Arati Singh

President, Board of Trustees

Date: 9/26/23

Approved as to form:

_____

Assistant City Attorney

EXHIBIT A
SCHOOL SITES SUBJECT TO ARTICLE X

School Site Number One (Maple Run Site)

Deleted in the Second Amendment to the School District Land Development Standards Agreement Between the City of Austin and the Austin Independent School District, executed on February 27, 2006.

School Site Number Two (Travis Country Site)

Tract of land consisting of approximately 13.42 acres out of a certain 705.75 acre tract being out of the J. Trammel Survey No. 4, the E. Barton Survey No. 8, the E. Jenkins Survey No. 9, and the C. Arnold Survey No. 78 in Travis County, Texas being more fully described by a deed of record in Volume 4046, page 1490 of the Real Property Records of Travis County Texas; the said 13.42 acres being Lot 63, Block "6" of the Travis Country Section Two, Phase Two Subdivision.

Impervious cover limit: 50% of the net site area.

School Site Number Three (Village at Western Oaks Site – now known at Mills Elementary)

Tract of land consisting of approximately 14.24 acres, described as Lot 38, Block A in the Village at Western Oaks, Section 28 and 29, approved preliminary subdivision plan # C8-84058.09.

Impervious cover limit: 50% of the net site area.

School Site Number Four (Boone Elementary)

Tract of land consisting of approximately 12.055 acres out of the Thomas Anderson League Survey #17, and also being out of a 14.11-acre tract as conveyed to A.I.S.D. by Deed recorded in Volume 5031, Page 1294, Deed Records of Travis County, Texas.

Impervious cover limit: 31% of the net site area.

School Site Number Five (Kiker Elementary)

Tract of land consisting of 11.727 acres, more or less, out of the Samuel Hamilton Survey No. 16, in Travis County, Texas, being more particularly described in a Special Warranty Deed from Circle C Development Joint Venture to Austin Independent School District, recorded in Volume 11278, Page 1333, Real Property Records of Travis County, Texas.

Impervious cover limit: 38% of net site area.

SAFE ROUTES TO SCHOOL AGREEMENTS

INTERLOCAL COOPERATION AGREEMENT
BETWEEN
THE CITY OF AUSTIN AND THE AUSTIN INDEPENDENT SCHOOL DISTRICT

This Interlocal Cooperation Agreement (the "Agreement") is made and entered into by and between the City of Austin, Texas, a Texas home-rule City and municipal corporation (the "City") and the Austin Independent School District a Texas Independent School District ("AISD") (together, AISD and the City are referred to as the "Parties" and each individually is referred to as a "Party").

WHEREAS, the Parties are authorized to enter into this Agreement pursuant to the provisions of the Interlocal Cooperation Act, Texas Government Code Section 791.011 et seq (the "Interlocal Act"); and

WHEREAS, the City is currently making infrastructure improvements to 137 public elementary and middle schools around Austin, which infrastructure includes but is not limited to the construction and improvements to sidewalks, shared-use paths, and pedestrian crosswalks (collectively, together with additional and future unplanned infrastructure improvements to sidewalks, shared-use paths, and pedestrian crosswalks at public elementary and middle schools, the "City Improvements").

WHEREAS, as of the date of this Agreement, AISD is undertaking the full or significant modification of certain improvements at approximately 20 schools around Austin which includes but is not limited to, the re-construction of sidewalks within the public right-of-way to meet City Code requirements and ADA compliance and the agreements set forth in that certain Interlocal Cooperation Agreement between the City of Austin and the Austin Independent School District dated as of September 22, 1994 (as amended, the "Existing ILA"), and AISD may in the future undertake the re-construction of additional sidewalks, shared-use paths, and pedestrian crosswalks associated with other schools or AISD properties to meet City Code requirements and ADA compliance and agreements set forth in the Existing ILA (collectively, whether now or in the future, the "AISD Improvements");

WHEREAS, the Parties have identified coordination opportunities related to the of the City Improvements and the AISD Improvements.

WHEREAS, coordinating the construction of the City Improvements and the AISD Improvements on or around certain AISD campus locations will reduce redundancy and result in significant cost savings for both Parties.

WHEREAS, on March 26, 2020, the Austin City Council authorized the negotiation of this Agreement; and

WHEREAS, on February 24, 2020, AISD's governing body authorized the negotiation and execution of this Agreement, which details the agreements by which AISD will receive up to $1,000,000 from the City of Austin for the AISD Improvements and AISD to use such funds to pay its contractors to undertake the AISD Improvements.

NOW THEREFORE, in consideration for the mutual promises, covenants, obligations, and benefits contained herein and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties agree as follows:

1. Purpose. The purpose of this Agreement is to define the terms, rights, and duties of the Parties as they relate to the Project.

2. Effective Date. The Effective Date of this Agreement shall be the date that the last Party signs this Agreement.

3. Term. This Agreement will commence on the Effective Date and continue thereafter until the Parties have fulfilled their respective obligations under this Agreement unless and until terminated as provided in Section 8 of this Agreement.

4. Project.

a. The project will consist of constructing sidewalks, shared-use paths, or pedestrian crosswalks (the "Improvements"), that either Party is authorized to construct, in City right-of-way located at or around AISD campus locations including Doss Elementary/Murchison Middle School, Brentwood Elementary, Casis Elementary, Sanchez Elementary, and Eastside Early College High School at the L.C. Anderson campus (the "Project"). While it is the intent of the Parties to this Agreement for AISD to perform the work on the Project, from time to time, it may be agreed upon by the Parties for the City of Austin to perform certain construction of Improvements in order to achieve efficiencies from both cost and timing perspectives. For this reason, this Agreement is written in a manner that contemplates either Party being the constructing Party.

b. A single point of contact from the City (the "City SPOC") and AISD (the "AISD SPOC") will coordinate the Project including without limitation i. the selection of sites on which Improvements will be constructed; ii. the construction obligation of each Party related to specific Improvements; and iii. the City and AISD Contributions (as defined herein) for the construction of specific Improvements.

The AISD SPOC contact information is:

Matias Segura, Operations Officer
Phone: (512) 414 -3112
Address: 4000 S. I-H 35 Frontage Rd., Austin, TX 78704
Email: matias.segura@austinisd.org

The City SPOC contact information is:

Janae Spence, Community Services Division Manager
Phone:
Address:
Email: Janae.spence@austintexas.gov

Either party may notify the other party in writing of a new single point of contact from time to time.

5. Financial Obligations.

a. Prior to incurring any expenses associated with the Project, AISD shall provide written notice to the City of the specific Improvements to be constructed accompanied by the following deliverables in forms reasonably sufficient to establish Eligible Expenses (defined below):

(i) Location and description of the specific Improvements to be undertaken.

(ii) The work that will be necessary to design, permit, construct and place in service, the specific Improvements to be undertaken. For example, certain Improvements consist of AISD projects for which permits have already been issued and approved by the City, and re-design expenses will be incurred and certain other projects will be commencing from pre-design stages.

(iii) Costs associated with the construction of the specific Improvements to be undertaken, including soft costs such as design costs, engineering and other consultant fees, legal expenses, and permitting costs, and hard construction costs.

b. Eligible expenses are expenses incurred, without markup, by either Party related to the Project that are reimbursable to AISD as part of the City's Contribution (defined below) or, if the City is performing the Work, AISD's Contribution (as defined below) (the "Eligible Expenses").

c. Either Party may submit a payment request to the other Party seeking the reimbursement of Eligible Expenses that sufficiently describes the Eligible Expense for which payment is requested and is accompanied by invoices, lien waivers and release, and/or other reasonable supporting documentation necessary to correspond the Eligible Expenses to the costs for the construction of the Improvements detailed in the information provided under Section 5(a)(iii) above the Eligible Expense on a monthly basis or as soon as Eligible Expenses are incurred (the "Payment Request").

d. The City will reimburse AISD for a total amount not-to-exceed $1,000,000 for Eligible Expenses incurred by AISD related to the Project (the "City Contribution").

e. AISD will reimburse the City for an agreed upon amount by AISD on a project-by-project basis for Eligible Expenses incurred by the City related to the Project if the City, as opposed to AISD, is performing construction work of the applicable portion of the Project, as mutually agreed in writing from time to time by AISD and the City (the "AISD Contribution").

f. Neither party will be obligated to reimburse the other Party for any Eligible

Expenses that, alone or when combined with prior Eligible Expenses, exceed the amounts set forth in this Section.

g. The Party receiving a Payment Request (the "Reimbursor") shall pay the Party submitting the Payment Request (the "Reimbursee") within 30 calendar days after receiving each Payment Request. If the Reimbursor disputes any expenses reflected in the Payment Request, the Reimbursor will promptly (i) provide written notice to the Reimbursee that outlines the reason for the dispute and (ii) participate in good faith discussions with Reimbursee in an effort to resolve the dispute.

h. In accordance with section 791.011(d) of the Act, each Party reimbursing the other Party for Eligible Expenses will make those payments from current revenue available to the paying party.

i. The Parties expressly acknowledge and agree that the reimbursement it will receive in accordance with this Agreement will fairly compensate it for services or functions performed under this Agreement.

6. Liability. To the extent allowed by Texas law, the Parties agree that each Party is responsible for its own proportionate share of any liability for its negligent acts or omissions.

7. Default. A party shall be in default under the Agreement if, after engaging in the appropriate dispute resolution process set forth in this Agreement, it fails to perform any of its material obligations under the Agreement. Notwithstanding anything contained herein to the contrary, failure of a Reimbursor to pay a Reimbursee amounts due and owing hereunder shall be deemed a "material" default. In the event of default, the non-defaulting Party may pursue all available legal and equitable remedies, on the understanding that the defaulting Party may, if such defense is available, claim governmental immunity.

8. Termination.

a. This agreement may be terminated by written notice by either Party upon uncured default of the other Party pursuant to section 7 of this Agreement; provided, however, such termination shall not alleviate a Reimbursor from obligations to reimburse under this Agreement for work undertaken prior to the date of such termination.

b. AISD acknowledges that the City has provided notice that the City's payment obligations to AISD are payable only from funds appropriated or available for the purpose of this Agreement. If the City does not appropriate funds for this Agreement, or if there are no other lawfully available funds for this Agreement, the Agreement is void. City shall provide AISD notice of the failure of City to make an adequate appropriation for any fiscal year to pay the amounts due under the Agreement or the reduction of any appropriation to an amount insufficient to permit the City to pay its obligations under the Agreement.

9. No Waiver. No payment, act, or omission by either Party may constitute or be construed as a waiver of any preceding or succeeding breach or default of any other Party. All rights under this Agreement are specifically reserved.

10. Entire Agreement. This Agreement represents the entire agreement between the Parties concerning the subject matter of this Agreement and supersedes all prior or contemporaneous oral or written statements, agreements, and negotiations between the Parties concerning said subject matter.

11. Amendments. The Parties will have the authority to negotiate and execute amendments to this Agreement without further action by either Party's governing body to the extent necessary to further clarify the intent of the respective governing bodies, but not in such a way as would constitute a substantive modification of the Agreement's terms and conditions or otherwise violate Chapter 791 of the Texas Government Code. Any amendments that would constitute a substantive modification to the Agreement must be approved by each Party's governing body. Whether substantive or typographical in nature, any modification, amendment, or supplement to this Agreement must be agreed upon in a writing signed by both Parties.

12. Dispute Resolution. The Parties desire to resolve disputes arising under this Agreement without litigation or disruption to the Project. Accordingly, if a dispute arises hereunder, the Parties agree to (i) continue performing their respective, unaffected duties under this Agreement and (ii) attempt in good faith to resolve the dispute between themselves through alternative dispute resolution procedures authorized by Chapter 2009 of the Texas Government Code. At the written request of either Party, each Party shall appoint one non-lawyer representative to negotiate informally and in good faith to resolve any dispute arising under this Agreement. The representatives appointed shall agree upon the location, format, frequency, and duration of the meetings at which negotiations will take place. If the representatives cannot resolve the dispute within 30 calendar days after the first negotiation meeting, the Parties agree to refer the dispute to the Dispute Resolution Center of Austin (the "Center"), which will assign a single mediator. Mediation will be conducted in accordance with the Center's mediation procedures, and each Party shall pay half the cost of the Center's mediation services.

13. Notice. Notices to either Party shall be in writing and may be either hand-delivered, e-mailed, or sent by certified or registered mail, postage paid, return receipt requested to the relevant address below. If notice is sent to the address designated herein, notice shall be deemed effective upon receipt in the case of hand delivery, on the same date an e-mail is sent to the other Party in the case of electronic mail, and three business days after deposit in the U.S. mail in the case of non-electronic mailing.

CITY:

WITH COPY TO:

Sean Creegan
Assistant City Attorney
City of Austin Law Department 301 W. 2nd Street
Austin, Texas 78701

AISD:

WITH A COPY TO:
Ylise Janssen
General Counsel
Austin ISD
4000 S. I-H 35 Frontage Rd., Austin, TX 78704

14. Counterparts. This Agreement may be executed in multiple counterparts which, taken together, will collectively constitute a single agreement.

15. Relationship of the Parties. Nothing in this Agreement shall be construed to create a joint venture or legal partnership between the Parties or an employee/employer or agency relationship. Neither Party shall have any express or implied right or authority to assume or create any obligations on behalf of or in the name of the other Party or to bind the other Party to any contract, agreement, or undertaking with any third party.

16. Venue and Applicable Law. This Agreement will be performed and enforced in Travis County, Texas, and will be construed in accordance with the laws of the State of Texas and the United States of America.

17. Force Majeure. In the event that either Party's performance of any of its obligations or undertakings hereunder shall be interrupted or delayed by any occurrence not occasioned by its own conduct, whether such occurrence be an act of God, or the common enemy, or the result of war, riot, the act of a civil authority (other than the Party claiming force majeure), civil corruption, sovereign conduct (other than the Party claiming force majeure), or the act of conduct of any person or persons not a party hereto, then it shall be excused from the performance of its obligations or undertakings for such period of time as is reasonably necessary to remedy the effects of such occurrence. Notwithstanding the foregoing, however, excuse from performance due to "force majeure" shall not apply to obligations that are to pay money or which can appropriately be mitigated by the reasonable acts of the party claiming delay.

18. Severability. Should one or more provisions of this Agreement be deemed invalid, illegal, or unenforceable for any reason, such invalidity, illegality, or unenforceability shall not affect any other provision of this Agreement, and any provision that is held to be void, voidable, or unenforceable shall be construed as severable from the remainder of this Agreement and shall not affect the validity of any other provisions of this Agreement, which shall remain in full force and effect.

19. Headings. The headings in this Agreement are for ease of reference purposes only and shall not be used to interpret this Agreement.

20. Number and Gender Defined. As used in this Agreement, whenever the context so indicates, the masculine, feminine, or neuter gender and the singular or plural form of a word shall each be deemed to include the others.

21. Computation of Time. When any period of time is stated in this Agreement, the time will be computed to exclude the first day and include the last day of the period. If the last day of any period falls on a Saturday, Sunday, or a day that either Party has declared a holiday for its employees, these days will be omitted from the computation.

22. Compliance with Law. Both Parties warrant that all improvements related to the Project shall be carried out in compliance with applicable federal, state, and local laws, including Title VI of the Civil Rights Act of 1964 (42 USC §2000d, et. seq.), the Rehabilitation Act of 1973 (29 USC §504), and the provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. §§ 12101-12213), each as is or may be amended, and with current standards, practices and guidelines promulgated by accrediting, licensing, or oversight agencies.

City of Austin:

By: _____

Date: 12-04-2020

Name: Gina Fiandaca

Title: Assistant City Manager

AISD:

By: _____

Date: September 1, 2020

yg 7/1/2020

Name: Geronimo M. Rodriquez, Jr.

Title: President, Board of Trustees

Approved to form:

By: Sean Creegan Digitally signed by Sean Creegan DN: cn=Sean Creegan, o=City of Austin, ou=Law Department, email=sean.creegan@austin.texas.gov, c=US Date: 2020.10.28 15:03:27 -05'00'

Name: Sean Creegan

Title: Assistant City Attorney

AMENDMENT NO. 1 TO INTERLOCAL COOPERATION AGREEMENT BETWEEN THE CITY OF AUSTIN AND THE AUSTIN INDEPENDENT SCHOOL DISTRICT

Amendment No. 1 to Interlocal Cooperation Agreement between the City of Austin and the Austin Independent School District, dated as of the Effective Date (the "**Amendment**"), between City of Austin, Texas, a Texas home-rule City and municipal corporation (the "City") and the Austin Independent School District a Texas Independent School District ("AISD") (together, AISD and the City are referred to as the "Parties" and each individually is referred to as a "Party").

WHEREAS, the Parties have entered into a Interlocal Cooperation Agreement between the City of Austin and the Austin Independent School District, dated December 4, 2020 (the "**Existing Agreement**"); and

WHEREAS, the Parties desire to amend the Existing Agreement on the terms and subject to the conditions set forth herein; and

WHERAS, the City Council for the City of Austin authorized the negotiation and execution of this Amendment on March 21, 2024.

NOW, THEREFORE, in consideration of the foregoing and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties agree as follows:

1. Definitions. Capitalized terms used and not defined in this Amendment have the respective meanings assigned to them in the Existing Agreement.

2. Amendments to the Existing Agreement. As of the Effective Date (defined below), the Existing Agreement is hereby amended or modified as follows:

(a) The second recital of the Existing Agreement is hereby amended as follows:

"**WHEREAS,** the City is currently making infrastructure improvements near public elementary and middle schools around Austin, which infrastructure includes but is not limited to the construction and improvements to sidewalks, shared-use paths, and pedestrian crosswalks (collectively, together with additional and future unplanned infrastructure improvements to sidewalks, shared-use paths, and pedestrian crosswalks at public elementary and middle schools, the "City Improvements")."

(b) The third recital of the Existing Agreement is hereby amended as follows:

"**WHEREAS,** as of the date of this Agreement, AISD is undertaking the full or significant modification of certain improvements at schools around Austin which includes but is not limited to, the re-construction of sidewalks within the public right-of-way to meet City Code requirements and ADA compliance and the agreements set forth in that certain Interlocal

Cooperation Agreement between the City of Austin and the Austin Independent School District dated as of September 22, 1994 (as amended, the "Existing ILA"), and AISD may in the future undertake the re-construction of additional sidewalks, shared-use paths, and pedestrian crosswalks associated with other schools or AISD properties to meet City Code requirements and ADA compliance and agreements set forth in the Existing ILA (collectively, whether now or in the future, the "AISD Improvements")."

(c) The seventh recital of the Existing Agreement is hereby amended as follows:

"WHEREAS, on February 24, 2020, AISD's governing body authorized the negotiation and execution of this Agreement, which details the agreements by which AISD will receive up to $5,000,000 from the City of Austin for the AISD Improvements and AISD to use such funds to pay its contractors to undertake the AISD Improvements."

(d) Section 4.a. of the Existing Agreement is hereby amended as follows:

"The project will consist of constructing sidewalks, shared-use paths, or pedestrian crosswalks (the "Improvements"), that either Party is authorized to construct, in City right-of-way located at or around AISD campus locations. While it is the intent of the Parties to this Agreement for AISD to perform the work on the Project, from time to time, it may be agreed upon by the Parties for the City of Austin to perform certain construction of Improvements in order to achieve efficiencies from both cost and timing perspectives. For this reason, this Agreement is written in a manner that contemplates either Party being the constructing Party."

(e) Section 4.b. of the Existing Agreement is hereby amended as follows:

"A single point of contact from the City (the "City SPOC") and AISD (the "AISD SPOC") will coordinate the Project including without limitation i. the selection of sites on which Improvements will be constructed; ii. the construction obligation of each Party related to specific Improvements; and iii. the City and AISD Contributions (as defined herein) for the construction of specific Improvements.

The AISD SPOC contact information is:

Matias Segura, Operations Officer Phone: (512) 414 -3112

Address: 4000 S. I-H 35 Frontage Rd., Austin, TX 78704 Email: matias.segura@austinisd.org

The City SPOC contact information is:

Amir Emamian, Community Services Division Manager

Phone: 512-974-9319

Address: 505 Barton Springs, Suite 802 Austin Tx 78704

Email: Amir.Emamian@austintexas.gov"

(f) Section 5.e of the Existing Agreement is hereby amended as follows:

"The City will reimburse AISD for a total amount not-to-exceed $5,000,000 for Eligible Expenses incurred by AISD related to the Project (the "City Contribution")."

3. Date of Effectiveness; Limited Effect. This Amendment will be deemed effective as of the date on which the last party signs the Amendment (the "**Effective Date**"). Except as expressly provided in this Amendment, all of the terms and provisions of the Existing Agreement are and will remain in full force and effect and are hereby ratified and confirmed by the Parties. Without limiting the generality of the foregoing, the amendments contained herein will not be construed as an amendment to or waiver of any other provision of the Existing Agreement or as a waiver of or consent to any further or future action on the part of either Party that would require the waiver or consent of the other Party. On and after the Effective Date, each reference in the Existing Agreement to "this Agreement," "the Agreement," "hereunder," "hereof," "herein," or words of like import will mean and be a reference to the Existing Agreement as amended by this Amendment.

4. Miscellaneous.

(a) This Amendment and all related documents are governed by, and construed in accordance with, the laws of the State of Texas, United States of America.

(b) This Amendment shall inure to the benefit of and be binding upon each of the Parties and each of their respective permitted successors and permitted assigns.

(c) The headings in this Amendment are for reference only and do not affect the interpretation of this Amendment.

(d) This Amendment may be executed in any number of counterparts, and each such counterpart will for all purposes be deemed an original, and all such counterparts shall constitute one and the same instrument. The exchange of executed copies of this Agreement by facsimile or Portable Document Format (PDF) transmission (including any electronic signature covered by the U.S. federal ESIGN Act of 2000, Uniform Electronic Transactions Act, the Electronic Signatures and Records Act or other applicable law), shall constitute effective execution and delivery of this Agreement as to the parties for all purposes, and signatures of the parties transmitted by facsimile or Portable Document Format (PDF) (including any electronic signature covered by the U.S. federal ESIGN Act of 2000, Uniform Electronic Transactions Act, the Electronic Signatures and Records Act or other applicable law), shall be deemed to be their original signatures for all purposes.

(e) This Amendment constitutes the sole and entire agreement between the Parties with respect to the subject matter contained herein, and supersedes all prior and contemporaneous understandings, agreements, representations and warranties, both written and oral, with respect to such subject matter.

[The remainder of this page was intentionally left blank. Signature page follows]

IN WITNESS WHEREOF, the Parties have executed this Amendment as of the Effective Date.

City of Austin:

By _____
Name: Mike Rogers
Title: Assistant City Manager

Signed as to form:

By: Sean Creegan
Name: Sean Creegan
Title: Assistant City Attorney

AISD:

DocuSigned by:
By Lynn Boswell
Name: Lynn Boswell
Title: Board President

JOINT USE AGREEMENT FOR JOINTLY OWNED FACILITIES

AGREEMENT BETWEEN THE CITY OF AUSTIN AND THE AUSTIN INDEPENDENT SCHOOL DISTRICT REGARDING DEVELOPMENT AND SHARED USE OF JOINTLY OWNED FACILITIES, GROUND IMPROVEMENTS AND OPEN SPACES

1. **PARTIES:** This Interlocal Cooperation Agreement ("Agreement") is made and entered into by and between the City of Austin (the "City"), and Austin Independent School District (the "AISD") hereinafter collectively referred to as the "Parties" and each, a "Party".

2. **AMENDMENT AND RESTATEMENT OF 1984 JOINT USE MEMORANDUM AND PRIOR AGREEMENTS:** It is the intent of the Parties to amend, restate and replace that certain Joint AISD/City Council Information Memorandum dated January 9, 1984, and all subsequent amendments (collectively, the "1984 Joint Use Agreement"). Effective as of the date of this Agreement, all terms, conditions, and provisions contained in the 1984 Joint Use Agreement are hereby superseded, amended and restated by the terms of this Agreement. For clarification, as of the effective date of this Agreement, the 1984 Joint Use Agreement shall be of no further force and effect and the terms, conditions and provisions of this Agreement (as may be amended from time to time by the Parties in writing) shall govern and control all aspects of the use, ownership, planning, operations and maintenance of Joint Use Facilities (as defined herein), including without limitation, cost sharing responsibilities and construction and maintenance responsibilities and obligations.

3. **AUTHORITY:** This Agreement is authorized and governed by the Interlocal Cooperation Act, Chapter 791 of the Texas state code to increase efficiency and effectiveness of local governments by authorizing them to contract, to the greatest possible extent, with one another and with agencies of the state. City of Austin Resolution 201990131-038 calls for the City to prioritize the existing and ongoing collaborative work of the City of Austin Strategic Facilities Governance Team and AISD to identify opportunities to achieve shared priority policy goals, including open space, recreation, and environmental protection. Each Party represents and warrants that in the performance of its respective obligations as set forth in this Agreement, it is carrying out a duly authorized government function, which it is authorized to perform individually under the applicable statutes of the State of Texas and/or its charter.

4. **PURPOSE**. The purpose of this Agreement is to provide the foundation, terms, and conditions upon which future jointly-owned facilities, ground improvements, and open spaces will be constructed, maintained, replaced, and upgraded, including without limitation, cost sharing responsibilities and obligations and to provide the governing terms and conditions for maintaining, upgrading and replacing existing jointly-owned facilities, ground improvements and open spaces (all such jointly owned facilities, ground improvements and open spaces, whether in existence as of the date of this Agreement or in the future, collectively, the "Joint Use Facilities"). However, to the extent entered into by the Parties, site-specific joint use agreements shall take precedence over this Agreement in the event of inconsistency between the terms of this Agreement and such site-specific joint use agreements. In order to provide opportunities for recreation, access to greenspace

and to offer the taxpayers the greatest possible benefit from their investments in public expenditures, it is necessary to establish a specific and formal system of communication between AISD and the City to provide for joint development, maintenance, and acquisition of Joint Use Facilities, and to improve coordination between the Parties. The purpose of this Agreement is to assure continuity, transparency, and the coordinated management of the Joint Use Facilities.

5. **Intentionally omitted.**

6. **ADMINISTRATION**: The Parties acknowledge that regular, ongoing communication is vital to the success for the collaboration and administration of this Agreement. This joint undertaking shall be conducted by the Parties according to the terms of this Agreement and jointly administered by the AISD Superintendent or their designee and the Director of Parks and Recreation or his or her designee, as such designees may be appointed by the AISD Superintendent and/or the Director of Parks and Recreation in writing (which writing may be in form of electronic mail to the email notices in this Agreement) from time to time (each a "Designated Representative"). Administration may consist of staff from maintenance, planning, facilities and operations, and other relevant departments from both AISD and the City (the "Administrative Committee"). This Administrative Committee shall identify a point of contact for each agency for public inquiries. Any decision made by a Designated Representative, or, if no Designated Representative is appointed by either the AISD Superintendent or the Director of Parks and Recreation at the time such decision is made, by the AISD Superintendent or Director of Parks and Recreation, as applicable, shall be binding on the Party thereby represented, and the other Party shall have the right to rely on the decision made by such Designated Representative or the AISD Superintendent or Director of Parks and Recreation, as applicable.

7. **TERM.** This Agreement shall be for a period of twenty (20) years ("Term"). At the expiration of such Term, the Term may be extended for three additional ten (10) year terms through the written agreement of the Parties. Either Party may provide written notice to the other party of its intent to renew the agreement not less than ninety (90) days prior to the expiration of the current Term. The Party receiving such notice shall provide written confirmation of its acceptance of the extension of the Agreement. Notwithstanding the foregoing, in the event either Party provides such timely notification of its desire to terminate this Agreement, this Agreement shall not be terminated until such date as a replacement agreement is agreed to and entered into by AISD and the City governing the terms, provisions, conditions, obligations, and responsibilities of AISD and the City with respect to the ownership, acquisition, operations, maintenance, planning, and other aspects relating to the joint ownership of all Joint Use Facilities.

8. **DEFINITIONS:**

AISD Facilities: AISD-owned School Grounds and School Buildings.

Community Partners: As it pertains to this agreement, any group, organization, or agency that provides assistance to the school park and its features.

Design/Maintenance Addendum: The Addendum attached hereto which governs the design, maintenance and related responsibilities, rights, and obligations of the Parties with respect to Joint Use Facilities. The Design/Maintenance Addendum may be updated, supplemented, or amended from time to time by the Parties in writing. Upon the mutual agreement of the Parties in writing to update, supplement and/or amend the Design/Maintenance Addendum, the Design/Maintenance Addendum attached hereto will be automatically updated and a written record provided to each Party, without necessity of obtaining consent and approval from AISD's Board and the City's City Council. Notwithstanding the foregoing, if proposed changes to the Design/Maintenance Addendum may result in additional expense to the City that exceeds the spending authority of the City Manager, approval of the City Council will be required.

Finance Addendum: The Addendum attached hereto which governs the financing and cost sharing obligations of the Parties with respect to Joint Use Facilities. The Finance Addendum may be updated, supplemented, or amended from time to time by the Parties in writing. Upon the mutual agreement of the Parties in writing to update, supplement and/or amend the Finance Addendum, the Finance Addendum attached hereto will be automatically updated and a written record provided to each.

Joint Use Facility: The term "Joint Use Facility" shall have the meaning provided for in Section 4 hereof, provided, however, such term shall include any real property jointly owned by the City and AISD.

Maintenance Expenses: Expenses incurred in the upkeep, repair, and improvements of grounds and amenities.

PARD Long Range Plan: A long-term vision plan for the entire organization with a timeframe typically of 10 years. The PARD Long Range Plan includes recommendations for future acquisitions, park amenities, trails, redevelopment initiatives, programming, and partnerships, as well as implementation strategies.

Planning Addendum: The Addendum attached hereto which governs the initial planning of Joint Use Facilities by the Parties, including without limitation initial establishment of shared goals and through the use, creation, and ownership of Joint Use Facilities. The Planning Addendum may be updated, supplemented, or amended from time to time by the Parties in writing. Upon the mutual agreement of the Parties in writing to update, supplement and/or amend the Planning Addendum, the Planning Addendum attached hereto will be automatically updated and a written record provided to each Party, without necessity of obtaining consent and approval from AISD's Board and the City's City Council. Notwithstanding the foregoing, if proposed changes to the Planning Addendum

may result in additional expense to the City that exceeds the spending authority of the City Manager, approval of the City Council will be required.

Project: Site and/or building improvements approved by the Parties for construction on each Joint Use Facility premises.

Project Budget: A budget document setting forth the proposed budget for the Project, as well as the allocation of such budgeted amounts to the Party responsible.

School Buildings: The physical school building including the classrooms, gyms, libraries, auditoriums, administration areas, cafeteria, kitchens, and other interior spaces.

School Grounds: Open spaces, athletic fields and courts, playfields, playgrounds, site features, and other amenities exterior to the building.

School Park: A school park is typically slightly smaller than a neighborhood park that is co-owned by AISD and the City of Austin to provide recreational facilities for the student population during school hours, and then the neighborhood during non-school hours.

Undivided Interest (ownership): Co-ownership of a portion of real property being a school site between AISD (or its predecessor in interest) and the City. The area within such jointly owned real property is as stated expressly in the warranty deed or other grant instrument conveying the Property to AISD and the City. For purposes of reference only, the ownership proportions are memorialized in Exhibit A attached hereto (as supplemented and updated from time to time to add new Joint Use Facilities). The area is described by metes and bounds through a warranty deed, or in some cases, with property acquired through condemnation, they are finalized in an Agreed Final Judgment. The Agreed Final Judgment, a document that is accepted as in lieu of warranty deed, is then recorded in the real property records and includes the Undivided Interest of each Party.

9. **PLANNING.** AISD and the City Parks and Recreation Department ("PARD") through its Planning Division may each involve the other entity in their long-range acquisition and development planning process to encourage joint planning and to prevent duplication of facilities and services. To facilitate this process, each entity may recognize and utilize the efforts of the Designated Representatives of the other Party in their long-range planning process. (See Planning Addendum). To the extent that any real property to be acquired by either Party is intended to be a Joint Use Facility, prior to obtaining fee simple or easement rights in and to such real property, the acquiring Party shall obtain the prior written consent of the other Party to determine how such real property will be developed, used, and maintained in accordance with the terms of this Agreement and which Party will be the primary user. Further, any real property to be acquired for a Joint Use Facility shall automatically be subject to the terms and conditions of this Agreement and such real property shall be deemed owned as agreed by the Parties.

10. **DESIGN.** It is recognized that AISD has the responsibility for designing and providing facilities primarily to be used for educational purposes and PARD shares similar responsibilities for designing Joint Use Facilities that will be utilized primarily for recreational purposes. For clarification, a Joint Use Facility's primary use shall be determined as follows: a Joint Use Facility that is used by AISD for its exclusive use during the hours of school operations (such as a School Park being closed to the general public during school hours of operation Monday through Friday during the AISD school calendar year) and open to the general public on weekends and during months when AISD is not utilizing such Joint Use Facilities, the primary use of such Joint Use Facility is educational. Exhibit A attached hereto lists the ownership percentages of each Party with respect to its undivided interest in each Joint Use Facility set forth therein. Exhibit A attached hereto shall be updated and supplemented to add new Joint Use Facilities and a record of all then-existing Joint Use Facilities and the Parties' respective undivided ownership interests shall be kept with each Designated Representative or his or her designee. (See Design /Maintenance Addendum and Exhibit A)

11. **MAINTENANCE.** The maintenance of grounds, equipment and facilities utilized for programming of Joint Use Facilities shall be performed as agreed by both entities in such a manner as to realize the greatest savings to the taxpayer in accordance with the Design/Maintenance Addendum attached hereto. (See Design/Maintenance Addendum).

12. **PROGRAM.** The operation of joint programs by the Parties will maximize shared resources to better serve the implementation of programs. The City and AISD supervisors involved in areas where site features or joint programming is to take place shall meet periodically or as needed, for communication and coordination of the programs. The day-to-day decisions of program specifics shall be developed at this level and included in individual shared use agreements. Should an event (i.e. ribbon-cutting) take place, the event shall be planned in coordination with the school principal, PARD communications office, and the AISD Department of Communications & Community Engagement.

13. **FINANCE.** The initial site development costs of improvements to be jointly developed shall be incurred by the Party initiating and/or requesting the installation of Joint Use Facilities and, unless otherwise agreed upon by the Parties, initiating the construction and installation of the Facilities, as more particularly described in the Finance Addendum. (See Finance Addendum).

14. **USE OF FACILITIES, GROUND IMPROVEMENTS AND OPEN AREAS.**

    a. Use and operation of Joint Use Facilities shall be on a shared basis between the City and AISD. The terms of facility use including scheduling, control, maintenance, and site supervision shall be determined between AISD and the City in shared use agreements to the extent not addressed in this Agreement. To the extent a shared use facility agreement is not adopted with respect to a particular Joint Use Facility, each Party shall be responsible for scheduling, controlling, and maintaining (with

the exception of capital repairs and/or repairs necessitated by the use of the other Party, including, with respect to the City, members of the public, during such Party's designated use times) during its hours of use. For example, a School Park will be scheduled, controlled and maintained by AISD during regular school hours and by the City during hours when the School Park is open to the public (including without limitation, hours when the School Park is closed to the public at such times as other public parks are closed to the public, and not during regular school hours). Any gates enclosing Joint Use Facilities will remain unlocked outside of regular school hours. Each school will be responsible for locking and unlocking gates for Joint Use Facilities located at that school's property.

b. One objective of this Agreement is to minimize billing and rental agreements between the Parties; however if it is more convenient for this using Party to pay incurred cost for specific events/use, that Party may do so at its option pursuant to a written agreement signed by both Parties.

c. Fees for the use of City and AISD facilities shall be determined by the mutual agreement of the Parties on an annual basis.

d. During construction projects on sites or properties containing Joint Use Facilities, AISD may place temporary construction mobile facilities on the land containing Joint Use Facilities with the prior written consent of the City. AISD shall consult with the City regarding the location and duration of the placement prior to the placement of the facilities.

15. **RIGHTS AND RESPONSIBILITIES.**

a. **Compliance with Rules and Laws**. The Parties shall comply with all applicable laws, ordinances, and regulations as well as applicable local policies and procedures. AISD is a tobacco free, drug, free, and weapon free environment. Employees, patrons and agents of the Parties who use or participate in activities pursuant to this Agreement shall conform to the policies applicable to the host Party at all times. Both Parties agree to comply with all local ordinances and state and federal laws applicable to this Agreement and the activities it contemplates, including, but not limited to, the Americans with Disabilities Act, Section 504 of the 1973 Rehabilitation Act, Title IX of the Education Amendments of 1972, and the Health Insurance Portability and Accountability Act of 1996.

b. **Responsibilities**. AISD shall not be liable for any claims, damages, or attorney fees arising from any negligence or unlawful acts of City or its employees in relation to this Agreement. City shall not be liable for any claims, damages, or attorney fees arising from any negligence or unlawful acts of AISD or its employees, agents, or representatives in relation to this Agreement. AISD and City both acknowledge that each entity remains otherwise responsible, to the extent allowed by Texas law, for any claims or losses from personal injury, death, or property damages resulting from the acts or omissions of that entity, its agents, employees, or representatives

and that each entity will be responsible for the handling of the portion of any claim related to this Agreement, which is based solely on the assertion that a policy of that entity is illegal or unenforceable in any way.

16. **REMEDIES/NOTICES:**

a. **Remedies Upon a Party Default.** To the extent either Party breaches its respective covenants or obligations under this Agreement, and such failure continues beyond (i) 5 business days from written notice of such failure or default by the non-defaulting Party for failure to comply with monetary requirements or obligations or (ii) 30 business days for failure to comply with non-monetary requirements or obligations (other than failures which will result in imminent damage or destruction to persons or property which cannot be cured within a certain time period), an "Event of Default" shall be considered to have occurred. During the continuance of an Event of Default, the non-defaulting Party shall have all rights and remedies against a defaulting Party that are available under applicable laws and at equity; provided, however, in no event shall termination of this Agreement or partition of a Joint Use Facility be a remedy available to a non-defaulting Party without consent of the defaulting Party. The non-defaulting Party shall mitigate direct or consequential damages arising from any default to the extent reasonably possible under the circumstances. The Parties agree that they will use their best efforts to resolve any disputes and may engage in mediation as required under Section 17 hereof before initiating any lawsuit to enforce their rights under this Agreement. The Parties shall have all remedies available in law or in equity, and nothing in this Agreement shall be construed to limit either Party's right to recover damages or to seek other authorized and appropriate curative remedies if a breach of contract action is filed by a non-defaulting Party to this Agreement.

b. **Recipient of Notices**. Notice shall be sent to the Parties as follows:

If to AISD: Austin Independent School District
4000 S IH 35 Frontage Rd
Austin, TX 78704
Attention: Chief of Operations
Phone Number: 512-414-3112
Email:matias.segura@austinisd.org

If to City: City of Austin

P. O. Box 1088
Austin, TX 78767
Attention: Director, Parks & Recreation Department
Phone Number: 512-974-6722
Email:kimberly.mcneeley@austintexas.gov

The Parties may change the person designated for receipt of notice by giving notice in writing to the other Party, identifying the new person designated for receipt of notice and

providing the person's mailing address and contact information. On or before August 1st of each year during the term of this Agreement, the AISD Superintendent and the Director of Parks and Recreation shall provide written notice to the other Party of any change in the Designated Representative from the prior twelve (12) month period. If no change is given, the Designated Representative remains the same person as in the immediately preceding twelve (12) month period. All notices and consent requests to be given or requested in writing under this Agreement may be given by electronic mail to the addresses stated above (as supplemented from time to time in accordance with this paragraph) and shall be deemed given and received the same day so long as such e-mail is sent (i) during the following normal business hours 8:00am Austin, Texas time and 5:00pm Austin, Texas time, and (ii) on a date on which neither AISD nor City is closed for business.

17. **DISPUTE RESOLUTION.** In the event that a dispute shall arise regarding the terms, conditions, or breach of this Agreement, the Parties shall, prior to taking any action, mediate the dispute using the services of a mutually agreed upon independent mediator. The Parties shall equally split the expenses of the mediator and the facility for the mediation. Each Party shall otherwise pay its own expenses. Mediation shall also take place prior to a non-defaulting Party exercising its remedies for an Event of Default, provided, however, if no agreement can be reached by mediation during a ninety (90) day period following the occurrence of an Event of Default, the requirement to mediate hereunder shall no longer be in effect for such Event of Default and the non-defaulting Party shall have the right available to it under Section 16 hereunder.

18. **CONFIDENTIALITY:** City shall maintain strict confidentiality of all information, data or records relating to students of the AISD, in accordance with applicable laws and regulations. City shall not disclose confidential or protected health information except as required by this Agreement, or as may be required or permitted by law.

19. **INSURANCE**. Each Party will have and maintain insurance coverage at a level sufficient to cover the needs of that Party pursuant to applicable generally accepted business standards. If required, each entity agrees to procure and maintain workers' compensation and public liability insurance to protect it from liability for injuries or damages to its employees. Each Party shall name the other Party as an additional insured under its insurance policies and, upon written request by the other Party shall provide evidence of such coverage and additional insured endorsements, from time to time. Notwithstanding the foregoing, the City is a self-insured entity and does not maintain commercial liability insurance and nothing in this Agreement shall be construed as an obligation for City to carry insurance of any type.

20. **SURVIVAL OF OBLIGATIONS**. All provisions of this Agreement that impose continuing obligations on the Parties beyond the term of this Agreement, including, but not

limited to, provisions related to confidentiality, shall survive the expiration or termination of this Agreement.

21. **ASSIGNMENT.** A Party to this Agreement may not assign or transfer its interests under this Agreement without prior written approval of the non-assigning Party.

22. **ENTIRETY OF AGREEMENT AND AMENDMENTS**. This Agreement constitutes the entire agreement and understanding between the Parties and supersedes all previous agreements, understandings, discussions, or representations, whether oral or written, concerning its subject matter. This Agreement may not be amended in whole or in part except in a written amendment signed and executed by both Parties to this Agreement. Notwithstanding the foregoing, the Addenda to this Agreement, including without limitation, the Design/Maintenance Addendum, the Finance Addendum, and the Planning Addendum may be amended or supplemented from time to time, by a written agreement signed by the Director of Parks and Recreation and the AISD Superintendent and shall be kept in the jointly maintained records of the Parties.

23. **PERFORMANCE**. The obligations arising under this Agreement shall be performed in Travis County, Texas.

24. **JURISDICTION**. The Parties agree that this Agreement is governed by the laws of the State of Texas and that the venue for a dispute arising from this Agreement shall be in Travis County, Texas.

25. **SEVERABILITY.** If a term or provision of this Agreement is determined to be void or unenforceable by a court of competent jurisdiction, the remainder of this Agreement remains effective to the extent permitted by law.

26. **FORCE MAJURE**. A Party shall not be liable for any default or delay in the performance of its obligations under this Agreement if and to the extent such default or delay is caused by an act of God, catastrophic storm, fire, riot, sabotage, domestic or foreign terrorism, or any other cause beyond the reasonable control of such Party ("Force Majeure"). Force Majeure does not include economic or market conditions that affect a Party's cost but not its ability to perform. Force Majeure will in no event excuse a default that can be cured by the payment of costs or fees (e.g. maintenance expenses, insurance). The Party invoking Force Majeure shall give prompt, timely, and adequate notice to the other Party by telephone confirmed promptly thereafter in writing in accordance with Section 5 of this Agreement. If a default or delay in performance under this Agreement due to Force Majeure cannot be cured by the due diligence of the Party invoking Force Majeure, the time for completion of the services will be extended by a mutually agreeable period of time reasonably necessary to overcome the effect of such Force Majeure.

27. **TEXAS PUBLIC INFORMATION ACT**. Each Party agrees that it is required to comply with Chapter 552 of the Texas Government Code ("Public Information Act" or "Act") and that this Agreement, non-legal work product produced under this Agreement, and all information obtained by either Party in connection with this Agreement is subject to the Act. If either Party receives a request for information related to the services provided under this Agreement, the information must qualify for an exception provided by the Act to be withheld from public disclosure.

28. **LIABILITY AND CLAIMS**. Approval by AISD or City of any payment or performance by the other Party under this Agreement shall not constitute nor be deemed a release of the responsibility and liability of either Party, their employees, agents, or affiliates for their own acts, nor shall approval be deemed to be the assumption of such responsibility or liability by AISD and/or City for any defect, error, omission, or act of negligence or bad faith by AISD and/or City or their respective employees, agents, or affiliates. Notwithstanding the foregoing, however, a designation of responsibilities by one Party to the other Party in writing that clarifies or amends the standards and obligations set forth in this Agreement shall be deemed to control over the terms and provisions in this Agreement and shall operate to amend such obligation.

29. **RESERVATION OF RIGHTS/ NON-WAIVER OF DEFAULT**. If any Party to this Agreement breaches this Agreement, the other Party shall be entitled to any and all rights and remedies provided by Texas law and any applicable Federal laws or regulations, subject, however, to Section . All rights of the Parties under this Agreement are specifically reserved, and any payment, act, or omission by a Party shall not impair or prejudice any remedy or right of that Party. The exercise or failure to act in response to the other Party's breach or default of this Agreement shall not preclude the exercise of any other right or remedy under this Agreement or under any law, nor shall any action taken or not taken in the exercise of any right or remedy be deemed a waiver of any other rights or remedies.

30. **CLAIMS NOTIFICATION**. If any claim or other action, including proceedings before an administrative agency, is made or brought by any person or entity against AISD or City alone related to this Agreement, the Party against whom the claim or other action is made shall give written notice to the other Party of the claim or other action within three (3) working days after being notified of it or the threat of it. Such notice shall include the following: (i) the name and address of the person or entity that made or threatened to make a claim or that instituted or threatened to institute any type of action or proceeding; (ii) the basis of the claim, action, or proceeding; (iii) the court or administrative tribunal, if any, where the claim, action or proceeding was instituted; and (iv) the name or names of any person or entity against whom this claim is being made or threatened. This written notice shall be given in the manner provided in Section 5 of this Agreement. Except as otherwise

directed, the Party against whom the claim has been made shall furnish to the other Party copies of all pertinent papers received by that Party.

31. **CITY OPERATING BUDGET**. If City's governing body does not appropriate, budget, and approve sufficient funding to cover City's monetary obligations under this Agreement, then this Agreement shall terminate automatically on the last day of the fiscal year for which sufficient funds were budgeted. City shall provide notice of the failure of City to make an adequate appropriation for any fiscal year to pay the amounts due under this Agreement or the reduction of any appropriation to an amount insufficient to permit City to pay its obligations under this Agreement. In the event that this Agreement terminates pursuant to this Section, then all obligations of the parties shall immediately cease and terminate in the same manner as upon expiration of the Term; provided, however, that City shall remain liable hereunder for all obligations and liabilities which accrue prior to such exercise.

32. **CURRENT FUNDS**. Any obligations of the Parties or payment of funds pursuant to this Agreement are subject to appropriation by the governing body or bodies of the Party, and any such obligations or payments may be demanded only from current appropriated revenues available to the paying Party.

Signature Page Follows

SIGNATURE PAGE

AN AGREEMENT BETWEEN THE CITY OF AUSTIN AND THE AUSTIN INDEPENDENT SCHOOL DISTRICT REGARDING DEVELOPMENT AND SHARED USE OF JOINTLY OWNED FACILITIES, GROUND IMPROVEMENTS AND OPEN SPACES

This Agreement is executed on the ____day of _____ 2022

City of Austin

By: _____

Name: Kimberly A McNeeley

Its: Director, CUA Parks and Recreation

Date: 3-31-2023

Austin Independent School District

By: _____

Name: Geronimo M. Rodriguez, Jr.

Its: President, AISD Board of Trustees

Date: 11/17/2022

DS MR

11/15/2022

PLANNING ADDENDUM

Austin Independent School District ("AISD") and the City, through its Parks and Recreation Department ("PARD") will each involve the other entity in their long-range acquisition, development, and site plan review processes to encourage joint planning and to prevent duplication of jointly-used facilities, ground improvements, open areas and services. The two entities will coordinate planning efforts and directives that are mutually beneficial to both entities and the community. Efforts and directives include concept planning, including the creation of park and school concept plans, acquisition strategies, expansion of joint-use opportunities, capital expenditures, and community-led improvements, when such planning would affect both entities. Coordination is consistent with Section 2 of the Agreement and planning related to modification of, or disposition of any existing Joint Use Facilities or redevelopment of a larger parcel on which Joint Use Facilities are located by either entity would trigger the required notices set forth in the Planning Addendum.

IMPROVEMENTS ON EXISTING JOINT-USE SITES

City may only expend funding on recreational facilities where it has real estate interest. As such, in the event there is an opportunity for additional investment in adding recreational facilities or improvements at a jointly owned site outside of the School Park area, City may petition for expanded real estate interest in the site.

1. An opportunity for expanded park use shall be considered reasonable if:

    a. The property could accommodate the Green School Park Program or open space without decreasing or impacting the function of the property as a school;

    b. There is an expressed community interest in additional facilities (through requests, Community Activated Park Project applications, AISD Long-Range Plan, PARD Long Range Plan, etc.);

    c. Additional areas of park improvements are needed to adequately serve the community, as determined by the Director of the Parks and Recreation Department. Reasons include an increase in density in the surrounding neighborhood, a need for diversified programming, such as work out equipment for the elderly, and improved connectivity.

2. PARD shall notify AISD with a Letter of Intent describing the amount and general location of the expanded real estate interest needed for investment.

3. AISD shall acknowledge PARD's Letter of Intent no more than sixty (60) days after it is received, and provide a final confirmation as to whether the intended area may be transferred to PARD, including an estimated timeline of conveyance and estimated compensation owed to AISD.

4. Land may be conveyed by:
    a. Easement
    b. Deed (undivided quarter-interest or otherwise)
    c. Other legally binding instruments of conveyance acceptable to both Parties.

Prior to the installation of any fencing at any jointly-owned site, the type and placement of the fencing shall be agreed upon by the Parties.

SITE DISPOSITION & PARK INTEREST CONDEMNATION

The Parties shall notify each other as early as possible of any potential future disposition of real property that might allow a reasonable opportunity for land transfer.

1. In the event AISD determines that a Joint Use Facility is no longer needed such that AISD shall no longer have a use for such Joint Use Facility and intends to relinquish its Undivided Interest in such Joint Use Facility, City shall have first right of refusal to AISD's remaining interest in the property. Should City decline the remaining interest, AISD will need to condemn City's interest in the joint use site prior to disposing of the property. AISD shall notify City in advance of the intent to condemn the City's interest in a jointly-owned property.

2. In the event AISD requires exclusive use of City's interest in a Joint Use Facility such that City shall no longer have the use of such Joint Use , City and AISD staff shall meet to determine if City staff will request that City Council place a measure on the ballot for voter approval of the conveyance of the City's interest to AISD in accordance with the City's Charter or if AISD will need to condemn City's interest in the joint use site.

FINANCE ADDENDUM

Project Budget

The Parties agree to adopt an official Project Budget for each Joint Use Facility project ("Project"). The Project Budget shall be inclusive of all services, materials, fees and expenses to be incurred in connection with the design, development and construction of the Project. Costs or expenses incident to the Project and not included in the Project Budget shall be borne by the Party incurring the cost or expense, and shall not be chargeable to the Project Budget, unless such expense is necessary to remedy a dangerous or emergent condition, in which case the incurring Party shall be entitled to reimbursement by the other Party based on its Pro Rata Share, or unless such cost and expense is necessitated by the gross negligence or willful misconduct of one Party, in which case, such Party shall be responsible for 100% of the costs, regardless of which Party performs the repair. This provision is only necessary when the provisions of Section 13 in the Agreement to which this Addendum is attached do not apply, as mutually agreed upon by the Parties.

Construction

In connection with the contemplated construction of the project site features, the Parties agree that the School District Land Development Standards Agreement between the City and AISD entered into on December 5, 1996 and subsequent Amendments, covering construction of AISD facilities within the City, shall control such construction.

The Parties agree to adopt a construction budget and schedule. All parties shall use reasonable efforts to diligently prosecute completion of the Project and shall endeavor to complete the Project within the fixed construction budget and schedule.

Notwithstanding anything contained herein to the contrary, prior to commencement of construction of any Project including or consisting of a Joint Use Facility, the Parties shall meet and enter into an agreement that details the following at a minimum (which agreement shall govern the initial construction or alterations other than repairs in the ordinary course due to the passage of time or use of Joint Use Facilities):

(1) Party responsible for contracting and constructing.
(2) Timing of construction and completion.
(3) Name(s) of project managers.

Operations

The Party defined responsible in the Design and Maintenance Addendum shall provide any necessary ongoing repair and maintenance and shall be responsible for any and all associated costs.

DESIGN AND MAINTENANCE ADDENDUM

Please note:

- Maintenance responsibilities refers to all aspects of maintenance including parts, cost, labor, and soft costs such as permitting and design fees, etc.
- The AISD Educational Specifications and Project Development Manual and the City of Austin Parks and Recreation Department Nature Play Guide may have more updated specifications. Please check and defer to these as these will supersede the design standards outlined in this agreement.
- For each site feature, Parties shall submit both an AISD Schoolyard Improvement Form and the PARD Community Activated Park Project (CAPP) form and must have joint approval before installation.
- Types and locations of new features installed at each school shall be reviewed by AISD and the City on an annual basis to ensure maps and records are up-to-date.
- If a feature is to be dissolved due to inactivity, unless otherwise stated, the agency that installed it is responsible for deconstructing it and related components within ninety (90) calendar days after notification to the school principal.
- Unless otherwise stated or agreed upon, features maintained by AISD are the responsibility of the school and/or community partners (not District nor City staff). Schools can check with the AISD Director of Maintenance and Operations or by submitting a question through Let's Talk.
- Maintenance Requests for existing site features: If deemed AISD responsibility per this agreement, a work order shall be submitted and assigned to the appropriate AISD department. If deemed City responsibility per this agreement, the work order shall be called into City of Austin 311.
- Vandalism: Excessive maintenance due to vandalism or abuse should be the responsibility of the entity responsible for maintenance at the time of the abuse.
- As a general note, joint use facilities will be restricted to use by AISD on weekdays when school is in session from 7 am to 4 pm and will be otherwise open to the public.

Cisterns (Rainwater Harvesting System)

Definition: Rainwater harvesting systems are designed to capture the runoff from rooftops before it is discharged to the ground contributing to polluted runoff from paved surfaces and landscaped areas (City of Austin ECM 1.6.7.D, 2018). The rainwater is typically filtered before draining into a cistern (rain tank) where it can be put to a variety of beneficial uses such as but not limited to irrigation, specific indoor uses, groundwater recharge, and habitat enhancements. If designed and managed properly the water volume captured in cisterns may be used towards water quality credits as prescribed in the Environmental Criteria Manual of the City of Austin.

Design Standards: When designing any system with water it is always important to make sure that it meets local code and does not jeopardize the integrity of the site's potable water system. The basic system consists of a gutter, pre-storage filter, first flush (optional based on pre-storage filter efficiency), storage tank (cistern), floating suction filter, storage overflow, and a distribution system. Cisterns shall be designed to prevent overflow water from backing into the gutter and onto the roof and to prevent the cistern overflow from causing erosion. A properly designed rainwater harvesting system will increase the possible uses of the water and reduce the necessary maintenance to keep the system functioning. The City of Austin Watershed Protection Department is a resource for design and maintenance guidance.

Maintenance Responsibilities

a. If installed by AISD (not the school nor community partners) then AISD is responsible for the maintenance. This includes cisterns installed through major construction and bond programs, etc.
b. For systems installed by the City of Austin Watershed Protection Department, City shall be responsible for the first year's maintenance and replacement components or improvements to the system. AISD assumes regular maintenance of systems after one (1) year warranty period.
c. If installed by the school and/or community partners, the school and community partners are responsible for the maintenance and upkeep of the cistern.

Maintenance Requirements: The exact maintenance tasks and frequencies will vary per system based on the amount of particles (branches, leaves, dust, pollen, etc.) that fall on the roof, types of filtration systems, layout of the entire system, and use of captured rainwater.

a. Maintenance Tasks:
    i. clear branches from rooftop (as needed)
    ii. clean gutters of leaves and debris (semi-annually)
    iii. clear pre and post storage filters (semi-annually)

iv. first flush cleanout and operation (semi-annually)
v. wash out bottom of tank (1-5 years)
vi. back flush irrigation system (semi-annually)
vii. check to make sure cistern is completely sealed off from mosquitos (semi-annually)
viii. check for leaks and broken connections (semi-annually)

School Produce Gardens

Definition: A school produce garden is an area with planting beds for learners of all ages to learn how to grow, harvest, and prepare food. Additionally, produce gardens can support lessons about the plant life cycle, biodiversity, environmental justice, health and food supply, etc.

Design Standards
Refer to the AISD Garden to Cafe requirements for growing produce intended for consumption.

Gardeners may use existing functional irrigation water taps and hose bibs at the site. In the event that a tap is not readily available, the school is responsible for ensuring the installation and associated cost of the water tap.

Maintenance Requirements
Maintenance of the school produce garden is the responsibility of the school and/or community partners. Please report all irrigation or water leaks promptly through the AISD work order system and/or AISD police (available 24/7) at 512-414-1703.

Maintenance Responsibilities
A school produce garden is created and managed by the school. If the garden becomes unused or falls into disrepair, AISD will first contact the principal to confirm if the school would like to keep it, and then may deconstruct the garden and related structures within ninety (90) calendar days if the school no longer wants responsibility for the garden.

City-Supported Community Produce Gardens

Definition: **A City-Supported Community Garden** is an approved site for growing organic produce for non-commercial use and follows parameters set forth in the Austin Community Gardens Program. It is operated and maintained by committed volunteers and is divided into individual or shared plots and common areas. It is up to the community to create, cultivate and manage each garden. This definition comes from City of Austin Ordinance No. 20110210-017. This type of garden follows all guidelines found at the Austin Community Gardens Program.

Approvals:

a. A community garden must receive AISD and PARD approval through the PARD Garden Permission cover sheet and AISD Schoolyard Improvement Form.
b. Community gardens are allowed to have chickens and bees with permission by AISD and City after at least one year of successful garden operation (no other domesticated animals permitted inside the community garden). All apiaries and coops must comply with City ordinances. If the produce is to be used in the school cafeteria, it must comply with the Garden to Café requirements.

Soil Testing

a. The community garden applicant is required to test for heavy metals before planting plants intended for human consumption. PARD Community Gardens Program will verify. Soil testing funding is available through the Austin Resource Recovery Office of Brownfield Revitalization. The City may provide free soil testing for school and community gardens through Austin Resource Recovery Brownfields Revitalization Office. The garden applicant shall coordinate testing with the City.
b. Nutrient analysis is recommended but optional.

Plant Selection

a. No illegal substances may be planted.
b. Organic and sustainable gardening principles must be followed.

Water Use

a. All water use for gardens must comply with City of Austin water restrictions and City of Austin Community Garden design guidelines in the information packet from the community gardens program website.
b. Gardeners may use existing functional irrigation water taps at the site. If a tap is not readily available, Austin Water Utility will waive water tap installation fees when permitted in accordance with City Code in conjunction with the community garden permit. This fee waiver does not waive the cost of engineering for the required water tap plan. PARD will help facilitate this process. AISD will be named

as utility account holder and will pay for water use to the garden. Leaks must be reported to AISD immediately for repair.

Compost

Gardeners must create a compost bin for garden clippings that comply with City guidelines for backyard composting (not curbside composting). Compost areas shall be located a minimum of 25 feet from any building or structure.

Garden Access

During normal school hours, Community Gardeners will be required to check in with the school office. When school is not in session, PARD park hours apply.

Maintenance Responsibilities

a. The garden shall be maintained according to the Austin Community Gardens Program.
b. Fenceline weeding is the responsibility of the gardeners.
c. Only fruit trees planted by community gardeners shall be pruned by community garden members; native shade trees are maintained by City.
d. If the garden is to be dissolved due to inactivity, the City of Austin Sustainable Urban Agriculture Community Garden Coordinator shall be contacted. If there is no substantive response within thirty (30) days following the city process for notification to the gardeners, then the City shall offer to hand over full responsibility for the garden to the school. If the school does not choose to assume responsibility for the garden, City is responsible for deconstructing the garden and related structures within ninety (90) calendar days.
e. Members from both community garden and the school leadership shall meet annually to review maintenance.

Grow Zones

Definition: Grow Zones are forested corridors along creeks where mowing used to occur regularly and vegetation is now allowed to establish naturally and with minimal active maintenance. This can help improve water quality, reduce erosion risks and increase wildlife habitat.

Design Standards

The width of the Grow Zone should be aligned with the Critical Water Quality Zones (creek buffers) established by the Watershed Protection Ordinance. Trails (preferably not a concrete trail in the critical water zone) can be established within the Grow Zone to incentivize exploration and contact with the creek. See "Nature Trails" section of this document.

Maintenance Responsibilities

a. City may provide interpretive signs in strategic locations to educate both the public and students about Grow Zones and their importance. AISD Grounds Department shall install the signs. City of Austin Watershed Protection Department shall provide replacement signs for any that become damaged, faded, or vandalized
b. City may provide resources including seeds/seedlings, consultation, technical support, and mapping. Schools are also eligible to participate in the Adopt-a-Creek program for help with Grow Zone maintenance and environmental stewardship education.

Lawns

Definition: Surface layer of vegetation that is either grass or ground cover, excluding meadows, grasslands, rain gardens, and other elements described in this agreement. This does not include athletic fields.

Design Standards

a. Encourage naturalized areas and groundcover (not turf grass) to reduce the need for irrigation and mowing. Refer to the AISD Project Development Manual for a list of acceptable ground cover plants.
b. If installing irrigation, consider including an irrigation submeter to avoid wastewater fees. Only use irrigation for the maximum 90-day establishment period. If irrigation is required, consider the use of City municipal reclaimed water for irrigation.

Maintenance Responsibilities

a. AISD shall maintain all lawns on all undivided interest properties with the exception of Kealing. Lawns shall be maintained on a level 3 to 4 (blow/clear clippings, edging/line trimming, mow). Property fronts are edged at 90 degrees, backs are edged at 45 degrees. Clippings shall be mulched and left on--site.
b. AISD custodians shall be notified in advance of mowing to pick up trash.
c. If irrigation is installed, AISD will cover the cost of water. School personnel shall perform daily visual inspection of the irrigation system during the maximum 90 day establishment period, and report any leaks via work order. AISD will arrange for and cover the cost of repair.

Meadows/Native Grasslands

Definition: Any area dedicated to native grasses and wildflowers. Prairie communities with a significant wildflower component can be aesthetically pleasing and provide habitat for other pollinators including monarch butterflies.

Design Standards

a. Area perimeter shall be clearly defined by a physical edge (rope, timbers, natural features, decomposed granite, paver stones, split rail fence, etc.) and/or 5 feet mowed buffer. No metal edging shall be used.
b. Meadows and native grasslands shall be sited at a distance greater than 25 feet from any building or outbuilding.
c. Water and irrigation shall not be installed.

Maintenance Responsibilities

a. City may provide interpretive signs in strategic locations to educate both the public and students about wildflower meadows and their importance. AISD Grounds Department shall install the signs. City may provide replacement signs in the event that they become damaged, faded or vandalized.
b. Mowing shall be performed by AISD on all undivided interest properties with the exception of Kealing in accordance to the Lady Bird Johnson Wildflower Center recommendation for mow periods after spring flowers have set seeds (mower deck set to 6-8 inches). An additional optional winter mowing can be performed AFTER fall flowers have set seed. Mowing height should not be shorter than 18" to prevent damaging tall grasses.
c. The City may provide seed for initial establishment.
d. If reseeding is needed, wildflowers shall be seeded in early fall by the school and/or community partners, not by the District.
e. Managing or removing volunteer tree seedlings on an ongoing basis by the school.

Nature Play Spaces

Definition: A nature play space is a defined area for all ages and abilities, which encourages creative and unstructured play while exploring natural materials.

Description: Nature play spaces can be incorporated into areas such as parks, childcare centers, schools, libraries, and backyards, and can be created both indoors and outdoors. They are designed by considering the type of play, age of intended user, type of audience, amount of use, weather, and other related factors . A nature play space includes elements such as boulders, logs, gardens, nature trails, vegetation, acorns, pinecones, sticks, etc.

Examples: Where a nature play space is added will greatly determine how a nature play space is designed. Inside a classroom, it can be as simple as adding live plants and animals for children to care for or installing natural materials for loose part play (often seen being used for sorting, stacking, designing, etc.). In a schoolyard, it may include a mud kitchen or an herb, vegetable, or habitat garden. Additionally, it could include large tree pieces for climbing, a sand digging space, dry creek bed, or large loose parts for a natural building station.

Design Standards

a. Nature play spaces shall be designed according to the City of Austin's Nature Play Guidelines.
b. Nature Play elements shall be designed for:
    i. Safety: Some of the guidelines from existing resources for play structures can be applied to natural play spaces to provide consistency and set some minimum standards that are measurable. While nature play spaces do not have regulations in the same way that traditional playscapes do, best practices are to follow those guidelines as it relates to safety, keeping in mind the intent of the feature. A checklist shall be created and used regularly for each nature play feature installed for maintenance or replacement purposes. Refer to the City of Austin Nature Play Guidelines for further detail.
    ii. Inclusivity: Nature play feature selection and location, ramps into play spaces, and the type of surfacing in the play space shall be considered when designing a nature play space. It should also be noted that physical challenges make up only a small proportion of children with disabilities. Care should be taken to design spaces that meet the needs of all children, including those with sensory, cognitive, social/emotional, and communication challenges.

Maintenance Responsibilities

a. Any nature play areas installed shall be inspected and maintained by the agency that installed it, including regular inspections of vegetation or fill surfacing, as described in the City of Austin Nature Play Guidelines.
b. The school shall submit an AISD work order if they require maintenance of their nature play area. If the nature play area was installed by the City, AISD will contact the appropriate City staff and/or dial 311.

Rain Gardens

Definition: Rain gardens are vegetated depressions in the soil designed to capture stormwater runoff and infiltrate it into the ground. Their intent is to reduce stormwater runoff to the streams and treat pollution on site via plants and natural soil microorganisms.

Design Standards

Rain gardens shall be designed according to the latest guidelines from the City of Austin Watershed Protection Department Grow Green Guidelines for Rain Gardens and in agreement with Environmental Criteria Manual 1.6.7.H. It is important to make inlets and outlets that do not erode or clog and are easy to keep cleared.

Maintenance Responsibilities

Unless installed through an AISD district construction project, the school (not district nor City staff) is responsible for the regular maintenance of the rain garden. This includes inlet and outlet cleaning, watering plants until they are established, removing and replacing dead plants (semi-annually), removing litter, etc.

Learning Ponds

Definition: Pre-existing natural free standing ponds on the property or ponds that are installed for educational and habitat value.

Design Standards

a. Ponds that are fenced in by a 6 foot fence on the property can be full depth to the bottom of the pond. Ponds that are not fenced must have a water depth maximum of 6 inches.
b. Appropriate pond materials include but are not limited to: livestock tanks, in ground lined ponds, solid plastic in ground liners.
c. Plants must be native plants with native fish such as gambusia.
d. There must be a large rock or egress out of the pond should wildlife fall in so that there is a safe exit strategy.

Maintenance Responsibilities

The school is responsible for all maintenance including maintaining the pond for appropriate water depth (see above design standards), dechlorination, plant and fish health, and healthy bacteria levels.

Manufactured Playground

Definition: Playground equipment refers to equipment for use by children ages 6 months through 12 years in the playground areas of parks, such as city, state, and community maintained parks and schools as described in CPSC Pub. 325.

Design Standards

a. ASTM F1487 and CPSC Pub. 325 minimum requirements. ASTM is required by State legislation (State of Texas Health and Safety Code) and supersedes CPSC if there is a discrepancy.
b. All components of the playground must be IPEMA certified.
c. Must meet or exceed Playworld best practices Inclusive Play Design or equivalent.

Maintenance Responsibilities

a. Any playgrounds or playscapes installed shall be regularly inspected and maintained by the agency that installed it, and meet the standards described in CPSC Pub. 325.
b. Regular inspections to be performed include:
    i. high: 1x/week - routine inspection for broken equipment and safety hazards as suggested in CPSC Pub. 325 Table 3. Personnel does not require playground safety certification.
    ii. low: 1x/month- detailed preventative maintenance inspection, recommended to be performed by certified personnel, as suggested in CPSC Pub. 325 Appendix A.
    iii. audits: assess to ASTM & CPSC standards; must be done by certified personnel in a frequency recommended by the manufacturer.
c. Maintaining surfacing per manufacturer specs (regarding schedule, requirements); prefer engineered wood fiber.

Button Parks

Definition: Button Parks are a strategy to achieve City of Austin Council Resolution regarding park access. A button park is a small park located on school grounds that allows for use by the general public during normal park hours and also during school hours. Amenities may include playground elements, game tables, seating, and nature-based play elements. The primary target audience is preschool aged children and their guardians, but the button park could also serve older generations. The button park will be fenced with self-closing gates.

Design Standards

Consult the latest design standards with the City of Austin Parks and Recreation Department.

Maintenance Responsibilities

The City of Austin is responsible for design, construction, and maintenance of button parks.

Nature Trails

Definition: A nature trail is a secondary or tertiary path that branches from primary track, trail or pathway and may include looping to provide access to natural features on site ie: forests, gardens, tree clusters, etc.

Design Standards

a. The nature trail or pathway may include a variety of materials including, decomposed granite, compacted dirt, stepping-stones, etc. No sand or pea gravel shall be used. Materials shall be selected and placed in a manner that does not pose a risk for washing into drains and stormwater channels.
b. Metal edging shall not be used.
c. Must comply with the PARD Standard Park Amenities Manual.

Maintenance Responsibilities

Unless otherwise agreed upon, the school (not district nor City staff) is responsible for the regular maintenance of the nature trail or pathway and natural features that the trail "visits". This includes removing litter, replacing substrate, weeding, mulching, planting, etc.

Exercise Trails

Definition

Exercise trails are typically 8-foot minimum in width and made of either concrete or asphalt. Acceptable alternates may include compacted crushed stone, decomposed granite, or porous pavement. All materials shall meet ADA accessible guidelines. The trail is typically in a loop layout.

Design Standard

Designs for exercise trails and tracks shall comply with both the most recent version of the Austin ISD Project Development Manual and PARD Standard Park Amenities Manual.

Maintenance Responsibilities

Any exercise trails installed shall be inspected and maintained by the agency that installed it, including removing litter, replacing substrate, weeding, etc.

Trees

Definition: Trees, which includes small stature trees, are long-lived woody perennials. Trees provide many varied benefits including campus beautification, habitat for wildlife, erosion control, stormwater management, and shade for learning and play.

Design Standards: Planting & Species Selection Standards

a. Species Selection: Partner organizations, community groups, landscape architects/designers are encouraged to rely only on plants identified by Texas Parks and Wildlife Department's Wildscape Program EcoRegion 4 (Blackland Prairies) or EcoRegion 7 (Edwards Plateau) appropriate to the campus within that region, identified as appropriate for Austin by the Lady Bird Johnson Wildflower Center plants recommended for Central Texas, or plants found in the City of Austin Grow Green Database for trees. Exotic invasives in Appendix F of the Environmental Criteria Manual shall be avoided.
b. Planting Stock: All planting stock shall be inspected before purchase/acceptance by a qualified project arborist. Nursery stock must conform to the most current edition of ANSI Z60.1 American Standard for Nursery Stock, and shall be free of pests, diseases, or structural defects.
c. Planting Standards: Plantings should be designed with the mature height and spread of each tree taken into consideration and spaced accordingly. Appropriate tree placement and spacing in relation to trails, pathways, walkways, tracks, or buildings shall be determined by the project arborist.
d. Notification: The agency, group, or organization implementing a planting project shall submit the project through appropriate review channels for both PARD and AISD (AISD Schoolyard Improvement Committee, PARD Community Activated

Park Projects). Planting plans shall be shared between PARD and AISD so that tree inventories may be updated.

Maintenance

a. Watering: The agency, group, or organization implementing a planting project is responsible for proposals that include a three-year watering plan subject to approval by the Parks and Recreation Urban Forestry Department and AISD.
    i. If the agency, group, or organization planting the trees decides to fund and install a temporary irrigation system through an approved vendor rather than transport their own water, it is preferred that the system be tied into an irrigation meter if one is available. Irrigation may be tied to AISD water sources. The agency, group, or organization is also responsible for monitoring and repairing leaks through the irrigation vendor's service contract.

b. Pruning
    i. Tree Pruning needed to correct structural or other defects during the three-year establishment period for newly planted trees shall be the responsibility of the agency, group, or organization that implemented the planting.
    ii. For all trees outside a three-year establishment period, pruning and long-term care on properties of undivided interest shall be conducted through a cost-share agreement between AISD and PARD subject to the following terms:
        1. Coordination, implementation, and tracking of tree care is the responsibility of AISD, and must comply with appropriate arboricultural and agency standards as determined by AISD and PARD.
        2. All tree care activities must be performed under the supervision of a qualified arborist.
        3. AISD may contract with a tree care vendor to perform tree care activities.
        4. Tree pruning related to hazard mitigation and routine maintenance within the bounds of necessary activities to maintain safe public spaces shall not require prior approval from PARD.
        5. Tree care activities in addition to those required for hazard mitigation or routine maintenance, such as soil care, shall require prior approval from PARD.
        6. AISD will retroactively notify PARD of tree removals within areas of undivided interest for the purposes of keeping tree inventories current.

Landscape Vegetation

Definition: Plants and ground cover that serve fundamental purposes of providing visual enhancement; learning, play, and recreation opportunities; and a calming and welcoming environment. For trees, see the "Trees" section of this document.

Design Standards

Landscape plants shall be in agreement with the most recent version of the AISD Project Development Manual. Emphasis should be placed on native vegetation as it is adapted to the local conditions in Austin and can reduce maintenance requirements of mowing and irrigation. Landscape plants should be integrated with rainwater harvesting and rain garden systems to reduce irrigation needs.

Maintenance Responsibilities

Unless installed through an AISD district construction project, the school and community partners, not the District, are responsible for maintaining any plants installed unless otherwise specified in this document.

Shade Structures

Definition: Commercial-grade exterior manufactured structure intended to provide shade including but not limited to shade sails, shade structure, and shade canopies.

Design Standards

Any shade structure must adhere to design standards in the most recent version of the AISD Project Development Manual and PARD Standard Park Amenities Manual.

Maintenance Responsibilities

Any shade structures installed shall be regularly inspected and maintained by the agency that installed it, according to the manufacturer's specifications.

Outdoor Amenities

Definition: Including but not limited to bike racks, picnic tables, benches, educational kiosk, waste receptacles, water fountain, pavilion, grill, bleachers, etc. as specified in the PARD Standard Park Amenities Manual.

Design Standards

If the amenity is to be maintained by the City, it must be selected from the PARD Standard Park Amenities Manual.

Maintenance Responsibilities

a. PARD installs and maintains any item from the PARD Standard Park Amenities Manual installed by PARD or by the community with PARD approval.
b. The school (not District) maintains any amenity installed by the school.
c. Waste Receptacles installed by the school or District shall be emptied by the school custodian during the school's operational hours. All other waste receptacles shall be emptied and maintained by PARD. If a community or private event takes place, it is the host's responsibility to remove and dispose of waste. Waste from these events shall not be placed in AISD dumpsters.

Sport Courts

Definition:

Sport courts can include a tennis, pickleball, basketball, or multi-purpose court.

Design Standards

Any sport court must adhere to design standards in the most recent version of the AISD Project Development Manual and PARD Standard Park Amenities Manual.

Maintenance Responsibilities

Any sport court installed shall be regularly inspected and maintained by the agency that installed it, according to the manufacturer's specifications.

Outdoor Studios/Classrooms

Definition: Outdoor studios provide a location for learners to have active learning spaces outside of the building.

Design Standards

Any outdoor studio/classroom must adhere to design standards in the most recent version of the AISD Project Development Manual and PARD Standard Park Amenities Manual.

Maintenance Responsibilities

Any outdoor studio/classroom shall be regularly inspected and maintained by the agency that installed it unless otherwise specified and agreed upon (school, district, community partners, PARD, etc.).

EXHIBIT A
LIST OF SITES

SITE NAME, ADDRESS
Andrews, 6801 Northeast Drive, Austin, TX 78723
Barrington, 400 Cooper Drive, Austin, TX 78752
Barton Hills, 2108 Barton Hills Drive, Austin, TX 78704
Cook, 1511 Cripple Creek Drive, Austin, TX 78758
Cunningham, 2200 Berkeley Avenue, Austin, TX 78745
Doss, 7005 Northledge Drive, Austin, TX 78731
Gullett, 6310 Treadwell Boulevard, Austin, TX 78757
Hill, 8601 Tallwood Drive, Austin, TX 78759
Houston, 5409 Ponciana Drive, Austin, TX 78744
Kealing, 1607 Pennsylvania Avenue, Austin, TX 78702
Norman-Sims, 4001 Tannehill Lane, Austin, TX 78721
Oak Springs, 3601 Webberville Road, Austin, TX 78702
Odom, 1010 Turtle Creek Boulevard, Austin, TX 78745
Ortega, 1135 Garland Avenue, Austin, TX 78721
Pecan Springs, 3100 Rogge Lane, Austin, TX 78723
Pillow, 3025 Crosscreek Drive, Austin, TX 78757
Reilly, 405 Denson Drive, Austin, TX 78752
Sanchez, 73 San Marcos Street, Austin, TX 78702
St. Elmo, 600 W. St. Elmo Road, Austin, TX 78745
Williams, 500 Mairo Street, Austin, TX 78748
Wooldridge, 1412 Norseman Terrace, Austin, TX 78758

EXHIBIT C

Inventory of Existing Amenities Maintained by PARD

An inventory of existing amenities are maintained by PARD and accessed via the PARD Interactive Map: https://austin-parks-and-recreation-austin.hub.arcgis.com/

SHARED AGREEMENT FOR USE OF PARKING FACILTIES BETWEEN COA AND AISD

MEMORANDUM OF UNDERSTANDING BETWEEN
AUSTIN COMMUNITY COLLEGE DISTRICT AND
AUSTIN INDEPENDENT SCHOOL DISTRICT REGARDING
SHARED USE OF PARKING FACILITIES

This Memorandum of Understanding ("MOU") will serve to establish the terms and conditions under which Austin Community College District ("ACC") and Austin Independent School District ("AISD"), hereafter the "Parties," share the ACC Rio Grande Parking Garage located at 824 West 12th Street, Austin, Texas 78701 and the AISD parking lot facility adjacent to House Park Athletics Facility located at 1301 Shoal Creek Boulevard, Austin, Texas 78701.

The period of this MOU is effective for the time period of July 1, 2024, through June 30, 2029.

WHEREAS Texas Education Code §§ 130.082 and 130.084 grant public junior college districts the authority to enter into cooperative agreements with independent school districts as may be required to govern and manage junior colleges; and

WHEREAS Texas Education Code§§ 11.151 and 11.1512 grant public school districts the authority to enter into cooperative agreements with junior college districts as may be required to govern and manage public schools; and

WHEREAS the Texas Local Government Code § 272.001 (j) authorizes a political subdivision to "donate, exchange, convey, sell or lease land, improvements or any other interest in real property to an institution of higher education ... to promote a public purpose related to higher education ... for less than its fair market value and without complying with notice and bidding requirements"; and

WHEREAS pursuant to such authorities and duties, the Parties desire to coordinate the utilization of the ACC garage parking facility located on Lamar Boulevard and the AISD parking lot facility located on Shoal Creek Boulevard adjacent to House Park;

NOW THEREFORE, in consideration of the mutual benefit to be derived here from by the Parties hereto and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, it is mutually understood and agreed by the Parties as follows:

Shared use of the ACC Rio Grande Parking Garage will be in accordance with the terms in Exhibit A.

Shared use of the AISD parking lot facility adjacent to House Park Athletics Facility will be in accordance with the terms in Exhibits B and C.

This MOU shall be in effect for an initial term of five (5) years, beginning July 1, 2024, through June 30, 2029, and may be renewed for one additional five (5) year period upon mutual written agreement by both parties. Either party must provide written notice to the other party of its intention not to renew at least ninety (90) days prior to the expiration of the initial term.

Additionally, either party may terminate this Agreement with a minimum of twelve (12) months' prior written notice, effective on the next annual renewal date of July 1st.

Any notice provided hereunder by any Party to the other shall be in writing and delivered by electronic mail, by hand, by nationally recognized overnight air courier services (such as Federal Express), or by United Stated Postal Service, registered or certified mail, return receipt requested, in each case addressed to the respective party at the address set forth below or such other address as designated in writing by either party. A notice shall be deemed effective upon receipt or the date sent if it returned to the address because it is refused, unclaimed or the address has moved. The notice address of each party are as follows:

If to ACC:

Austin Community College District
6101 Highland Campus Drive
Austin, Texas 78752-6000
Attn: Risk Management & Insurance Department
Cc: Executive Director, Risk Management & Insurance
512-223-7832

If to AISD

Austin Independent School District
4000 S. IH-35 Frontage Road
Austin, Texas 78704
Attn: Athletic Director
Cc: Director of Athletics
512-414-1700

Either Party may designate a different agent or address for notice purposes by giving the other ten (10) days written notice in the manner provided above.

This MOU contains the entire agreement of the Parties hereto with respect to the matters covered by its terms, and it may not be modified in any manner without the express written consent of the Parties.

If any term(s) or provision(s) of this MOU are held by a court of competent jurisdiction to be invalid, void or unenforceable, the remainder of the term(s) or provision(s) of this MOU shall remain in full force and effect and shall in no way be effected, impaired or invalidated, unless such holding causes the obligations of the Parties hereto to be impossible to perform or shall render the terms of this MOU to be inconsistent with the intent of the Parties hereto.

No assignment of this MOU or of any duty or obligation of performance hereunder shall be made in whole or in part by any Party hereto without the prior written consent of the other Party hereto.

No waiver of a breach of any provision of this MOU shall be construed to be a waiver of any breach of any other provision. No delay in acting with regard to any breach of any provision shall be construed to be a waiver of such breach.

No party to this MOU waives or relinquishes any immunity or defense on behalf of themselves, their trustees, officers, employees and agents as a result of its execution of this Agreement and performance of the functions and obligations described herein.

[*Signature Page Follows*]

Austin Community College District

Neil Vickers (Sep 19, 2024 17:15 CDT)

Neil W. Vickers
Executive Vice Chancellor, Finance &Administration

09/19/2024
Date

Austin Independent School District

DocuSigned by:
Matias Segura
8B1A30BEB80F486...

Matias Segura
Superintendent

9/19/2024
Date

DS

EXHIBIT A
Shared Use of ACC Rio Grande Parking Garage

1. AISD has shared use of all parking spaces in the ACC Rio Grande Parking Garage parking facility from 5:00 p.m. until Midnight on the Wednesday, Thursday, and Friday evenings listed below for the use of overflow parking during AISD football games at House Park Athletics Facility.

2. AISD Athletic Director will provide the dates of varsity football games for the next academic school year prior to June 30 of the then current academic year to the ACC Risk Management & Transportation Department.

3. AISD may request use of the ACC Rio Grande Parking Garage for Saturday and Sunday events upon prior approval by the ACC Risk Management & Transportation Department. Requests for weekend event use must be in writing and received fifteen (15) business days prior to the date of the event.

4. AISD security staff will provide oversight of the parking areas when used for AISD events. AISD security staff will use a common radio channel with ACC security staff during AISD events. AISD security dispatch units will access ACC video cameras to scan the ACC garage parking facility during AISD events.

5. AISD custodial service will provide cleaning services in the ACC garage parking facility following AISD events.

6. The terms for utilization of the parking spaces apply to any subsequent years that this MOU is in force.

EXHIBIT B

Shared Use of AISD Parking Lot Facility Adjacent to House Park Athletics Facility

1. ACC has shared use of 133 parking spaces as indicated on Exhibit C. This parking area will be available for ACC faculty, staff and student parking from 6:00 a.m. to Midnight, Sunday through Saturday.

2. ACC will provide appropriate signage for the parking area and will provide directional signs as necessary.

3. AISD security staff will provide oversight of the parking areas when used for AISD events. AISD security staff will use a common radio channel with ACC security staff during AISD events. After video cameras are placed on sight, AISD security dispatch units will access ACC video cameras to scan the parking facility during AISD events.

4. Game days must be designated in writing no later than June 30 of the then current academic school year to the ACC Risk Management & Transportation Department.

5. The terms for utilization of the parking spaces apply to any subsequent years that this MOU is in force.

6. Approximately twenty-two (22) of the one hundred and thirty-three (133) spaces are located on City of Austin property. Use of these specific parking spaces by ACC and AISD is subject to the City of Austin making these parking spaces available.

EXHIBIT C
Map of AISD Parking Lot Facility Adjacent to House Park Athletics Facility

CHAPTER 3

ENERGY, WATER, & SUSTAINABILITY

AUSTIN
Independent School District

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INTRODUCTION

The Austin Independent School District (AISD) is committed to the conservation of energy and water resources, healthy indoor environmental quality, and the implementation of sustainable construction practices and thriving ecosystems.

The contractual obligations with respect to this effort are described under the Contracts/Agreements between the Owner and Design & Construction professionals. These contractual obligations include, but are not limited to, tracking and documenting sustainability achievements using one or more of three available rating systems as described below.

The rating system(s) applicable to each project shall be determined by the Owner's designated Project Manager, the Owner's Energy, Water, and Sustainability (EWaS) Team, and the design team during the green building kick-off meeting. Designers and Contractors/Construction Managers are responsible for preparing and submitting sustainability documentation as required by the selected rating system(s). Project scorecards are managed with support from the Owner's EWaS team.

The following sections of this chapter outline the Owner's goals and general requirements associated with the various aspects of sustainable design and construction. More detailed guidance is included in subsequent chapters and appendices of this document.

SUSTAINABILITY RATINGS

The three rating systems selected to track and document sustainability achievements for AISD projects are described below.

A. LEED for Building Design and Construction:
   1. Applicable to new schools, full modernization, and additions greater than 1,000 square feet. Projects between 1,000 and 10,000 square feet will be reviewed for applicability by the Owner, EWaS team, and Project Manager.
   2. Design team is required to complete project registration with GBCI (leedonline.com).
   3. Projects must achieve a Silver certification as a minimum.
   4. Design team must include LEED Scorecard with project objectives in the Project Specifications.
   5. Design and Construction teams are required to have LEED accredited professionals who will work with EWaS personnel.
   6. Design team is responsible for submitting LEED documentation.

B. LEED for Interior Design and Construction:
   1. Applicable to projects consisting primarily of interior renovations, with minimal site work.
   2. Design team is required to complete project registration with GBCI (leedonline.com).
   3. Projects must achieve a Silver certification as a minimum.
   4. Design team must include LEED Scorecard with project objectives in the Project Specifications.
   5. Design and Construction teams are required to have LEED accredited professionals who will work with EWaS personnel.
   6. Design team is responsible for submitting LEED documentation.

C. Austin Energy Green Building (AEGB):
   1. Applicable to all projects involving Architectural work, including interior renovations, full modernizations and additions.
   2. Design team is required to register project with Austin Energy and use their on-line rating system (greenbuilding.austinenergy.com) – unless specifically determined otherwise in consultation with Owner and the EWaS team.

3. Projects must achieve a Three-Star rating as a minimum.
4. AEGB rating must be achieved in addition to LEED rating – unless specifically determined otherwise in consultation with Owner and the EWaS team.
5. Design team is responsible for uploading AEGB documentation, including the AEGB Commercial Rating Primary Calculator – unless specifically determined otherwise in consultation with Owner and the EWaS team.

D. Austin ISD Sustainability Scorecard:

1. Applicable to projects that include no significant Architectural work, or are otherwise unable to pursue LEED and/or AEGB ratings.
2. Projects must complete Sustainability Scorecard to establish sustainability objectives prior to Schematic Design Phase.
3. Design team is required to include a complete Sustainability Scorecard with project requirements in the Project Specifications.
4. Design team is responsible for preparing documentation associated with sustainability features of the design and submitting to the EWaS team upon request for review and verification.

SITE

Responsible site design and land conservation measures are key to human and environmental health. Subsequent chapters and appendices of the Project Development Manual include strategies and metrics to design, construct, and maintain outdoor areas that preserve open space, protect and restore habitat, reduce potable water use, encourage transportation that does not rely on fossil fuels, and promote outdoor learning. The following Site Sustainability features must be addressed and documented by the Design and Construction team, as applicable to each project and in accordance with the requirements of Chapter 5 and related Appendices of this PDM, even in cases where these may not be sufficient to meet the thresholds required for LEED or AEGB ratings.

A. Erosion and Sedimentation Control Plan: Complete and implement an erosion and sedimentation control plan.
B. Site Environmental Assessment: Complete a Phase 1 Environmental Site Assessment, and remediate as required.
C. Rainwater Management: Implement design strategies to manage runoff on-site using green infrastructure strategies.
D. Electric Vehicle Charging Stations: Design site and electrical infrastructure to enable the installation of electrical vehicle charging stations.
E. Bicycle facilities: Provide covered bicycle parking and staff shower and changing room facilities. Provide dedicated bicycle paths/lanes that extend at least to the end of school property.
F. Landscape Plant Selection: Design landscapes with native and non-invasive adapted species.
G. Outdoor Water Use Reduction: Specify efficient irrigation equipment and low-water using native and non-invasive adapted species to reduce water use. Use auxiliary water sources including collected condensate and/or rainwater; connect to City of Austin reclaimed ‘purple pipe’ system when accessible.
H. Outdoor Education: Design dedicated areas to support outdoor learning opportunities.
I. Exterior Lighting: Specify and install exterior light fixtures and internally illuminated signs that protect the night sky by limiting uplight and light trespass.

WATER

The Owner embraces a commitment to the responsible stewardship of water. The subsequent chapters of the Project Development Manual provide strategies and metrics to design, construct, and operate high-performance facilities that reduce potable water use, encourage and support learners, educators, and staff to implement water-conserving practices, and optimize the use of water in operations.

The following Water Sustainability features must be addressed and documented by the Design and Construction team, as applicable to each project and in accordance with the requirements of Chapter 5 and related Appendices of this PDM, even in cases where these may not be sufficient to meet the thresholds required for LEED or AEGB ratings.

A. Rainwater Management: Implement low-impact development and green infrastructure strategies to reduce runoff volume and improve water quality.
B. Outdoor Water Use Reduction: Specify native and non-invasive adapted species and efficient irrigation equipment to reduce outdoor potable water use.
C. Indoor Water Use Reduction: Specify indoor plumbing fixture flush and flow rates to reduce indoor potable water use.
D. Auxiliary water sources: Capture condensate and rainwater for non-potable outdoor and indoor water uses; connect to City of Austin reclaimed 'purple pipe' system when accessible; assess the viability to install dual-plumbing system to enable water closet and urinal flushing with auxiliary water source.
E. Water Metering: Install water meters to measure the project's total indoor and outdoor potable water use, and consider additional meters to support water management and identify opportunities for additional water savings.

ENERGY

All new schools, additions, and renovation projects at the AISD will comply with the current City of Austin Energy Code, plus ALL of the following additional requirements, as applicable:

A. Minimum Energy Performance Requirements in Chapter 5 of this Project Development Manual.
B. Meet AEGB Basic Requirement 6 - Energy Performance, which includes the following:
    1. Building envelope performance
    2. Fenestration performance
    3. 20 Enhanced Energy Credits from IECC 2021
C. Achieve a minimum of 5 points under the AEGB Energy Performance Measure.
D. Achieve a minimum of 12 points under LEED for Schools EA Credit Optimize Energy Performance for new schools.
E. Achieve a minimum of 13 points under LEED ID+C EA Credit Optimize Energy Performance for building interior renovations.

COMMISSIONING

All new schools, additions, and renovation projects at the AISD will comply with the current City of Austin Energy Code requirements for Building Envelope Performance (C402.5) and Commissioning of MEP systems (C408), plus ALL of the following, as applicable:

A. Commissioning Requirements in Chapter 5 of this Project Development Manual.
B. Meet AEGB Basic Requirement 5 for Commissioning.
C. Achieve 2 points under the AEGB Additional Commissioning Measure for new buildings.
D. Achieve 1 point under the AEGB Additional Commissioning Measure for interior renovations.
E. Achieve 6 points under LEED for Schools EA Credit Enhanced Commissioning for new schools.
F. Achieve 5 points under LEED ID+C EA Credit Enhanced Commissioning for building interior renovations.

MATERIALS

Sustainable building materials and products are key to human and environmental health. Subsequent chapters of the Project Development Manual include strategies and metrics to specify, construct, and maintain building materials that promote material ingredient transparency, minimize use of harmful substances, declare life-cycle impacts, and are sustainably sourced. The following Materials Sustainability features must be addressed and documented by the Design and Construction team, as applicable to each project and in accordance with the requirements of Chapter 5, Chapter 6, and related Appendices of this PDM, even in cases where these may not be sufficient to meet the thresholds required for LEED or AEGB ratings.

A. Material Life-Cycle Impacts: Specify and install materials and products with available life-cycle impact disclosures, such as is provided in an Environmental Product Declaration (EPD), and prioritize products from manufacturers with verified improved environmental life-cycle impacts.
B. Material Health: Specify and install materials and products with available chemical ingredient inventories, such as is provided in a Health Product Declaration (HPD), and prioritize products that have been verified to minimize the use and generation of harmful substances.
C. Material Sourcing: Specify and install materials and products that are verified to have been extracted or sourced in a responsible manner including, but not limited to, products manufactured with pre- and/or post-consumer recycled content; bio-based materials; FSC-certified new wood products; and products sourced (extracted, manufactured, and purchased) within 100 miles of project site.

INDOOR ENVIRONMENTAL QUALITY

Indoor environmental quality is critical to occupant health and comfort. High-quality indoor environments can enhance performance, decrease absenteeism, and reduce liability. Subsequent chapters of the Project Development Manual include strategies and metrics to design, construct, and maintain facilities that ensure enhanced air quality, reduced emissions, pollutant source control, quality lighting, and acoustic performance. The following Indoor Environmental Quality Sustainability features must be addressed and documented by the Design and Construction team, as applicable to each project and in accordance with the requirements of Chapter 5, Chapter 6, and related Appendices of this PDM, even in cases where these may not be sufficient to meet the thresholds required for LEED or AEGB ratings.

A. IAQ Performance: Meet ASHRAE 62.1 mechanical ventilation requirements, monitor outdoor air intake flow, and use high rated filtration media.
B. Pollutant Exposure: Prohibit smoking in the building and on the grounds during construction; minimize the release of dirt and particulates, hazardous gases, and concentrated levels of carbon dioxide.
C. Low-Emitting Materials and Products: Specify and install no- or low-VOC (volatile organize compound) emitting paints, coatings, adhesives, sealants, flooring, walls, ceilings, insulation, composite wood, and furniture and furnishings.
D. Construction Indoor Air Quality Management Plan: Develop and implement a construction indoor air quality management plan and document compliance.
E. Thermal Comfort: Meet ASHRAE 55 Thermal Comfort Conditions for Human Occupancy and provide thermal comfort controls for individual and multi-occupant regularly occupied spaces.
F. Daylight: Provide spaces that connect building occupants with the outdoors, reinforce circadian rhythms, provide glare control, and reduce the use of electrical lighting through effective daylight design.
G. Electrical Lighting: Design electrical lighting to address the following: glare control, color rendering, lighting controls, and surface reflectivity.
H. Acoustic Performance: Provide spaces to facilitate communication, privacy, and sound transmission through effective acoustic design.

WASTE MANAGEMENT

The Owner aims to reduce the generation of construction, demolition, and operational waste disposed of in landfills and incineration facilities. Waste prevention and reusing, recovering, recycling, and composting materials will preserve and protect environmental resources for future generations. The following Waste Management features must be addressed and documented by the Design and Construction team, as applicable to each project and in accordance with the requirements of Chapter 5, Chapter 6, and related Appendices of this PDM, even in cases where these may not be sufficient to meet the thresholds required for LEED or AEGB ratings.

A. Construction & Demolition Waste Management Plan and Implementation: Develop and implement a construction and demolition waste management plan and document compliance; include in plan a requirement to divert a minimum 75% by weight of the total non-hazardous construction and demolition materials from landfill and incineration facilities.
B. Waste Reduction: Prevent waste through reuse and source reduction strategies.
C. Collection & Storage: Design space plans that provide dedicated space to locate recycling and composting containers throughout the building and off-site.
D. Batteries & Electronic Equipment: Adopt and implement the Owner's policy for the safe recycling of used batteries and electronic equipment.

GREEN BUILDING EDUCATION

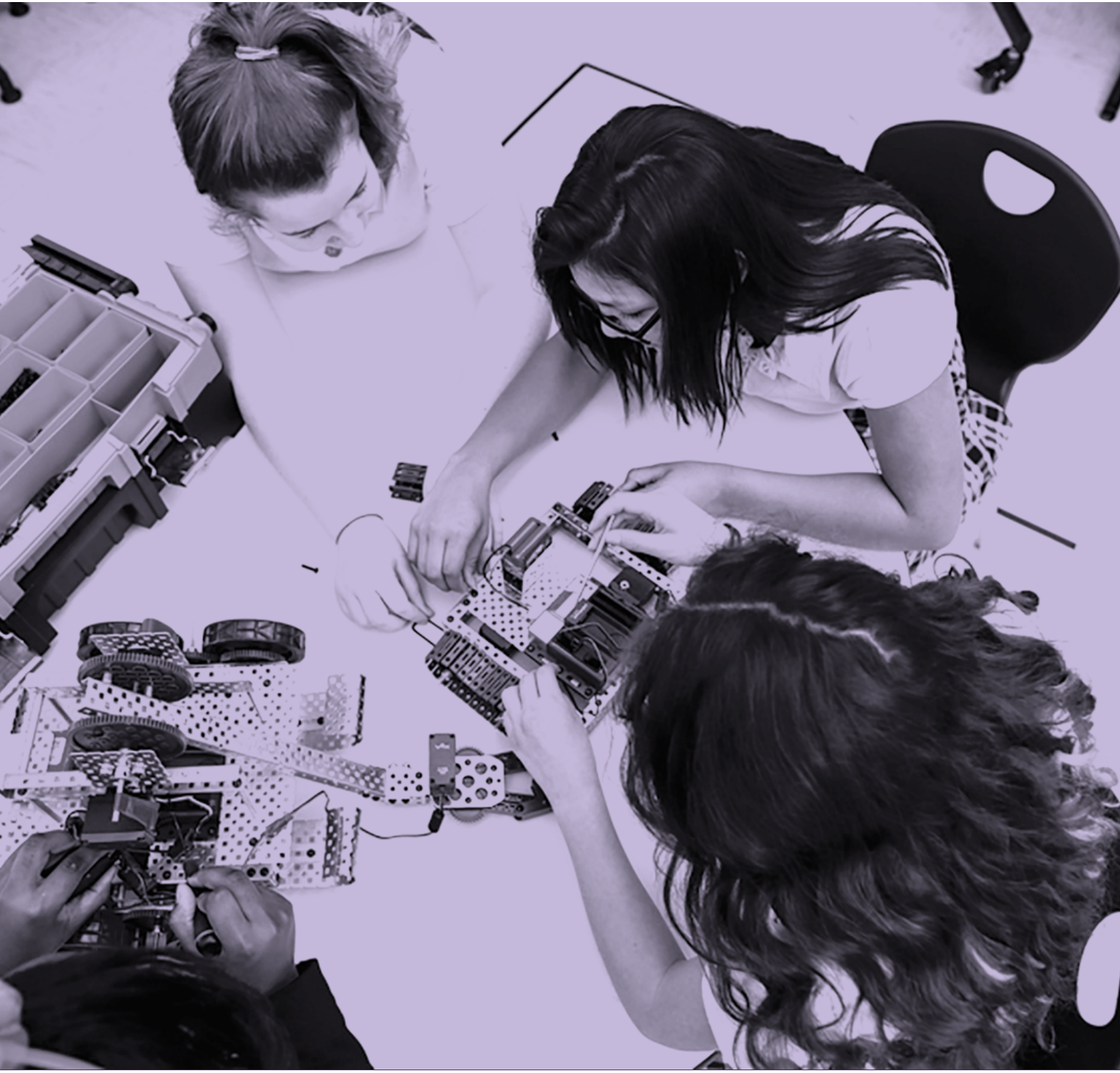
Educational signage, case studies, design features, and curriculum integration can disseminate green building information and extend the Owner's mission to provide a comprehensive educational experience. The following Green Building Education features must be addressed and documented by the Design and Construction team, as applicable to each project and in accordance with the requirements of Chapter 5 and related Appendices of this PDM, even in cases where these may not be sufficient to meet the thresholds required for LEED or AEGB ratings.

A. Green Building Signage: Install green building signage to educate occupants and visitors on the project's green features and sustainability benefits; the EWaS team will provide a template.
B. Green Building Case Studies: Provide content for the Owner's green building case studies to educate design professionals and the public, coordinated by the EWaS team.
C. Educational Design Features: Include design features that can be integrated into the curriculum and used as green building teaching tools.
D. Alignment with Education Mission: Integrate the sustainable features of a school facility with the school's educational mission.
E. Internships: Encourage design firms to host internships for AISD learners.

GREEN BUILDING RESOURCES

The following resources are available and will be updated as needed to assist in the documentation of sustainability measures. Refer to the links provided below to ensure latest resources are being utilized.

A. Green Building Credit Guidance Memos – this folder contains memos to assist project teams with green building credits and documentation.
B. LEED, AEGB, and AISD Checklists - this folder contains LEED, AEGB, and AISD sustainability scorecards and checklists.
C. AISD Sustainability Submittal Sheets
D. AISD Sustainability Scorecard Resources - this folder contains resources related to the AISD Sustainability Scorecard.



CHAPTER 4

FACILITY DESIGN STANDARDS

AUSTIN
Independent School District

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INTRODUCTION

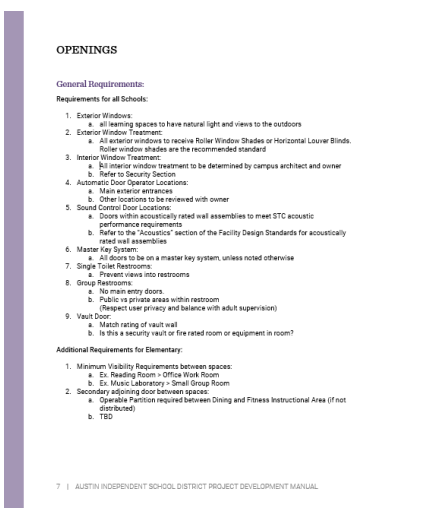
HOW TO USE THIS CHAPTER

The Facility Design Standards outline the design requirements by programmatic space for all elementary, middle, and high schools in Austin Independent School Owner. There are two sets of requirements outlined in this chapter: one set for elementary schools, and a combined set for middle and high schools. It is the responsibility of the design team to incorporate the requirements outlined in this chapter. Determine Career and Technical Education (CTE) programs with the Owner. The space types provided are meant to be flexible in order to accommodate various programs. Define unique additional spaces or requirements with the Owner.

Chapter Format:

Each section of this chapter is divided into two parts:

1. General Requirements
2. Master Charts



OPENINGS

General Requirements:

Requirements for all Schools:

1. Exterior Windows:
   a. all learning spaces to have natural light and views to the outdoors
2. Exterior Window Treatment:
   a. All exterior windows to receive Roller Window Shades or Horizontal Louver Blinds. Roller window shades are the recommended standard
3. Interior Window Treatment:
   a. Bid interior window treatment to be determined by campus architect and owner
   b. Refer to Security Section
4. Automatic Door Operator Locations:
   a. Main exterior entrances
   b. Other locations to be reviewed with owner
5. Sound Control Door Locations:
   a. Doors within acoustically rated wall assemblies to meet STC acoustic performance requirements
   b. Refer to the "Acoustics" section of the Facility Design Standards for acoustically rated wall assemblies
6. Master Key System:
   a. All doors to be on a master key system, unless noted otherwise
7. Single Toilet Restrooms
   a. Prevent views into restrooms
8. Group Restrooms:
   a. No main entry doors.
   b. Public vs private areas within restroom (Respect user privacy and balance with adult supervision)
9. Vault Door:
   a. Match rating of vault wall
   b. Is this a security vault or fire rated room or equipment in room?

Additional Requirements for Elementary:

1. Minimum Visibility Requirements between spaces:
   a. Ex. Reading Room > Office Work Room
   b. Ex. Music Laboratory > Small Group Room
2. Secondary adjoining door between spaces:
   a. Operable Partition required between Dining and Fitness Instructional Area (if not distributed)
   b. TBD

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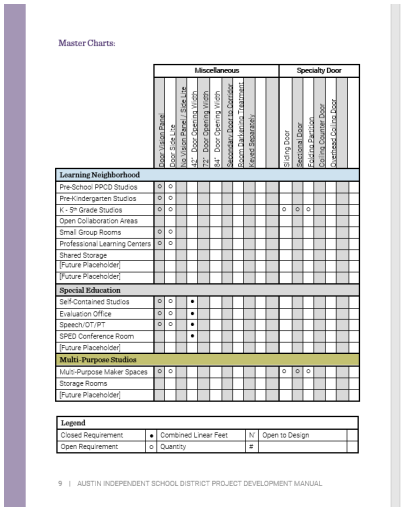

Master Charts:

	Miscellaneous											Specialty Door						
	Room Divider Panel	Door Glass Line	Sound Rated Panel / Glass Line	1¾" Door Opening Width	2¾" Door Opening Width	3¾" Door Opening Width	Door Hardware Cabinet	Room Darkening Treatment	Wood Separate	Sliding Door	Security Door	Folding Partition	Folding Counter Door	Overhead Coiling Door	Future Placeholder	Future Placeholder	Future Placeholder
Learning Neighborhood																		
Pre-School PPCD Studios	○	○										○	○					
Pre-Kindergarten Studios	○	○																
K - 5th Grade Studios	○	○										○	○					
Open Collaboration Areas																		
Small Group Rooms	○	○																
Professional Learning Centers	○	○																
Shared Storage																		
[Future Placeholder]																		
[Future Placeholder]																		
Special Education																		
Self-Contained Studios	○	○	•															
Evaluation Office	○	○	•															
Speech/OT/PT	○	○	•															
SPED Conference Room			•															
[Future Placeholder]																		
Multi-Purpose Studios																		
Multi-Purpose Maker Spaces	○	○										○	○					
Storage Rooms																		
[Future Placeholder]																		

Legend					
Closed Requirement	•	Combined Linear Feet	N	Open to Design	
Open Requirement	○	Quantity	#		

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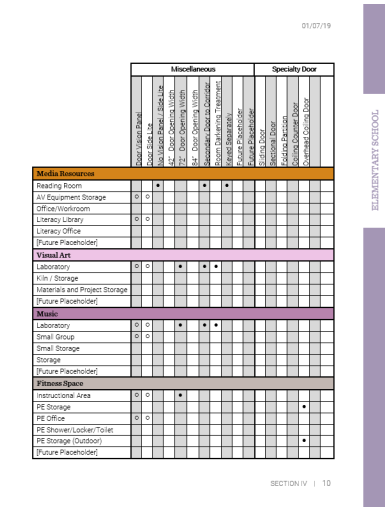

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	Miscellaneous											Specialty Door						
	Room Divider Panel	Door Glass Line	Sound Rated Panel / Glass Line	1¾" Door Opening Width	2¾" Door Opening Width	3¾" Door Opening Width	Door Hardware Cabinet	Room Darkening Treatment	Wood Separate	Future Placeholder	Future Placeholder	Security Door	Folding Partition	Folding Counter Door	Overhead Coiling Door			
Media Resources																		
Reading Room		•				•		•										
AV Equipment Storage	○	○																
Office/Workroom																		
Literacy Library	○	○																
Literacy Office																		
[Future Placeholder]																		
Visual Art																		
Laboratory	○	○		•		•	•											
Kiln / Storage																		
Materials and Project Storage																		
[Future Placeholder]																		
Music																		
Laboratory	○	○		•		•	•											
Small Group	○	○																
Small Storage																		
Storage																		
[Future Placeholder]																		
Fitness Space																		
Instructional Area	○	○		•														
PE Storage														•				
PE Office	○	○																
PE Shower/Locker/Toilet																		
PE Storage (Outdoor)														•				
[Future Placeholder]																		

ELEMENTARY SCHOOL

SECTION IV | 10

General Requirements:

Requirements for all schools – Requirements specific to all schools.

Additional requirements for elementary schools – Requirements specific to elementary schools.

Additional requirements for middle & high schools – Requirements specific to middle & high schools.

Master Charts:

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

Closed Requirement – A non-negotiable requirement.

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

Combined Linear Footage. – The required linear feet.

Quantity – The required quantity.

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

Sample Master Chart:

	Miscellaneous											Specialty Door						
	Door Vision Panel	Door Sidelite	No Vision Panel / Sidelite	42" Door Opening Width	72" Door Opening Width	84" Door Opening Width	Secondary Door to Corridor	Room Darkening Treatment	Keyed Separately	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	Sliding Door	Sectional Door	Folding Partition	Coiling Counter Door	Overhead Coiling Door	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Sample Spaces																		
Program A				o	o				●									
Program B	o	o										o		o				
Program C			●					●							●			

Please note that this chart is purely an example and is not tied to a specific program space.

Program A is required to have *either* a 42 inch or 72" Opening Width and be keyed separately.

Program B is required to have *either* a Door Vision Panel or a Door Sidelite, and *either* a Sliding Door or Folding Partition.

Program C is required to have No Vision Panel / Sidelite, Room Darkening Treatment, and a Coiling Counter Door.

ELEMENTARY SCHOOL

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PLUMBING 4-45

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OPENINGS

General Requirements:

Requirements for all schools:

1. Exterior Windows:
    A. Provide natural light and views to the outdoors from all learning spaces.
2. Building Entry
    A. Provide direct visual sightlines between the Administration Reception, secure vestibule, and building entry. Window treatments are not acceptable at these locations.
3. Exterior Window Treatment:
    A. Provide exterior window treatments in compliance with *Chapter 5, Safety and Security*.
    B. Mini blinds or horizontal louver blinds are not acceptable window treatments at any location.
    C. Both motorized and manual roller shades are acceptable, unless noted otherwise below:
        i. Provide motorized shades at clerestory windows.
    D. Provide roller window shades at exterior window locations for the following spaces:
        i. Studios
        ii. Private Offices and Conference Rooms
        iii. Group Rooms and PLCs
        iv. Community Room
        v. Any spaces requiring room darkening treatment
4. Interior Window Treatment:
    A. Provide interior window treatments in compliance with *Chapter 5, Safety and Security*.
    B. Mini blinds or horizontal louver blinds are not acceptable window treatments at any location. Curtains and roller shades are acceptable window treatments at any location.
    C. Minimize the number of individual window treatment units on any one wall for ease and speed of use during emergency procedures.

D. Provide curtains or roller shades at all interior windows with line of sight from a corridor for the following spaces, including but not limited to:
    i. Studios
    ii. Private Offices and Conference Rooms
    iii. Group Rooms and PLCs
    iv. Community Room
    v. Student Mental Wellness and Counseling
E. Provide roller shades at all doors with vision panels, vision lites, or sidelites. Given the configuration or design, coordinate with the Owner if an alternative solution is recommended.

5. Door Access/Door Hardware:
    A. Refer to *Appendix A, Section 087100 – Door Hardware*
    B. Refer to *Chapter 5, Safety and Security*
6. Automatic Door Operators:
    A. Provide automatic door operators at the following locations:
        i. Main entry vestibule
        ii. Bus entrance
        iii. Playground entrance
        iv. Review any potential additional locations with the Owner.
7. Sound Control Door:
    A. Provide sound control doors within acoustically rated wall assemblies as required *Chapter 5, Acoustics*
8. Single Occupant Restrooms:
    A. Prevent views of plumbing fixtures from public areas.
9. All-User Restrooms:
    A. No main entry doors are allowed.
    B. Provide ability to limit access to restrooms in case of maintenance issues.
    C. Provide a full door with no more than a 1-inch opening from the bottom of door to floor, set within full-height partition construction, for learner privacy and safety. Doors at all-user restrooms to be standard thickness doors and hardware, with full-height continuous hinges on the doors.
    D. Door and hardware assemblies to be made of bleach-cleanable materials and assemblies.

E. Provide an occupancy lock with indicator at individual toilet room doors.
    i. Indicators must be clearly visible and legible at least 5-feet away from doors.
F. Access to adult family or staff restrooms should be separate and distinct from learner all-user restrooms.
G. All doors to individual toilet rooms must swing out.
H. Provide overhead stops at all doors to individual toilet rooms.

10. Hollow Metal Doors:
    A. Provide hollow metal doors and frames at all building support spaces.
11. Kickplate:
    A. Provide a door kickplate at exterior doors where a kickplate is not integral to the door (i.e. storefront).
    B. Refer to *Appendix A, Section 087100 – Door Hardware*
12. Kitchen/Serving:
    A. Provide the ability to limit access to the kitchen and serving area when not serving.
13. Self-Closing Door Hardware
    A. Provide self-closing door hardware at all custodial closets.
    B. Provide self-closing door hardware at any additional areas where chemicals are stored.
14. Mother's Room
    A. Provide an occupancy lock with indicator, lockable from the inside only, at the Mother's Room.
        i. Indicators must be clearly visible and legible at least 5-feet away from doors.
15. Learning Neighborhood Access
    A. Provide vision panels in double doors leading into and out of learning neighborhoods. Coordinate with the Owner for security film requirements.
16. Core Counseling and Wellness Rooms
    A. Consider providing an operable partition between the Core Counseling and Wellness Rooms for increased flexibility.

Additional requirements for elementary schools:

1. Provide supervision with direct visual sightlines between the following spaces:
    A. Refer to adjacency diagrams in the *Educational Specifications* for sightline requirements.
    B. Media Center Office/Workroom and Reading Room
    C. Open Collaboration Area and Small Group Rooms, Learning Studio, or Maker Space.
    D. Music Studio and Small Group Room
    E. Gymnasium and PE Office
    F. Nurse Station or Office to General Care Cots and Isolation Rooms
    G. All corridors and Studios or Offices
    H. Additional Locations: Refer to *Chapter 5, Safety and Security*
2. Provide a secondary adjoining door or opening between the following spaces:
    A. Dining Commons (if not distributed) and Gymnasium
        i. Operable Partition is required.
        ii. Refer to *Chapter 5, Acoustics* for STC requirements of subdividing partitions between these spaces.
    B. Pre-Kindergarten Restrooms and Pre-Kindergarten Studio
        i. Dutch door is required
    C. Pre-School ECSE Restrooms and Pre-School ECSE Studios
    D. PE Storage and PE Storage (Outdoor)
        i. Consider combining spaces into one space
3. Provide a means for creating visual privacy for the following spaces:
    A. Health Services Areas
    B. Academic Intervention spaces (incl. Speech and Diagnostician)
    C. Conference Rooms
    D. Small Group Rooms
    E. Counseling Spaces
4. Provide a secondary door to a separate egress path for the following spaces:
    A. Principal's Office
    B. Counseling Center

Master Charts:

	Miscellaneous											Specialty Door						
	Door Vision Panel	Door Sidelite	No Vision Panel / Sidelite	42" Door Opening Width	72" Door Opening Width	84" Door Opening Width	Secondary Door to Corridor	Room Darkening Treatment	Keyed Separately	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	Sliding Door	Sectional Door	Folding Partition	Coiling Counter Door	Overhead Coiling Door	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Learning Neighborhood																		
Studios (Pre-K)		●																
Studios (ECSE)		●		●								o	o	o				
Studios (K-5) / Studio (SPED Flex)		●										o	o	o				
Studio (Life Skills)		●		●														
Open Collaboration Areas		●										o	o	o				
Small Group Rooms		●																
Professional Learning Centers		●																
PLC Meeting Room		●																
Neighborhood Storage																		
[FUTURE PLACEHOLDER]																		
Special Education																		
Speech / Diagnostics		●		●														
Academic Intervention		●		●														
Office / Conference		●		●														
Sensory Motor Lab		●		●				●										
Washer/Dryer																		
Storage (Equipment)				●														
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

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

*Door opening width is not limited to a typical personnel door.

	Miscellaneous											Specialty Door						
	Door Vision Panel	Door Sidelite	No Vision Panel / Sidelite	42" Door Opening Width	72" Door Opening Width	84" Door Opening Width	Secondary Door to Corridor	Room Darkening Treatment	Keyed Separately	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	Sliding Door	Sectional Door	Folding Partition	Coiling Counter Door	Overhead Coiling Door	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Maker Spaces																		
Maker Spaces		●										○	○	○				
Storage																		
[FUTURE PLACEHOLDER]																		
Library Media Center																		
Reading Room									●									
Storage (AV Equipment)				●														
Office/Workroom		●																
Literacy Library																		
Literacy Office		●																
[FUTURE PLACEHOLDER]																		
Visual Art																		
Studio		●			●		●	●										
Kiln				●														
Storage				●														
[FUTURE PLACEHOLDER]																		
Music																		
Studio		●			●		●	●										
Small Group		●																
Storage																		
[FUTURE PLACEHOLDER]																		
Wellness																		
Gymnasium		●			●													
Storage (PE, After-School)					●													
PE Office		●																
Storage (Outdoor PE)													○			○		
[FUTURE PLACEHOLDER]																		

	Miscellaneous											Specialty Door						
	Door Vision Panel	Door Sidelite	No Vision Panel / Sidelite	42" Door Opening Width	72" Door Opening Width	84" Door Opening Width	Secondary Door to Corridor	Room Darkening Treatment	Keyed Separately	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	Sliding Door	Sectional Door	Folding Partition	Coiling Counter Door	Overhead Coiling Door	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Food Services																		
Dining Commons																		
Serving																		
Teaching Presentation Space																		
Kitchen				●					●									
Stage							●											
Storage (Stage, After-School)																		
Storage (Chairs/Tables)					●													
[FUTURE PLACEHOLDER]																		
Administration																		
Private Offices		●																
Reception / Secretary																		
Bookkeeper		●																
Workroom		●																
Conference Room		●																
Storage (Records)			●						●									
Storage (Supply)																		
Mothers Room			●															
Professional Learning Center		●																
Commuter Shower																		
School Resource Officer (SRO)			●						●									
[FUTURE PLACEHOLDER]																		

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

*Door opening width is not limited to a typical personnel door.

	Miscellaneous											Specialty Door						
	Door Vision Panel	Door Sidelite	No Vision Panel / Sidelite	42" Door Opening Width	72" Door Opening Width	84" Door Opening Width	Secondary Door to Corridor	Room Darkening Treatment	Keyed Separately	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	Sliding Door	Sectional Door	Folding Partition	Coiling Counter Door	Overhead Coiling Door	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Student Mental Wellness and Counseling																		
Offices		●						●										
Core Counseling		●						●										
Wellness Room		●						●										
School Mental Health Center		●						●										
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Health Services																		
Care Center		●																
Storage (Health)																		
Isolation																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Community																		
Community Room		●																
Professional Learning Center		●																
Group Rooms		●																
Office		●						●										
Storage																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

	Miscellaneous											Specialty Door						
	Door Vision Panel	Door Sidelite	No Vision Panel / Sidelite	42" Door Opening Width	72" Door Opening Width	84" Door Opening Width	Secondary Door to Corridor	Room Darkening Treatment	Keyed Separately	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	Sliding Door	Sectional Door	Folding Partition	Coiling Counter Door	Overhead Coiling Door	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Building Support / Restrooms																		
Storage					●													
Bookroom				●														
Main Electrical & Elec. Closets																		
Central HVAC & Mech. Closets					●													
Custodial Office		●																
Professional Learning Center		●																
Custodial Closets																		
Safety Patrol Closet				●														
Telecomm (IDF)																		
Main Telecomm (MDF)																		
All-User Restroom			●															
Single Restroom			●															
Life Skills / ECSE Restroom			●	●														
Family Restroom			●	●														
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

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

*Door opening width is not limited to a typical personnel door.

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FINISHES

General Requirements:

Requirements for all schools:

1. Finishes
    A. All flooring and wall finish selections are limited to what is provided in the master chart. All other decorative finishes should be specified based upon function, durability, acoustics, maintenance, and indoor air quality. Refer to *Chapter 5, Division 09.*
    B. Consider ability to withstand extended unoccupied temperature and humidity levels during summer HVAC shut offs for flooring and wall finish selections, unless otherwise specified.
2. Corner Guards & Wall Protection:
    A. Provide a minimum of 48 inch high corner guards and wall protection at gypsum board walls in areas with high traffic or abuse such as circulation areas.
    B. Recommended Wall Protection:
        i. Ceramic/Porcelain Tile with a dark grout
        ii. Resilient Wall Panel
        iii. Provide abuse-resistant gypsum board at areas with heavy traffic and when the desired final finish is painted gypsum board.
        iv. The Owner's preference is a more durable, resilient finish in corridors, heavy traffic areas, and high-abuse areas. Alternatives to recommendations above are acceptable pending Owner approval.
3. Wall Base:
    A. Provide 4 inch high wall base at all gypsum wall board and concrete masonry unit walls.
    B. Provide 4 inch high integral cove base at all restrooms.
4. Walk-off Mat:
    A. Provide walk-off mat, 10 feet in the direction of travel, at all entrances from the exterior. Where integrated mats are not feasible, coordinate roll out mat locations with the Owner.
5. Corridors:
    A. No carpet in corridors is allowed except at administration suite corridors.

B. Consider the use of varying materials and textures for wall and floor surfaces in corridors to support tactile wayfinding for visually impaired learners.

6. Stairs & Ramps:
    A. Provide protective nosings at all stairs to prevent sharp edges and slip hazards.
    B. Provide non-slip flooring at all interior ramps.
7. Kitchen/Serving:
    A. Provide integral cove base.
    B. Provide a minimum of 48 inch high ceramic/porcelain tile at non-concrete masonry unit walls.
    C. Provide cleanable ceiling tiles.
    D. Provide quarry tile at all Food Service Kitchen and Serving spaces.
8. Drinking Fountains (Water Coolers):
    A. Provide porcelain/ceramic tile at all walls behind drinking fountains.
    B. No carpet or wood flooring beneath drinking fountain is allowed.
9. Sinks:
    A. No carpet or wood flooring beneath sinks is allowed.
10. Acoustic Panels:
    A. Provide acoustic panels where necessary to achieve acoustic requirements. Refer to *Chapter 5, Acoustics*.
11. Studios (SPED Flex):
    A. Provide abuse-resistant walls or wall finish.
12. Food Preparation
    A. Coordinate finishes of all learning areas supporting food preparation with Food Services Department.
13. Custodial Closets
    B. Where exposed ceilings are selected, provide walls to structural deck at all Custodial Closets.
14. All-User Restrooms
    A. Provide resilient, bleach-cleanable materials for all finishes and assemblies.
    B. Provide tile on all sides of all-user restroom spaces.
15. Gymnasium Storage
    A. Clear Height: minimum of 12 feet to accommodate tall equipment at minimum one storage area accessible from each gymnasium.

Additional requirements for elementary schools:

1. Pre-Kindergarten:
    A. Consider zoning floor finishes to accommodate wet art activities.
2. Stage:
    A. Provide bamboo or wood flooring.
3. Music Studio:
    A. Provide inherently anti-microbial rubber flooring to prevent odors.
4. Gymnasium:
    A. Provide resilient athletic flooring with a matte finish and striping.
    Refer to *Appendix C, Elementary Gym – Floor Striping Options.*
    B. Provide wall padding in run-off area behind basketball goals that are offset from the wall.
    C. Provide 30 linear feet of climbing wall with lockable cover.
5. Pre-School ECSE Studios / Restroom and Life Skills Studio / Restroom:
    A. Provide inherently antimicrobial flooring and durable wall finish.
6. Teaching Presentation Space
    A. Provide finishes that are nonporous, antimicrobial, and easy to clean for all surfaces.

Master Charts:

	Floor								Wall					Ceiling				
	Resilient Flooring	Porcelain Tile	Carpet Tile	Resinous Flooring (Epoxy)	Resinous Matrix Terrazzo	Polished Concrete	Sealed Concrete	*[FUTURE PLACEHOLDER]*	Concrete Masonry Unit	Gypsum Wall Board	Porcelain/Ceramic Tile	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	Acoustical Panel Ceiling	Gypsum Board Ceiling	Exposed Structure	Specialty Ceiling	*[FUTURE PLACEHOLDER]*
Learning Neighborhood																		
Studios (Pre-K)	o		o		o	o								●				
Studios (ECSE)	●													●				
Studios (K-5) / Studio (SPED Flex)	o		o		o	o								●				
Studio (Life Skills)	●													●				
Open Collaboration Areas	o		o		o	o												
Small Group Rooms	o		o		o	o								●				
Professional Learning Centers	o		o		o	o								●				
PLC Meeting Room	o		o											●				
Neighborhood Storage	o					o	o							o		o		
[FUTURE PLACEHOLDER]																		
Special Education																		
Speech / Diagnostics			●											●				
Academic Intervention			●											●				
Office / Conference			●											●				
Sensory Motor Lab	o		o											●				
Washer / Dryer	o					o	o							o		o		
Storage (Equipment)	o					o	o							o		o		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

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

	Floor								Wall					Ceiling				
	Resilient Flooring	Porcelain Tile	Carpet Tile	Resinous Flooring (Epoxy)	Resinous Matrix Terrazzo	Polished Concrete	Sealed Concrete	*[FUTURE PLACEHOLDER]*	Concrete Masonry Unit	Gypsum Wall Board	Porcelain/Ceramic Tile	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	Acoustical Panel Ceiling	Gypsum Board Ceiling	Exposed Structure	Specialty Ceiling	*[FUTURE PLACEHOLDER]*
Maker Spaces																		
Maker Spaces	○			○		○								○		○		
Storage	○			○		○								○		○		
[FUTURE PLACEHOLDER]																		
Library Media Center																		
Reading Room			●															
Storage (AV Equipment)	○					○	○							○		○		
Office/Workroom	○		○			○								●				
Literacy Library	○		○		○									○		○		
Literacy Office			●											●				
[FUTURE PLACEHOLDER]																		
Visual Art																		
Studio	○					○										●		
Kiln							●									●		
Storage							●									●		
[FUTURE PLACEHOLDER]																		
Music																		
Studio	○		○											○		○	○	
Small Group	○		○			○								●				
Storage	○					○								○		○		
[FUTURE PLACEHOLDER]																		
Wellness																		
Gymnasium									●							●		
Storage (PE, After-School)	○						●		●							●		
PE Office	○		○											●				
Storage (Outdoor PE)							●		●							●		
[FUTURE PLACEHOLDER]																		

	Floor								Wall					Ceiling				
	Resilient Flooring	Porcelain Tile	Carpet Tile	Resinous Flooring (Epoxy)	Resinous Matrix Terrazzo	Polished Concrete	Sealed Concrete	*[FUTURE PLACEHOLDER]*	Concrete Masonry Unit	Gypsum Wall Board	Porcelain/Ceramic Tile	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	Acoustical Panel Ceiling	Gypsum Board Ceiling	Exposed Structure	Specialty Ceiling	*[FUTURE PLACEHOLDER]*
Food Services																		
Dining Commons	○	○			○	○								○		○	○	
Serving									○		○							
Teaching Presentation Space	○	○			○	○			○		○							
Kitchen																		
Stage																		
Storage (Stage, After-School)						●								○		○		
Storage (Chairs/Tables)						●								○		○		
[FUTURE PLACEHOLDER]																		
Administration																		
Private Offices	○		○		○									●				
Reception / Secretary	○	○	○		○									●				
Bookkeeper	○		○											●				
Workroom	○		○		○	○								●				
Conference Room			●											●				
Storage (Records)	○						○									●		
Storage (Supply)	○						○							○		○		
Mothers Room	○				○	○								●				
Professional Learning Center	○		○			○												
Commuter Shower		○		○					○		○				●			
School Resource Officer (SRO)	○		○		○	○								●				
[FUTURE PLACEHOLDER]																		

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

	Floor								Wall					Ceiling				
	Resilient Flooring	Porcelain Tile	Carpet Tile	Resinous Flooring (Epoxy)	Resinous Matrix Terrazzo	Polished Concrete	Sealed Concrete	*[FUTURE PLACEHOLDER]*	Concrete Masonry Unit	Gypsum Wall Board	Porcelain/Ceramic Tile	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	Acoustical Panel Ceiling	Gypsum Board Ceiling	Exposed Structure	Specialty Ceiling	*[FUTURE PLACEHOLDER]*
Student Mental Wellness and Counseling																		
Offices	○		○											●				
Core Counseling	○		○											●				
Wellness Room	○		○											●				
School Mental Health Center	○		○											●				
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Health Services																		
Care Center	○			○		○								●				
Storage (Health)	○					○	○							○		○		
Isolation	○	○			○	○								●				
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Community																		
Community Room	○	○	○		○	○												
Professional Learning Center	○		○			○												
Group Rooms	○		○			○												
Office	○		○		○									●				
Storage	○					○	○							○		○		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

	Floor								Wall					Ceiling				
	Resilient Flooring	Porcelain Tile	Carpet Tile	Resinous Flooring (Epoxy)	Resinous Matrix Terrazzo	Polished Concrete	Sealed Concrete	*[FUTURE PLACEHOLDER]*	Concrete Masonry Unit	Gypsum Wall Board	Porcelain/Ceramic Tile	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	Acoustical Panel Ceiling	Gypsum Board Ceiling	Exposed Structure	Specialty Ceiling	*[FUTURE PLACEHOLDER]*
Building Support / Restrooms																		
Storage							●		●							●		
Bookroom							●									●		
Main Electrical & Elec. Closets							●									●		
Central HVAC & Mech. Closets							●									●		
Custodial Office			○				○							●				
Professional Learning Center	○		○			○												
Custodial Closets							●								○	○		
Safety Patrol Closet							●									●		
Telecomm (IDF)							●									●		
Main Telecomm (MDF)							●									●		
All-User Restroom		●									●				●			
Single Restroom		●									●				●			
Life Skills / ECSE Restroom		●									●				●			
Family Restroom		●									●				●			
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

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

CASEWORK & DISPLAY

General Requirements:

Requirements for all schools:

1. Casework:
    A. Determine casework depth and functional needs with the Owner, unless noted otherwise.
    B. Casework can include wall cabinets, base cabinets, and full height cabinets within the combined linear footage. Continuous casework is not required in the combined linear footage.
    C. Lockable Casework:
        i. Provide two lockable cabinets for the following spaces:
            a. All elementary learning studios
            b. All maker spaces
            c. All CTE medium and high intensity labs (where casework is provided)
            d. Administrative Workrooms and Flex PLCs
        ii. Provide all lockable casework in all Special Education spaces where casework is required.
        iii. Refer to *Chapter 5, Section 123212 – Manufactured Wood-Veneer-Faced Casework* for keying requirements.
    D. Accommodate any casework-nested equipment/plumbing within the combined linear footage of casework.
    E. Mobile storage may be provided as an alternative to meet casework storage requirement, pending Owner approval.
2. Countertops:
    A. Solid Surface – Recommended as typical. Required at serving and cooking areas.
    B. Plastic Laminate – Review all locations with the Owner. Not allowed in wet locations.
    C. Acid Resistant – As required
    D. Stainless Steel – As required. Not allowed at serving.
    E. Backsplash – Provide integral backsplash; 4” typical, unless noted otherwise.

3. Writable Surface:
    A. Mounting heights:
        i. Elementary School – 2 feet above finish floor maximum to 6 feet above finish floor minimum.
        ii. Middle & High School – 2 feet 6 inches above finish floor maximum to 6 feet above finish floor minimum.
    B. Linear footage of writable surface is allowed as a combination of fixed and mobile writable surfaces. Refer to *Chapter 6, Furniture Standards* for mobile writable surfaces.
    C. Linear footage of writable surface does not include clear glass.
    D. Provide magnetic writable surfaces where possible.
4. Tackboard/Tackwall/Tackstrip:
    A. Mounting heights:
        i. Elementary School – 2 feet above finish floor maximum to 6 feet above finish floor minimum.
        ii. Middle & High School – 2 feet 6 inches above finish floor maximum to 6 feet above finish floor minimum.
    B. Provide tackable surfaces in corridors / circulation space to meet campus needs. Confirm linear footage and locations with the Owner.
    C. Magnetic markerboards are an acceptable substitute in lieu of tackboards in learning studios.
5. Adjustable Shelving:
    A. Determine the adjustable shelving depth and functional needs with the Owner, unless noted otherwise.
    B. Provide fire-resistant materials for adjustable shelving in the Kiln Room.
6. Display Case:
    A. Can be located within designated space or adjacent circulation space.
    B. Provide lockable display cases with lighting and tackwall. Tackwall is not required at dual sided display cases.
    C. Determine depth and functional needs with the Owner, unless noted otherwise.
7. Instrument Storage:
    A. Provide protected storage for musical instruments.
    B. Determine location, size, and functional needs with the Owner, unless noted otherwise.

Additional requirements for elementary schools:

1. Learner, Staff, and Educator Personal Storage:
    A. Provide furniture solution for staff and educator personal storage. Refer to *Chapter 6, Furniture Standards*.
    B. Provide mobile cubby storage (refer to *Chapter 6, Furniture Standards)* or fixed backpack hooks for learner backpack storage, based on campus preference. Provide one cubby or hook for every learner, within the learning studio. If there are spatial limitations, providing hooks along the corridor wall of the studio is an acceptable alternative.
2. Pre-Kindergarten / ECSE
    A. Provide a storage solution for sleeping mats, either within casework or mobile storage.
3. Visual Art Studio:
    A. Provide a minimum of 2 feet of backsplash at countertops with sinks.
4. Library Media Center:
    A. Provide furniture solution for circulation desk. Refer to *Chapter 6, Furniture Standards.*
    B. Provide furniture solution for book storage. Refer to *Chapter 6, Furniture Standards.*
5. Health Services:
    A. Provide transparency into wall cabinets. Confirm amount with the Owner.
6. Gymnasium:
    A. Divide in half the combined linear footage of writable surface and tackboard/tackwall and distribute within space to create two teaching areas.
    B. Provide additional tackboard outside the Gymnasium.
7. PE Storage:
    A. Provide wall-mounted ball storage. Prevent ability for balls to roll. Confirm size requirements and quantity with the Owner.
    B. Provide hooks or brackets for hula hoop, jump rope, and hurdle storage.
8. Teaching Presentation Space:
    A. Provide casework demo teaching station. Accommodate children and adult counter height. Consider island countertop design.

Master Charts:

	Combined Linear Footage						
	Casework (max.)	Countertop (min.) **length included w/in casework*	Writable Surface (min.)	Tackboard/Tackwall (min.)	Adjustable Shelving	Display Case (max.)	*[FUTURE PLACEHOLDER]*
Learning Neighborhood							
Studios (Pre-K)	10-16	6	12	8			
Studios (ECSE)	10-16	6	12	8			
Studios (K-5) / Studio (SPED Flex)	10-16	6	12	8			
Studio (Life Skills)	10-16	6	12	8			
Open Collaboration Areas			12				
Small Group Rooms			8				
Professional Learning Centers	6	6	8				
PLC Meeting Room			4				
Neighborhood Storage					•		
[FUTURE PLACEHOLDER]							
Special Education							
Speech / Diagnostics			4				
Academic Intervention			4				
Office / Conference			4				
Sensory Motor Lab							
Washer/Dryer					•		
Storage (Equipment)					•		
[FUTURE PLACEHOLDER]							
[FUTURE PLACEHOLDER]							

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

* Casework & Display Closed Requirement – Determine combined linear footage with the Owner.

	Combined Linear Footage						
	Casework (max.)	Countertop (min.) **length included w/in casework*	Writable Surface (min.)	Tackboard/Tackwall (min.)	Adjustable Shelving	Display Case (max.)	*[FUTURE PLACEHOLDER]*
Maker Spaces							
Maker Spaces	10-16	6	12	8			
Storage					•		
[FUTURE PLACEHOLDER]							
Library Media Center							
Reading Room			12	16		8	
Storage (AV Equipment)					•		
Office/Workroom	10-16	6		4			
Literacy Library			8	8	•		
Literacy Office				4			
[FUTURE PLACEHOLDER]							
Visual Art							
Studio	22	10	12	12		8	
Kiln					•		
Storage					•		
[FUTURE PLACEHOLDER]							
Music							
Studio	6	6	12	8			
Small Group			8				
Storage					•		
[FUTURE PLACEHOLDER]							
Wellness							
Gymnasium			16	8			
Storage (PE, After-School)					•		
PE Office			4	4			
Storage (Outdoor PE)					•		
[FUTURE PLACEHOLDER]							

	Combined Linear Footage						
	Casework (max.)	Countertop (min.) *length included w/in casework	Writable Surface (min.)	Tackboard/Tackwall (min.)	Adjustable Shelving	Display Case (max.)	*[FUTURE PLACEHOLDER]*
Food Services							
Dining Commons				8			
Serving							
Teaching Presentation Space	•	•	8				
Kitchen							
Stage							
Storage (Stage, After-School)					•		
Storage (Chairs/Tables)							
[FUTURE PLACEHOLDER]							
Administration							
Private Offices			4	4			
Reception / Secretary	•			12		8	
Bookkeeper			4				
Workroom	12	12	4	8			
Conference Room			8				
Storage (Records)							
Storage (Supply)					•		
Mothers Room	3-6	6					
Professional Learning Center	6	6	8				
Commuter Shower							
School Resource Officer (SRO)				4			
[FUTURE PLACEHOLDER]							

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

* Casework & Display Closed Requirement – Determine combined linear footage with the Owner.

	Combined Linear Footage						
	Casework (max.)	Countertop (min.) **length included w/in casework*	Writable Surface (min.)	Tackboard/Tackwall (min.)	Adjustable Shelving	Display Case (max.)	*[FUTURE PLACEHOLDER]*
Student Mental Wellness and Counseling							
Offices			4	4			
Core Counseling	8	4	8	4			
Wellness Room			8	8			
School Mental Health Center			8				
[FUTURE PLACEHOLDER]							
[FUTURE PLACEHOLDER]							
[FUTURE PLACEHOLDER]							
Health Services							
Care Center	16	12	4				
Storage (Health)					•		
Isolation							
[FUTURE PLACEHOLDER]							
[FUTURE PLACEHOLDER]							
[FUTURE PLACEHOLDER]							
Community							
Community Room	6	6	4	4			
Professional Learning Center	6	6	8				
Group Rooms			8				
Office			4	4			
Storage					•		
[FUTURE PLACEHOLDER]							
[FUTURE PLACEHOLDER]							
[FUTURE PLACEHOLDER]							
[FUTURE PLACEHOLDER]							

	Combined Linear Footage						
	Casework (max.)	Countertop (min.) *length included w/in casework	Writable Surface (min.)	Tackboard/Tackwall (min.)	Adjustable Shelving	Display Case (max.)	*[FUTURE PLACEHOLDER]*
Building Support / Restrooms							
Storage					•		
Bookroom					•		
Main Electrical & Elec. Closets							
Central HVAC & Mech. Closets							
Custodial Office				4			
Professional Learning Center	6	6	8				
Custodial Closets					•		
Safety Patrol Closet				4			
Telecomm (IDF)							
Main Telecomm (MDF)							
All-User Restroom							
Single Restroom							
Life Skills / ECSE Restroom							
Family Restroom							
[FUTURE PLACEHOLDER]							
[FUTURE PLACEHOLDER]							
[FUTURE PLACEHOLDER]							
[FUTURE PLACEHOLDER]							
[FUTURE PLACEHOLDER]							

Legend					
Closed Requirement	•	Combined Linear Footage	#	Open to Design	
Open Requirement	o	Quantity	#		

* Casework & Display Closed Requirement – Determine combined linear footage with the Owner.

EQUIPMENT

General Requirements:

Requirements for all schools:

1. Equipment included in this section:
    A. Equipment that has significant size/clearance requirements
    B. Equipment that requires dedicated:
        i. Floor or wall space
        ii. Casework or countertop space
        iii. Power or data
        iv. Plumbing or mechanical
    C. Determine any additional equipment needs with the Owner.
    D. Refer to *Appendix C, OFCI / CFCI Responsibilities Matrix*.
    E. Refer to LEED, AEGB, and AISD Sustainability Scorecard as applicable for water efficiency requirements for equipment and appliances.
2. Technology:
    A. Determine required equipment with the Owner.
3. Fire Extinguishers:
    A. Provide ceiling or wall-mounted signage.
4. AED:
    A. Provide AED at the following locations:
        i. Provide one AED per each noncontiguous building on campus
        ii. Provide one AED per each floor in a building
        iii. Provide one AED near the main administration area.
        iv. Provide additional AEDs as requested by Owner or as required by state laws.
    B. Provide ceiling or wall-mounted signage.
5. Lock box (safe):
    A. Locate within administration suite.
6. Paper Towel Dispensers and Hand Dryers:
    A. Locate at all non-restroom sinks. Add compost waste receptacles to paper towel stations in accordance with Waste Bin Capacity by Room Type Table below, and Austin ISD Indoor Zero Waste Station Specifications.

B. To avoid disruptions, provide electric, high-velocity hand dryers in toilet rooms that are not connected to learning spaces and where learning spaces are connected provide paper towel dispensers.
C. Non-battery electric hand dryers are the recommended standard; however, should not be disruptive to learning or performance spaces.
D. If a paper towel dispenser is to be used (not the preferred choice because of waste and cost of paper towels), then non-battery models are preferred.

7. Food Service Kitchen
    A. Refer to *Appendix C, Kitchen Equipment Requirements*.
8. Administration Workrooms:
    A. Die-cut machine
    B. Large paper cutter
    C. Butcher paper dispenser
    D. Bubble sheet machine
    E. Spent battery recycling container
9. Health Services:
    A. Wheelchair
    B. Stadiometer weight scale
    C. Epi pens
    D. Bleeding Control Kit
    E. Narcan Spray
    F. Locking medicine cart or cabinet
    G. Full-sized refrigerator with compressor
    H. Recovery cot
        i. Refer to *Educational Specifications, Part 5 – Space Programs* for count.
        ii. Provide one recovery cot in the Privacy Room.
10. Restrooms:
    A. All Restrooms
        i. Paper towel dispensers and/or electric hand dryers
            a. Refer to *Chapter 4 – Elementary School: Equipment (#6 Paper Towel and Soap Dispensers)* for requirements regarding paper towel dispenser and hand dryer requirements
        ii. Trash receptacles (built in or mobile)
            a. Since stalls typically have individual landfill waste cans, only

compost receptacles are required if paper towel dispensers are installed.

iii. Toilet paper dispenser

iv. Soap dispenser - non-battery models preferred.

v. Sanitary napkin disposal

a. Provide sanitary napkin disposal at all, all-user restrooms.

vi. Mirrors

B. Life Skills Studio Restroom(s):

i. Lift system (refer to *Chapter 5, Section 117300 – Patient Care Equipment)*

ii. Changing table (refer to *Chapter 5, Section 117300 – Patient Care Equipment)*

iii. Ensure access to onsite washer/dryer.

C. Family Restrooms:

i. Baby changing station

11. Central Custodial Storage

A. Provide a washer and dryer. Refer to *Chapter 5, Division 11 – Equipment* for basis of design.

12. Mother's Room

A. Provide a paper towel dispenser and trash receptacle near the sink in the mother's room.

B. Provide a wall-mounted, 2-foot by 6-foot mirror.

13. Provide wall-anchored shelving at the following locations, where adjustable shelving is required in the charts below:

A. Storage Rooms

B. Custodial Closets

C. Learner Record Storage / Administrative Vault

14. Washer and Dryer Units

A. Coordinate overall quantity of washer and dryer units provided at any given campus with the Owner.

16. School Resource Officer

A. 36-inch tall electrically-operated gun safe bolted to ground or wall studs, with backup key. Refer to *Chapter 5, Division 10 – Specialties.*

B. Lockable evidence storage (can be incorporated into gun safe)

C. Desktop monitor

17. Principal and Assistant Principal Offices
    A. Provide wall-mounted presentation equipment.
18. Stages and Theater/Auditoria
    A. Refer to *Chapter 5, Section 116133 – Theater Rigging Systems and Controls* for stage requirements for all schools.
    B. Refer to *Chapter 5, Section 116143 – Stage Curtains* for stage requirements for all schools.

Additional requirements for elementary schools:

1. ECSE Learning Studio Restroom(s):
    A. Child size changing table
    B. Ensure access to onsite washer/dryer
2. Pre-Kindergarten:
    A. Equipment and toys for pre-kindergarten centers
        i. Centers: art, blocks, math, writing, pretend and learn, science, and library
    B. Step stools
3. Library Media Center AV Equipment Storage:
    A. Provide free floor space and wall space for storing and charging mobile electronics.
4. Visual Art:
    A. 1 Kiln
    B. Horizontal drying racks
    C. Rolling carts
    D. Large paper cutter
5. Music Studio:
    A. 1 Grand piano w/ hand truck
    B. 1 Digital upright piano
6. Gymnasium:
    A. 4 Adjustable basketball goals
        i. Adjustable between 8 feet and 10 feet
        ii. Offset 2 of the goals to align with the floor striping
            a. Refer to *Appendix C, Elementary Gym – Floor Striping Options*
    B. Retractable wall hooks (to secure mats to wall)

C. 4 Climbing ropes
    i. Provide 7 feet high min. pulley system clamp, safety cables, and safety tambourines
    ii. Provide climbing knobs for 2 of the 4 climbing ropes.
    iii. Locate climbing ropes approximately 6 feet from the wall.
D. Cargo net
    i. Provide wall pulleys to secure net 10 feet min. above the floor when not in use.
    ii. Locate 5 to 6 feet from the wall.
E. Safety crash pad (8 feet width x 12 feet length x 8 inches height)
F. Large storage bins for balls (6 minimum)
G. Portable volleyball standards (3 sets)

7. Dining Commons:
    A. Refer to *Table: Waste Bin Capacity and Room Type* for bins in these areas - landfill, recycling and compost bins
8. Teaching Presentation Space:
    A. Induction burner
9. Custodial Closets (Refer to AISD Green Cleaning Plan):
    A. Custodial key box
    B. Chemical mixing unit
    C. Mop/broom holder
    D. Wet/dry vacuum
    E. 30”x50” flatbed card
    F. Carpet cleaner
    G. Scrubbing machine
    H. Hand truck
    I. High speed burnisher
    J. Ladders (6’ and 10’)
    K. Custodial carts

10. Provide motorized projection screens and ceiling/wall-mounted projectors at the following locations:
    A. Platform Stages
    B. Dining Commons (where the Stage does not open into the Dining Commons)
    C. Gymnasium
    D. Other locations as determined by Owner.
11. Library Media Center AV Equipment Storage:
    A. Provide free floor space and wall space for storing and charging mobile electronics.

Master Charts:

	Appliances								Miscellaneous									
	Refrigerator	Under-counter Refrigerator	Microwave	Oven/ Range/ Exhaust Hood	Washer/ Dryer	Dish Washer	Vending Machine	*[FUTURE PLACEHOLDER]*	Floor Printer / Copier	Wall Mounted TX & USA Flags	Metal Lockers	Presentation Equipment	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Learning Neighborhood																		
Studios (Pre-K)										●		●						
Studios (ECSE)	●									●		●						
Studios (K-5) / Studio (SPED Flex)										●		●						
Studio (Life Skills)	●									●		●						
Open Collaboration Areas										●		●						
Small Group Rooms												●						
Professional Learning Centers	●		●						●			●						
PLC Meeting Room																		
Neighborhood Storage																		
[FUTURE PLACEHOLDER]																		
Special Education																		
Speech / Diagnostics																		
Academic Intervention																		
Office / Conference												●						
Sensory Motor Lab																		
Washer/Dryer					●													
Storage (Equipment)																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

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

	Appliances								Miscellaneous									
	Refrigerator	Under-counter Refrigerator	Microwave	Oven/ Range/ Exhaust Hood	Washer/ Dryer	Dish Washer	Vending Machine	*[FUTURE PLACEHOLDER]*	Floor Printer / Copier	Wall Mounted TX & USA Flags	Metal Lockers	Presentation Equipment	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Maker Spaces																		
Maker Spaces										•		•						
Storage																		
[FUTURE PLACEHOLDER]																		
Library Media Center																		
Reading Room										•		•						
Storage (AV Equipment)																		
Office/Workroom																		
Literacy Library																		
Literacy Office																		
[FUTURE PLACEHOLDER]																		
Visual Art																		
Studio										•		•						
Kiln																		
Storage																		
[FUTURE PLACEHOLDER]																		
Music																		
Studio										•		•						
Small Group												•						
Storage																		
[FUTURE PLACEHOLDER]																		
Wellness																		
Gymnasium										•		•						
Storage (PE, After-School)																		
PE Office																		
Storage (Outdoor PE)																		
[FUTURE PLACEHOLDER]																		

	Appliances								Miscellaneous									
	Refrigerator	Under-counter Refrigerator	Microwave	Oven/ Range/ Exhaust Hood	Washer/ Dryer	Dish Washer	Vending Machine	*[FUTURE PLACEHOLDER]*	Floor Printer / Copier	Wall Mounted TX & USA Flags	Metal Lockers	Presentation Equipment	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Food Services																		
Dining Commons										●		●						
Serving																		
Teaching Presentation Space	●																	
Kitchen											●							
Stage																		
Storage (Stage, After-School)																		
Storage (Chairs/Tables)																		
[FUTURE PLACEHOLDER]																		
Administration																		
Private Offices												●						
Reception / Secretary																		
Bookkeeper																		
Workroom	●		●				●		●									
Conference Room												●						
Storage (Records)																		
Supply Storage																		
Mothers Room		●																
Professional Learning Center	●		●						●			●						
Commuter Shower																		
School Resource Officer (SRO)																		
[FUTURE PLACEHOLDER]																		

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

	Appliances								Miscellaneous									
	Refrigerator	Under-counter Refrigerator	Microwave	Oven/ Range/ Exhaust Hood	Washer/ Dryer	Dish Washer	Vending Machine	*[FUTURE PLACEHOLDER]*	Floor Printer / Copier	Wall Mounted TX & USA Flags	Metal Lockers	Presentation Equipment	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Student Mental Wellness and Counseling																		
Offices																		
Core Counseling										●		●						
Wellness Room										●		●						
School Mental Health Center												●						
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Health Services																		
Care Center / Office	●																	
Storage (Health)																		
Isolation																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Community																		
Community Room	●		●									●						
Professional Learning Center	●		●						●			●						
Group Rooms												●						
Office																		
Storage																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

	Appliances								Miscellaneous									
	Refrigerator	Under-counter Refrigerator	Microwave	Oven/ Range/ Exhaust Hood	Washer/ Dryer	Dish Washer	Vending Machine	*[FUTURE PLACEHOLDER]*	Floor Printer / Copier	Wall Mounted TX & USA Flags	Metal Lockers	Presentation Equipment	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Building Support / Restrooms																		
Storage																		
Bookroom																		
Main Electrical & Elec. Closets																		
Central HVAC & Mech. Closets																		
Custodial Office																		
Professional Learning Center	●		●						●		●							
Custodial Closets																		
Safety Patrol Closet																		
Telecomm (IDF)																		
Main Telecomm (MDF)																		
All-User Restroom																		
Single Restroom																		
Life Skills / ECSE Restroom																		
Family Restroom																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

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

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PLUMBING

General Requirements:

Requirements for all schools:

1. Bottle Fillers
    A. Provide at least one bottle filling station on each floor, wing, or other building section of a school building
    B. Provide at minimum one, centrally-located bottle filler in each learning neighborhood.
    C. Provide one bottle filling station in all school food service areas
    D. Provide one bottle filling station near gymnasiums and outdoor learning and activity areas, including playgrounds and athletic facilities
2. Kitchen / Serving:
    A. Coordinate with Owner's food services department for additional plumbing requirements in this area.
    B. Refer to *Appendix C, Kitchen Equipment Requirements* for additional plumbing requirements in this area.
    C. Provide garbage can washer and hose bib at kitchen receiving docks.
    D. Provide a 3 compartment, learner dishwashing sink at the scullery. Coordinate location and height with the Owner.
    E. Provide 3 learner hand washing lavatories at entrance to serving. Coordinate location and height with the Owner.
3. Building Exterior:
    A. Provide exterior, lockable, freeze-proof wall hydrants on all sides of each building.
    B. Provide exterior, freeze-proof roof hydrants within 50 feet of roof-top mechanical equipment.
    C. Provide exterior, lockable, freeze-proof roof hydrants within 50 feet of ground-mounted mechanical equipment (cooling towers, condensing units).
4. Art Laboratories:
    A. Provide point use clay traps at a minimum of one sink with signage.
    B. Distribute sinks to eliminate congestion.
5. Student Mental Wellness and Counseling
    A. Provide close proximity to an all-user restroom for shared lavatory access.

6. Floor Drains/Floor Sinks:
    A. Provide floor drain directly adjacent to all mop sinks.
    B. Provide floor drain directly adjacent to all clothes washing machines and other places where water is present.
    C. Provide floor sinks in applications expected to receive large and/or continuous streams of effluent.
7. Lavatories:
    A. Confirm with the Owner whether a wash fountain is appropriate in locations where lavatories are noted.
8. Ice Machine / Washer Machine Connection:
    A. Provide an ice machine connection at locations where full-size refrigerators are planned.
    B. Provide a washing machine connection at washing machine locations.
9. Community Suite
    A. Locate required water cooler and bottle filler in the corridor of the Community Partner's Suite (refer to *Educational Specifications, Part 2 – A Flexible Campus* for adjacencies) for improved accessibility.

Additional requirements for elementary schools:

1. Learning Studios (Pre-K, K-5, SPED Flex):
    A. Provide access to a sink within the studio, shared access between two studios, or in adjacent open collaboration space.

Master Charts:

	Plumbing Fixtures & Equipment																
	Lavatory	Sink	Oil / Water Separator	Solid Separator	Acid Neutralization	Mop Sink	Floor Sink	Floor Drain	Shower	Water Cooler and Bottle Filler	Utility Sink	Emergency Eye Wash	Emergency Eye Wash/Shower	Hose Bib	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Learning Neighborhood																		
Studios (Pre-K)																		
Studios (ECSE)		●																
Studios (K-5) / Studio (SPED Flex)																		
Studio (Life Skills)		●																
Open Collaboration Areas										●								
Small Group Rooms																		
Professional Learning Centers		●																
PLC Meeting Room																		
Neighborhood Storage																		
[FUTURE PLACEHOLDER]																		
Special Education																		
Speech / Diagnostics																		
Academic Intervention																		
Office / Conference																		
Sensory Motor Lab																		
Washer/Dryer							●	●										
Storage (Equipment)																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

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

	Plumbing Fixtures & Equipment																	
	Lavatory	Sink	Oil / Water Separator	Solid Separator	Acid Neutralization	Mop Sink	Floor Sink	Floor Drain	Shower	Water Cooler and Bottle Filler	Utility Sink	Emergency Eye Wash	Emergency Eye Wash/Shower	Hose Bib	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Maker Spaces																		
Maker Spaces		•						•				•						
Storage																		
[FUTURE PLACEHOLDER]																		
Library Media Center																		
Reading Room																		
Storage (AV Equipment)																		
Office/Workroom		•																
Literacy Library																		
Literacy Office																		
[FUTURE PLACEHOLDER]																		
Visual Art																		
Studio		•									•							
Kiln																		
Storage																		
[FUTURE PLACEHOLDER]																		
Music																		
Studio		•								•								
Small Group																		
Storage																		
[FUTURE PLACEHOLDER]																		
Wellness																		
Gymnasium										•								
Storage (PE, After-School)																		
PE Office																		
Storage (Outdoor PE)														•				
[FUTURE PLACEHOLDER]																		

	Plumbing Fixtures & Equipment																
	Lavatory	Sink	Oil / Water Separator	Solid Separator	Acid Neutralization	Mop Sink	Floor Sink	Floor Drain	Shower	Water Cooler and Bottle Filler	Utility Sink	Emergency Eye Wash	Emergency Eye Wash/Shower	Hose Bib	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Food Services																		
Dining Commons	●									●								
Serving								●										
Teaching Presentation Space		●																
Kitchen	●	●					●	●										
Stage																		
Storage (Stage, After-School)																		
Storage (Chairs/Tables)																		
[FUTURE PLACEHOLDER]																		
Administration																		
Private Offices																		
Reception / Secretary																		
Bookkeeper																		
Workroom		●																
Conference Room																		
Storage (Records)																		
Storage (Supply)																		
Mothers Room		●																
Professional Learning Center		●																
Commuter Shower								●	●									
School Resource Officer (SRO)																		
[FUTURE PLACEHOLDER]																		

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

	Plumbing Fixtures & Equipment																
	Lavatory	Sink	Oil / Water Separator	Solid Separator	Acid Neutralization	Mop Sink	Floor Sink	Floor Drain	Shower	Water Cooler and Bottle Filler	Utility Sink	Emergency Eye Wash	Emergency Eye Wash/Shower	Hose Bib	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Student Mental Wellness and Counseling																	
Offices																	
Core Counseling																	
Wellness Room																	
School Mental Health Center																	
[FUTURE PLACEHOLDER]																	
[FUTURE PLACEHOLDER]																	
[FUTURE PLACEHOLDER]																	
Health Services																	
Care Center		●						●				●					
Storage (Health)																	
Isolation																	
[FUTURE PLACEHOLDER]																	
[FUTURE PLACEHOLDER]																	
Community																	
Community Room		●								●							
Professional Learning Center		●															
Group Rooms																	
Office																	
Storage																	
[FUTURE PLACEHOLDER]																	
[FUTURE PLACEHOLDER]																	
[FUTURE PLACEHOLDER]																	
[FUTURE PLACEHOLDER]																	

	Plumbing Fixtures & Equipment																
	Lavatory	Sink	Oil / Water Separator	Solid Separator	Acid Neutralization	Mop Sink	Floor Sink	Floor Drain	Shower	Water Cooler and Bottle Filler	Utility Sink	Emergency Eye Wash	Emergency Eye Wash/Shower	Hose Bib	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Building Support / Restrooms																		
Storage																		
Bookroom																		
Main Electrical & Elec. Closets																		
Central HVAC & Mech. Closets							●	●						●				
Custodial Office																		
Professional Learning Center		●																
Custodial Closets						●		●										
Safety Patrol Closet																		
Telecomm (IDF)																		
Main Telecomm (MDF)																		
All-User Restroom	●							●						●				
Single Restroom	●							●										
Life Skills / ECSE Restroom	●							●										
Family Restroom	●							●										
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

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

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MECHANICAL

General Requirements:

Requirements for all schools:

1. Static Pressure:
    A. Design building for positive static pressure compared to the building exterior.
        i. For the areas denoted as “Negative Static Pressure”, this requirement refers to the static pressure between that area compared to spaces directly adjacent.
2. Kitchen / Serving:
    A. Refer to *Appendix C, Kitchen Equipment Requirements* for additional HVAC requirements in this area.
3. Maker Spaces:
    A. For fully enclosed maker spaces, design HVAC system to control a negative static pressure and provide an exhaust fan.
4. Kiln Rooms:
    A. Specialty exhaust systems for kiln room are typically furnished with the kiln and are directly connected to the equipment.
5. Carbon Dioxide Sensors
    A. Place all carbon dioxide sensors between 3 and 6 feet above the floor.
    B. Provide audible, visual, or building automation system alerts if the sensed carbon dioxide concentration exceeds the setpoint by more than 10%.

Additional requirements for elementary schools:

1. Literacy Library/Book Storage:
    A. HVAC design shall include provisions for dehumidification to maintain the humidity levels within the recommended range for stored materials in this area.

Master Charts:

	HVAC Systems																
	Heated Only	Fully Conditioned	Ventilated Only	Dedicated HVAC Equipment	Redundant HVAC Equipment	Temp\Humidity Sensor	Direct Exhaust System	Specialty Exhaust System	Positive Static Pressure	Negative Static Pressure	Carbon Dioxide Sensor	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Learning Neighborhood																		
Studios (Pre-K)		●				●			●		●							
Studios (ECSE)		●				●	●		●		●							
Studios (K-5) / Studio (SPED Flex)		●				●			●		●							
Studio (Life Skills)		●				●	●		●		●							
Open Collaboration Areas		●				●			●		●							
Small Group Rooms		●				●			●		●							
Professional Learning Centers		●				●			●		●							
PLC Meeting Room		●				●			●		●							
Neighborhood Storage		●																
[FUTURE PLACEHOLDER]																		
Special Education																		
Speech / Diagnostics		●				●			●		●							
Academic Intervention		●				●			●		●							
Office / Conference		●				●			●		●							
Sensory Motor Lab		●				●	●		●		●							
Washer/Dryer		●				●												
Storage (Equipment)		●																
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

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

	HVAC Systems																
	Heated Only	Fully Conditioned	Ventilated Only	Dedicated HVAC Equipment	Redundant HVAC Equipment	Temp\Humidity Sensor	Direct Exhaust System	Specialty Exhaust System	Positive Static Pressure	Negative Static Pressure	Carbon Dioxide Sensor	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Maker Spaces																		
Maker Spaces		●				●	●			●	●							
Storage		●																
[FUTURE PLACEHOLDER]																		
Library Media Center																		
Reading Room		●		●		●			●		●							
Storage (AV Equipment)		●																
Office/Workroom		●				●			●		●							
Literacy Library		●				●			●		●							
Literacy Office		●				●			●		●							
[FUTURE PLACEHOLDER]																		
Visual Art																		
Studio		●				●	●	●		●	●							
Kiln		●					●	●										
Storage		●																
[FUTURE PLACEHOLDER]																		
Music																		
Studio		●				●			●		●							
Small Group		●				●			●		●							
Storage		●																
[FUTURE PLACEHOLDER]																		
Wellness																		
Gymnasium		●		●		●			●		●							
Storage (PE, After-School)		●																
PE Office		●				●			●		●							
Storage (Outdoor PE)	○	○	○				●			●								
[FUTURE PLACEHOLDER]																		

	HVAC Systems																	
	Heated Only	Fully Conditioned	Ventilated Only	Dedicated HVAC Equipment	Redundant HVAC Equipment	Temp\Humidity Sensor	Direct Exhaust System	Specialty Exhaust System	Positive Static Pressure	Negative Static Pressure	Carbon Dioxide Sensor	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Food Services																		
Dining Commons		●		●		●			●		●							
Serving		●				●			●									
Teaching Presentation Space		●				●				●								
Kitchen		●		●		●		●		●								
Stage		●		●		●			●		●							
Storage (Stage, After-School)		●							●									
Storage (Chairs/Tables)		●							●									
[FUTURE PLACEHOLDER]																		
Administration																		
Private Offices		●				●			●		●							
Reception / Secretary		●				●			●		●							
Bookkeeper		●				●			●		●							
Production Workroom		●				●			●		●							
Conference Room		●				●			●		●							
Storage (Records)		●																
Storage (Supply)		●																
Mothers Room		●				●			●		●							
Professional Learning Center		●				●			●		●							
Commuter Shower		●					●			●								
School Resource Officer (SRO)		●				●			●		●							
[FUTURE PLACEHOLDER]																		

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

	HVAC Systems																
	Heated Only	Fully Conditioned	Ventilated Only	Dedicated HVAC Equipment	Redundant HVAC Equipment	Temp\Humidity Sensor	Direct Exhaust System	Specialty Exhaust System	Positive Static Pressure	Negative Static Pressure	Carbon Dioxide Sensor	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Student Mental Wellness and Counseling																		
Offices		●				●			●		●							
Core Counseling		●				●			●		●							
Wellness Room		●				●			●		●							
School Mental Health Center		●				●			●		●							
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Health Services																		
Care Center		●				●			●		●							
Storage (Health)		●																
Isolation		●				●	●			●	●							
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Community																		
Community Room		●		●		●			●		●							
Professional Learning Center		●				●			●		●							
Group Rooms		●				●			●		●							
Office		●				●			●		●							
Storage		●																
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

	HVAC Systems																	
	Heated Only	Fully Conditioned	Ventilated Only	Dedicated HVAC Equipment	Redundant HVAC Equipment	Temp\Humidity Sensor	Direct Exhaust System	Specialty Exhaust System	Positive Static Pressure	Negative Static Pressure	Carbon Dioxide Sensor	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Building Support / Restrooms																		
Storage		●							●									
Bookroom		●		●		●			●									
Main Electrical & Elec. Closets	○	○	○			●	●											
Central HVAC & Mech. Closets	○	○	○			●	●											
Custodial Office		●				●			●		●							
Professional Learning Center		●				●			●		●							
Custodial Closets		○	○				●			●								
Safety Patrol Closet		●																
Telecomm (IDF)		●		●		●												
Main Telecomm (MDF)		●		●	●	●												
All-User Restroom		○	○				●			●								
Single Restroom		○	○				●			●								
Life Skills / ECSE Restroom		○	○				●			●								
Family Restroom		○	○				●			●								
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

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

General Requirements:

Requirements for all schools:

1. Technology:
    A. Meet with the Owner to determine all technology and technology requirements.
2. General Power:
    A. Provide a minimum of two receptacles in walls designated to receive power in addition to equipment needs unless noted otherwise.
    B. Provide duplex receptacles unless noted otherwise.
    C. Floor power allowed only in carpeted locations except all performance stages.
    D. All floor boxes for floor power and data to be flush or low profile with elevation of finished floor.
    E. Where walls are constructed of glass or movable partitions, relocate power as additional power to an adjacent wall.
3. Room Specific Power:
    A. Studios – Provide at minimum 2 receptacles on each wall around the perimeter of each room, in addition to receptacles for required equipment. In locations where the minimum number of receptacles cannot be met, provide floor/ceiling power or additional receptacles on adjacent walls. At walls where receptacles are more than 12-feet apart, provide additional receptacles.
    B. Offices –
        i. For offices sized 150 SF or smaller, provide two separate duplex-receptacles total, dispersed on different walls.
        ii. For offices sized greater than 150 SF, provide a minimum of one receptacle on each wall. Confirm the quantity of telecommunications outlets required with the Owner.
    C. Conference Rooms – Provide a floor box with power and USB ports in all conference rooms. Coordinate location with room layout and specified furniture (refer to *Chapter 6 – Furniture Standards, Performance Requirements* for conference room furniture requirements). In lieu of available furniture selection, locate floor box in center of the room.
    D. Restrooms – Provide one convenience receptacle minimum. Circuit receptacle with

the adjacent corridor.

E. Storage rooms – Provide one convenience receptacle for every 100 square feet, one receptacle minimum. Circuit receptacle(s) with the adjacent corridor.

F. Copier Room – Provide a dedicated 120v, 20amp circuit for each copier minimum. Confirm copier power requirements with the Owner to determine need for a 208v outlet.

G. MDF and IDF Rooms – Provide one convenience receptacle near the door designated as 'dirty' power. Circuit this receptacle with receptacles in the adjacent corridor but do not circuit receptacle with other receptacles within the MDF or IDF. Provide a minimum of one receptacle on each wall. Provide additional receptacles as directed by the Owner to support equipment. Confirm requirements of UPSs and other equipment with the Owner.

H. Media Center Reading Room – Provide evenly distributed floor power to allow for maximum flexibility.

I. Mother's Room – Provide one receptacle at above the countertop and at minimum one receptacle at a typical mounting height.

J. Life Skills Studio Restroom(s) – Provide at minimum one receptacle directly adjacent to the changing table.

4. Outdoor Building Power:
    A. Provide lockable convenience outlet(s) at all outdoor learning areas. Confirm location and quantity with the Owner.
5. Room Specific Data
    A. SRO Offices – Provide three data drops in a singular faceplate. Coordinate location with furniture design.
    B. Offices, Typical
        i. For offices sized 150 SF or smaller, provide two data drops total, dispersed on different walls.
        ii. For offices sized greater than 150 SF, provide a minimum of one data drop on each wall (total of four data drops). Confirm the quantity of telecommunications outlets required with the Owner.
    C. Professional Learning Centers (PLCs)
        i. For PLCs sized 300 SF or smaller, or serving two staff or less, provide two data drops total, dispersed on different walls.
        ii. For PLCs sized greater than 300 SF, or serving three or more staff, provide

a minimum of one data drop on each wall (total of four data drops). Confirm the quantity of telecommunications outlets required with the Owner.

D. Administration Reception
    i. Provide two data drops per station at Reception desks. Confirm quantity of stations with Owner.

6. Wireless Access Points:
    A. Provide additional data for wireless access points for 100% wireless coverage of the building based on building configuration and input from the Owner.
    B. Ensure access to WiFi for all storage areas for storing mobile technology or learner devices to support maintenance needs. Wireless Access Points can be provided in nearby or adjacent spaces, provided storage areas have access.
    C. Provide additional Wireless Access Points in storage areas as directed by the Owner.
7. Public Address:
    A. Ensure all storage and accessory spaces without a public address system requirement are within proximity of a speaker for safety announcements. Public address speakers can be provided in nearby or adjacent spaces, including corridors, provided announcements can be heard throughout the building.
    B. Provide additional speakers as directed by the Owner.
    C. Provide volume control in additional areas as directed by the Owner.
8. Synchronous Clock
    A. In addition to locations outlined in this section, provide synchronous clocks in all publicly accessible areas including but not limited to:
        i. Hallways and corridors
        ii. Lobby and reception areas
9. Lighting:
    A. Consider ceiling height and access to all lighting for cleaning and maintenance.
    B. Provide color tuning for SPED rooms allowing occupant to vary the color temperature of the fixtures from warm to cool.
    C. Provide lighting within crawl spaces.
10. Kitchen / Servery
    A. Provide two data drops to support POS and phone systems within the servery.

11. Time Clocks
    A. Provide data connections 45" AFF for time clocks as follows. Timeclock locations require approval by the Owner, especially at campuses with multiple buildings.
    B. Elementary schools: minimum one timeclock at the administration area and one at the kitchen.
    C. Middle schools: minimum one timeclock at the administration area and one at the kitchen.
    D. High schools: minimum two time clocks for administration areas and one at the kitchen.
12. Vending Machines:
    A. Confirm location of vending machines with the Owner and provide the appropriate power.
13. Theatrical Lighting
    A. Refer to *Chapter 5, Section 265561 – Theatrical Lighting* for lighting fixture and controls requirements for all schools.
14. Life Skills Restrooms
    A. Coordinate location to provide a GFI receptacle with cover behind intended location of changing table. Refer to *Chapter 4, Equipment* and *Chapter 5, Section 117300 – Patient Care Equipment* for changing table requirements.
15. Desktop VOIP Phones
    A. Library Media Center – Circulation Desk: Provide a hard-wired VOIP phone at the circulation desk. Coordinate data location with planned location of circulation desk.
    B. Care Center Office / Desk - Provide an additional data drop connection for a desktop VOIP phone at the campus Registered Nurse's primary workstation.

Master Charts:

	Power				Data							Miscellaneous						
	One-Wall	Perimeter	Floor	Ceiling	One-Wall	Perimeter	Floor	Wireless Access Point	Wall-Mounted VoIP Phone	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	Public Address Speaker	Synchronous Clock	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Learning Neighborhood																		
Studios (Pre-K)		●				●		●	●			●	●					
Studios (ECSE)		●				●		●	●			●	●					
Studios (K-5) / Studio (SPED Flex)		●				●		●	●			●	●					
Studio (Life Skills)		●				●		●	●			●	●					
Open Collaboration Areas		○		○	●			●				●	●					
Small Group Rooms		●			●			●				●						
Professional Learning Centers		●				●		●	●			●	●					
PLC Meeting Room		●			●													
Neighborhood Storage	●																	
[FUTURE PLACEHOLDER]																		
Special Education																		
Speech / Diagnostics		●				●		●				●	●					
Academic Intervention		●				●		●				●	●					
Conference		●					●	●				●						
Sensory Motor Lab		●		●	●			●	●			●						
Washer/Dryer		●										●						
Storage (Equipment)	●																	
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

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

	Power				Data							Miscellaneous					
	One-Wall	Perimeter	Floor	Ceiling	One-Wall	Perimeter	Floor	Wireless Access Point	Wall-Mounted VoIP Phone	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	Public Address Speaker	Synchronous Clock	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Maker Spaces																	
Maker Spaces		●			●			●	●			●	●				
Storage	●																
[FUTURE PLACEHOLDER]																	
Library Media Center																	
Reading Room		●	●		●		●	●				●	●				
Storage (AV Equipment)		●															
Office/Workroom		●				●		●				●					
Literacy Library		●			●			●				●					
Literacy Office		●				●		●				●					
[FUTURE PLACEHOLDER]																	
Visual Art																	
Studio		●				●		●	●			●	●				
Kiln	●																
Storage	●																
[FUTURE PLACEHOLDER]																	
Music																	
Studio		●				●		●	●			●	●				
Small Group		●			●			●				●					
Storage	●																
[FUTURE PLACEHOLDER]																	
Wellness																	
Gymnasium		●			●			●				●	●				
Storage (PE, After-School)		●															
PE Office		●			●							●					
Storage (Outdoor PE)		●															
[FUTURE PLACEHOLDER]																	

	Power				Data							Miscellaneous						
	One-Wall	Perimeter	Floor	Ceiling	One-Wall	Perimeter	Floor	Wireless Access Point	Wall-Mounted VoIP Phone	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	Public Address Speaker	Synchronous Clock	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Food Services																		
Dining Commons		●						●				●	●					
Serving		●			●			●				●						
Teaching Presentation Space		●			●							●						
Kitchen		●			●			●				●						
Stage		●	●		●		●					●						
Storage (Stage, After-School)	●																	
Storage (Chairs/Tables)	●																	
[FUTURE PLACEHOLDER]																		
Administration																		
Private Offices		●			●							●						
Reception / Secretary		●				●		●				●	●					
Bookkeeper		●										●						
Workroom		●				●		●	●			●	●					
Conference Room		●	●				●	●				●	●					
Storage (Records)	●																	
Storage (Supply)	●																	
Mothers Room	●											●						
Professional Learning Center		●				●		●	●			●	●					
Commuter Shower																		
School Resource Officer (SRO)		●			●							●						
[FUTURE PLACEHOLDER]																		

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

	Power				Data							Miscellaneous					
	One-Wall	Perimeter	Floor	Ceiling	One-Wall	Perimeter	Floor	Wireless Access Point	Wall-Mounted VoIP Phone	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	Public Address Speaker	Synchronous Clock	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Student Mental Wellness and Counseling																	
Offices		●			●							●	●				
Core Counseling		●			●			●				●	●				
Wellness Room		●			●			●				●	●				
School Mental Health Center		●				●		●				●	●				
[FUTURE PLACEHOLDER]																	
[FUTURE PLACEHOLDER]																	
[FUTURE PLACEHOLDER]																	
Health Services																	
Care Center / Office		●				●		●				●					
Storage (Health)	●																
Isolation		●															
[FUTURE PLACEHOLDER]																	
[FUTURE PLACEHOLDER]																	
[FUTURE PLACEHOLDER]																	
Community																	
Community Room		●				●			●			●	●				
Professional Learning Center		●			●			●	●			●	●				
Group Rooms		●			●			●				●					
Office		●			●							●					
Storage	●																
[FUTURE PLACEHOLDER]																	
[FUTURE PLACEHOLDER]																	
[FUTURE PLACEHOLDER]																	
[FUTURE PLACEHOLDER]																	

	Power				Data							Miscellaneous					
	One-Wall	Perimeter	Floor	Ceiling	One-Wall	Perimeter	Floor	Wireless Access Point	Wall-Mounted VoIP Phone	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	Public Address Speaker	Synchronous Clock	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Building Support / Restrooms																	
Storage	●											●					
Bookroom		●															
Main Electrical & Elec. Closets	●																
Central HVAC & Mech. Closets	●							●									
Custodial Office		●			●			●				●					
Professional Learning Center		●				●		●	●			●	●				
Custodial Closets	●																
Safety Patrol Closet	●																
Telecomm (IDF)		●															
Main Telecomm (MDF)		●						●	●								
All-User Restroom	●											●					
Single Restroom	●																
Life Skills / ECSE Restroom	●																
Family Restroom	●																
[FUTURE PLACEHOLDER]																	
[FUTURE PLACEHOLDER]																	
[FUTURE PLACEHOLDER]																	
[FUTURE PLACEHOLDER]																	
[FUTURE PLACEHOLDER]																	

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

SUPPLEMENTAL INFORMATION

General Requirements:

Requirements for all schools:

1. Main Storage:
    A. Locate near the dock area to receive deliveries of cleaning materials, supplies, and other items.
2. Custodial Closets:
    A. Locate at the entrance to wing or neighborhood.
    B. Seal all penetrations at Custodial Closet walls and ceilings.

Additional requirements for elementary schools:

1. Safety Patrol Closet:
    A. Storage needs: hanging storage for belts, badges, and raincoats for 25 learners.
    B. Locate near the main office.
2. Gymnasium:
    A. No exposed structure or protruding fixtures, grilles, or sharp edges below 7 feet.
    B. Consider ceiling or structural design that prevents balls or equipment from getting lodged.

MIDDLE & HIGH SCHOOL

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OPENINGS

General Requirements:

Requirements for all schools:

1. Exterior Windows:
    A. Provide natural light and views to the outdoors from all learning spaces.
2. Building Entry
    A. Provide direct visual sightlines between the Administration Reception, secure vestibule, and building entry. Window treatments are not acceptable at these locations.
3. Exterior Window Treatment:
    A. Provide exterior window treatments in compliance with *Chapter 5, Safety and Security*.
    B. Mini blinds or horizontal louver blinds are not acceptable window treatments at any location.
    C. Both motorized and manual roller shades are acceptable, unless noted otherwise below:
        i. Provide motorized shades at clerestory windows.
    D. Provide roller window shades at exterior window locations for the following spaces:
        i. Studios
        ii. Private Offices and Conference Rooms
        iii. Group Rooms and PLCs
        iv. Community Room
        v. Any spaces requiring room darkening treatment
4. Interior Window Treatment:
    A. Provide interior window treatments in compliance with *Chapter 5, Safety and Security*.
    B. Mini blinds or horizontal louver blinds are not acceptable window treatments at any location. Curtains and roller shades are acceptable window treatments at any location.
    C. Minimize the number of individual window treatment units on any one wall for ease and speed of use during emergency procedures.
    D. Provide curtains or roller shades at all interior windows with line of sight from a

corridor for the following spaces, including but not limited to:

i. Studios
ii. Private Offices and Conference Rooms
iii. Group Rooms and PLCs
iv. Community Room
v. Student Mental Wellness and Counseling

E. Provide roller shades at all doors with vision panels, vision lites, or sidelites. Given the configuration or design, coordinate with the Owner if an alternative solution is recommended.

5. Door Access/Door Hardware:
   A. Refer to *Appendix A, Section 087100 – Door Hardware*
   B. Refer to *Chapter 5, Safety and Security*
6. Automatic Door Operators:
   A. Provide automatic door operators at the following locations:
      i. Main entry vestibule
      ii. Bus entrance
      iii. Playground entrance
      iv. Review any potential additional locations with the Owner.
7. Sound Control Door:
   A. Provide sound control doors within acoustically rated wall assemblies as required in *Chapter 5, Acoustics*.
8. Single Occupant Restrooms:
   A. Prevent views of plumbing fixtures from public areas.
9. All-User Restrooms:
   A. No main entry doors are allowed.
   B. Provide ability to limit access to restrooms in case of maintenance issues.
   C. Provide a full door with no more than a 1-inch opening from the bottom of door to floor, set within full-height partition construction, for learner privacy and safety. Doors at all-user restrooms to be standard thickness doors and hardware, with full-height continuous hinges on the doors.
   D. Door and hardware assemblies to be made of bleach-cleanable materials and assemblies.
   E. Provide an occupancy lock with indicator at individual toilet room doors.
      i. Indicators must be clearly visible and legible at least 5-feet away from doors.

F. Access to adult family or staff restrooms should be separate and distinct from learner all-user restrooms.
G. All doors to individual toilet rooms must swing out.
H. Provide overhead stops at all doors to individual toilet rooms.

10. Hollow Metal Doors:
    A. Provide hollow metal doors and frames at all building support spaces.
11. Kickplate:
    A. Provide a door kickplate at exterior doors where a kickplate is not integral to the door (i.e. storefront).
    B. Refer to *Appendix A, Section 087100 – Door Hardware*
12. Kitchen/Serving:
    A. Provide the ability to limit access to the kitchen and serving area when not serving.
13. Self-Closing Door Hardware
    A. Provide self-closing door hardware at all custodial closets.
    B. Provide self-closing door hardware at any additional areas where chemicals are stored.
14. Mother's Room
    A. Provide an occupancy lock with indicator, lockable from the inside only, at the Mother's Room.
        i. Indicators must be clearly visible and legible at least 5-feet away from doors.
15. Learning Neighborhood Access
    A. Provide vision panels in double doors leading into and out of learning neighborhoods. Coordinate with the Owner for security film requirements.
16. Core Counseling and Wellness Rooms
    A. Consider providing an operable partition between the Core Counseling and Wellness Rooms for increased flexibility.

Additional requirements for middle & high schools:

1. Provide supervision with direct visual sightlines between the following spaces:
    A. Refer to adjacency diagrams in the *Educational Specifications* for sightline requirements.
    B. Media Center Office and Reading Room
    C. Media Center Workroom and Reading Room
    D. Open Collaboration Area and Small Group Room or Learning Studio
    E. All Fine Arts Rehearsal Halls and Practice Rooms
    F. All Fine Arts Rehearsal Halls and Offices
    G. Nurse Station or Office to General Care Cots and Isolation Rooms
    C. Into CTE Prep/Workroom from CTE Studios or Labs
    D. All corridors and Studios or Offices
    H. Additional Locations: Refer to *Chapter 5, Safety and Security*
2. Provide a secondary adjoining door or opening between the following spaces:
    A. Projection Control Room and Light Control Room (High School)
    B. Scenery Construction Area and Proscenium Stage (High School)
        i. Provide an overhead coiling door of 8 feet wide by 18 feet high.
3. Provide a means for creating visual privacy for the following spaces:
    A. Health Services Areas
    B. Counseling Center
    C. Counselors' Offices
    D. Counselors' Conference Room
    E. College / Career Center
    F. Small Group Rooms
    G. Academic Intervention spaces (incl. Speech and Diagnostician)
    H. Conference Rooms
4. Provide a secondary door to a separate egress path for the following spaces:
    A. Principal's Office
    B. Counseling Center
5. Computer Labs:
    A. Provide room darkening treatment.
6. Large Gym and Multi-purpose Gym:
    A. Minimize number of exits locations. Consider crowd control.

7. Empower Center
    A. Refer to *Educational Specifications, Appendix B* for additional information regarding the Empower Center.

Master Charts:

	Miscellaneous										Specialty							
	Door Vision Panel	Door Sidelite	No Vision Panel / Sidelite	42" Door Opening Width	72" Door Opening Width	84" Door Opening Width	Secondary Door to Corridor	Room Darkening Treatment	Keyed Separately	*[FUTURE PLACEHOLDER]*	Sliding Door	Sectional Door	Folding Partition	Coiling Counter Door	Overhead Coiling Door	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Learning Neighborhood																		
Professional Learning Center		●																
PLC Meeting Room		●																
Maker Space		●		●							o	o	o					
Science Lab		●					●				o	o	o					
Storage / Prep (Science)		●					●											
Studio / Studio (SPED Flex)		●									o	o	o					
Open Collaboration																		
Group Rooms		●																
Neighborhood Storage																		
Studio (Life Skills)		●		●														
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Dedicated Instructional																		
Journalism Studio / Lab		●																
Storage (Journalism)																		
Video Production Lab		●						●										
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

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

*Door opening width is not limited to a typical personnel door.

	Miscellaneous										Specialty							
	Door Vision Panel	Door Sidelite	No Vision Panel / Sidelite	42" Door Opening Width	72" Door Opening Width	84" Door Opening Width	Secondary Door to Corridor	Room Darkening Treatment	Keyed Separately	*[FUTURE PLACEHOLDER]*	Sliding Door	Sectional Door	Folding Partition	Coiling Counter Door	Overhead Coiling Door	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Special Education																		
Vocational Lab		●		●														
Speech / Diagnostics		●		●														
Academic Intervention		●		●														
Office / Conference		●		●														
Sensory Motor Lab		●		●				●										
Washer/Dryer																		
Storage (Equipment)				●														
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Media Resource Center																		
Reading Rm / Teaching Area																		
Circulation																		
Workroom / Storage		●																
Storage (A/V Stor./ Equip. / Prof. Library)				●					●									
Presentation Room		●					●											
Offices		●																
Group Rooms		●																
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Empower Center																		
Core Space		●			●		●	●			○	○	○		○			
Staging Area					●													

	Miscellaneous										Specialty							
	Door Vision Panel	Door Sidelite	No Vision Panel / Sidelite	42" Door Opening Width	72" Door Opening Width	84" Door Opening Width	Secondary Door to Corridor	Room Darkening Treatment	Keyed Separately	*[FUTURE PLACEHOLDER]*	Sliding Door	Sectional Door	Folding Partition	Coiling Counter Door	Overhead Coiling Door	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Career and Technical Education																		
CTE Studio		●									○	○	○					
Low Intensity Lab		●		●							○	○	○					
Medium Intensity Lab		●			●		●				○	○	○					
High Intensity Lab		●			○	○	●								●			
Safety Vestibule		●																
Prep/Workroom		●																
Dressing / Locker/ Changing			●															
Storage																		
Professional Learning Center		●																
Group Rooms / Breakout		●																
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Visual Arts																		
2D Studio		●			●			●										
3D Studio		●			●			●										
Kiln				●														
Storage				●														
Digital Arts Studio		●																
Art Gallery																		
Professional Learning Center		●																
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

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

*Door opening width is not limited to a typical personnel door.

	Miscellaneous										Specialty							
	Door Vision Panel	Door Sidelite	No Vision Panel / Sidelite	42" Door Opening Width	72" Door Opening Width	84" Door Opening Width	Secondary Door to Corridor	Room Darkening Treatment	Keyed Separately	*[FUTURE PLACEHOLDER]*	Sliding Door	Sectional Door	Folding Partition	Coiling Counter Door	Overhead Coiling Door	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Music																		
Rehearsal Halls		●				●												
Practice Rooms		●		●														
Libraries / Workrooms		●																
Prep / Dressing			●															
Professional Learning Centers		●																
Storage (Uniform / Booster)																		
Storage (Risers/ Equipment)						●												
Storage (Instruments)					o	o												
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Theater Arts																		
Theater Arts Studio		●																
Black Box																		
Stage (Middle School)		●																
Storage (Theater Arts / AV)																		
Storage (Props / Equipment)																		
Script Library		●																
Professional Learning Center		●																
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

	Miscellaneous										Specialty							
	Door Vision Panel	Door Sidelite	No Vision Panel / Sidelite	42" Door Opening Width	72" Door Opening Width	84" Door Opening Width	Secondary Door to Corridor	Room Darkening Treatment	Keyed Separately	*[FUTURE PLACEHOLDER]*	Sliding Door	Sectional Door	Folding Partition	Coiling Counter Door	Overhead Coiling Door	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Theater / Auditorium (High School)																		
Gallery / Lobby																		
Ticket Booth														●				
Proscenium and Stage						●												
Wing Space																		
Projection Control Rooms		●																
Storage																		
Storage (Piano)						●												
Scenery Construction Area															●			
Loading Dock															●			
House																		
Laundry																		
Prep / Dressing			●															
Makeup Room		●																
Green Room		●																
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Dance																		
Rehearsal Room		●																
Professional Learning Center		●																
Storage																		
Locker Rooms			●															
[FUTURE PLACEHOLDER]																		

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

*Door opening width is not limited to a typical personnel door.

	Miscellaneous										Specialty							
	Door Vision Panel	Door Sidelite	No Vision Panel / Sidelite	42" Door Opening Width	72" Door Opening Width	84" Door Opening Width	Secondary Door to Corridor	Room Darkening Treatment	Keyed Separately	*[FUTURE PLACEHOLDER]*	Sliding Door	Sectional Door	Folding Partition	Coiling Counter Door	Overhead Coiling Door	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Athletics & Wellness																		
Gym Lobby																		
Competition Gym		●			●													
Multipurpose/Practice Gym		●			●													
Storage					●													
Weight Room		●			●													
PE Locker Rooms			●															
Athletic Locker Rooms			●															
Educator / Coaches Offices		●																
Educator / Coaches Showers																		
Athletic Training Room		●																
Concession														●				
Wrestling Room		●			●													
Laundry Rooms																		
Health Studio		●																
PE Fitness Room		●																
Professional Learning Center		●																
Group Rooms		●																
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Food Services																		
Dining Commons																		
Serving																		
Kitchen				●														
Storage (Chairs, Tables, After School)					●													
[FUTURE PLACEHOLDER]																		

	Miscellaneous										Specialty							
	Door Vision Panel	Door Sidelite	No Vision Panel / Sidelite	42" Door Opening Width	72" Door Opening Width	84" Door Opening Width	Secondary Door to Corridor	Room Darkening Treatment	Keyed Separately	*[FUTURE PLACEHOLDER]*	Sliding Door	Sectional Door	Folding Partition	Coiling Counter Door	Overhead Coiling Door	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Administration Space																		
Private Offices		●																
Secretaries / Clerks		●																
Reception / Main Office																		
Registrar		●																
Conference Room		●																
Bookkeeper		●																
Data Clerk		●																
Workroom		●																
Storage (Records)			●						●									
Testing		●																
Mechanical / PA																		
ISSSC		●																
School Resource Officer (SRO)			●						●									
Mothers Room			●															
Professional Learning Center		●																
Commuter Shower																		
Storage (Supply)																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

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

*Door opening width is not limited to a typical personnel door.

	Miscellaneous										Specialty							
	Door Vision Panel	Door Sidelite	No Vision Panel / Sidelite	42" Door Opening Width	72" Door Opening Width	84" Door Opening Width	Secondary Door to Corridor	Room Darkening Treatment	Keyed Separately	*[FUTURE PLACEHOLDER]*	Sliding Door	Sectional Door	Folding Partition	Coiling Counter Door	Overhead Coiling Door	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Student Mental Wellness and Counseling																		
Offices		•						•										
Core Counseling		•						•										
Reception																		
Storage									•									
Conference / Group Room		•																
College / Career Center		•																
Wellness Room		•						•										
School Mental Health Center		•						•										
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Health Services																		
Care Center		•																
Storage																		
Office		•																
Isolation																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Community																		
Community Room		•																
Professional Learning Center		•																
Group Rooms		•																
Office		•						•										
Storage																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

	Miscellaneous										Specialty							
	Door Vision Panel	Door Sidelite	No Vision Panel / Sidelite	42" Door Opening Width	72" Door Opening Width	84" Door Opening Width	Secondary Door to Corridor	Room Darkening Treatment	Keyed Separately	*[FUTURE PLACEHOLDER]*	Sliding Door	Sectional Door	Folding Partition	Coiling Counter Door	Overhead Coiling Door	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Building Support / Restrooms																		
Central Plant					o	o												
Electrical / Telecomm Closets																		
Mechanical Rooms					o	o												
Storage					o	o												
Book Rooms																		
Custodial Office		●																
Custodial Closet				●														
All-User Restroom																		
Single Restroom																		
Life Skills Restroom				●														
Family Restroom				●														
Professional Learning Center		●																
School Store																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

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

*Door opening width is not limited to a typical personnel door.

FINISHES

General Requirements:

Requirements for all schools:

1. Finishes
    A. All flooring and wall finish selections are limited to what is provided in the master chart. All other decorative finishes should be specified based upon function, durability, acoustics, maintenance, and indoor air quality. Refer to *Chapter 5, Division 09.*
    B. Consider ability to withstand extended unoccupied temperature and humidity levels during summer HVAC shut offs for flooring and wall finish selections, unless otherwise specified.
2. Corner Guards & Wall Protection:
    A. Provide a minimum of 48 inch high corner guards and wall protection at gypsum board walls in areas with high traffic or abuse such as circulation areas.
    B. Recommended Wall Protection:
        i. Ceramic/Porcelain Tile with a dark grout
        ii. Resilient Wall Panel
        iii. Provide abuse-resistant gypsum board at areas with heavy traffic and when the desired final finish is painted gypsum board.
        iv. The Owner's preference is a more durable, resilient finish in corridors, heavy traffic areas, and high-abuse areas. Alternatives to recommendations above are acceptable pending Owner approval.
3. Wall Base:
    A. Provide 4 inch high wall base at all gypsum wall board and concrete masonry unit walls.
    B. Provide 4 inch high integral cove base at all restrooms.
4. Walk-off Mat:
    A. Provide walk-off mat, 10 feet in the direction of travel, at all entrances from the exterior. Where integrated mats are not feasible, coordinate roll out mat locations with the Owner.
5. Corridors:
    A. No carpet in corridors is allowed except at administration suite corridors.

B. Consider the use of varying materials and textures for wall and floor surfaces in corridors to support tactile wayfinding for visually impaired learners.

6. Stairs & Ramps:
    A. Provide protective nosings at all stairs to prevent sharp edges and slip hazards.
    B. Provide non-slip flooring at all interior ramps.
7. Kitchen/Serving:
    A. Provide integral cove base.
    B. Provide a minimum of 48 inch high ceramic/porcelain tile at non-concrete masonry unit walls.
    C. Provide cleanable ceiling tiles.
    D. Provide quarry tile at all Food Service Kitchen and Serving spaces.
8. Drinking Fountains (Water Coolers):
    A. Provide porcelain/ceramic tile at all walls behind drinking fountains.
    B. No carpet or wood flooring beneath drinking fountain is allowed.
9. Sinks:
    A. No carpet or wood flooring beneath sinks is allowed.
10. Acoustic Panels:
    A. Provide acoustic panels where necessary to achieve acoustic requirements. Refer to *Chapter 5, Acoustics*.
11. Studios (SPED Flex):
    C. Provide abuse-resistant walls or wall finish.
12. Food Preparation
    A. Coordinate finishes of all learning areas supporting food preparation with Food Services Department.
13. Custodial Closets
    D. Where exposed ceilings are selected, provide walls to structural deck at all Custodial Closets.
14. All-User Restrooms
    A. Provide resilient, bleach-cleanable materials for all finishes and assemblies.
    B. Provide tile on all sides of all-user restroom spaces.
15. Gymnasium Storage
    A. Clear Height: minimum of 12 feet to accommodate tall equipment at minimum one storage area accessible from each gymnasium.

Additional requirements for middle & high schools:

1. Dance Rehearsal Hall:
    A. Provide a minimum of 7 feet high mirrors on multiple walls extending the full length of the space. Review location with the Owner.
    B. Refer to *Chapter 5, Section 096470 – Wood Dance Flooring* for performance requirements for dance flooring.
2. Proscenium and Stage:
    A. Refer to *Chapter 5, Section 061000 – Rough Carpentry* for performance requirements for theater stage flooring.
3. Black Box Studio
    A. Consider masonite flooring if used as a performance space.
4. Rehearsal Hall and Practice Rooms:
    A. Provide inherently anti-microbial rubber flooring to prevent odors.
    B. Music Rehearsal Hall ceiling heights:
        i. Ceiling Height (Small): minimum of 16 feet for required acoustic performance.
        ii. Ceiling Height (Medium): minimum of 18 feet for required acoustic performance.
        iii. Ceiling Height (Large): minimum of 20 feet for required acoustic performance.
        iv. Ceiling Height (Extra Large): minimum of 20 feet for required acoustic performance.
5. Large Gym and Multi-Purpose Gym:
    A. Provide wood athletic flooring and striping. Refer to *National Federation of State High School Associations* for court dimension requirements.
    B. Provide wall padding in run-off area behind basketball goals.
6. PE Fitness Room
    A. Provide a minimum of 7 feet high mirrors on at least one wall extending the full length of the space. Review location with the Owner.
7. Weight Room:
    A. Provide resilient athletic flooring.
8. Life Skills Studio / Restroom:
    A. Provide inherently antimicrobial flooring and durable wall finish.
9. Career & Technical Education

A. Refer to *Educational Specifications, Appendix B* for additional considerations regarding CTE support spaces.
B. Medium and High Intensity Labs
    i. For labs intending to support Culinary Arts programming, provide finishes that are nonporous, antimicrobial, and easy to clean for all surfaces.

10. Empower Center
    A. If resilient flooring is selected as desired floor finish, consult with campus and Owner's Career and Technical Education departments for programmatic limitations of this finish.
    B. Consider resilient athletic or multi-use sport flooring if Athletics uses are the primary intended programs for this space.
    C. Refer to *Educational Specifications, Appendix B* for additional information regarding the Empower Center.

Master Charts:

	Floor								Wall					Ceiling				
	Resilient Flooring	Porcelain Tile	Carpet Tile	Resinous Flooring (Epoxy)	Resinous Matrix Terrazzo	Polished Concrete	Sealed Concrete	Wood Athletic Flooring	Concrete Masonry Unit	Gypsum Wall Board	Porcelain/Ceramic Tile	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	Acoustical Panel Ceiling	Gypsum Board Ceiling	Exposed Structure	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Learning Neighborhood																		
Professional Learning Center	○		○		○	○								●				
PLC Meeting Room	○		○											●				
Maker Space	○			○	○	○								○		○		
Science Lab	○				○	○								○		○		
Storage / Prep (Science)	○					○								○		○		
Studio / Studio (SPED Flex)	○		○		○	○								○		○		
Open Collaboration	○		○		○	○												
Group Rooms	○		○		○	○								●				
Neighborhood Storage	○					○	○							○		○		
Studio (Life Skills)	●													●				
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Dedicated Instructional																		
Journalism Studio / Lab	○		○		○	○								●				
Storage (Journalism)	○					○	○							○		○		
Video Production Lab	○		○		○	○								○		○		
[FUTURE PLACEHOLDER]	○					○								○		○		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

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

	Floor								Wall					Ceiling				
	Resilient Flooring	Porcelain Tile	Carpet Tile	Resinous Flooring (Epoxy)	Resinous Matrix Terrazzo	Polished Concrete	Sealed Concrete	Wood Athletic Flooring	Concrete Masonry Unit	Gypsum Wall Board	Porcelain/Ceramic Tile	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	Acoustical Panel Ceiling	Gypsum Board Ceiling	Exposed Structure	Specialty Ceiling	*[FUTURE PLACEHOLDER]*
Special Education																		
Vocational Lab	○			○	○	○								○		○		
Speech / Diagnostics			●											●				
Academic Intervention			●											●				
Office / Conference			●											●				
Sensory Motor Lab	○		○											●				
Washer/Dryer	○					○	○							○		○		
Storage (Equipment)	○					○	○							○		○		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Media Resource Center																		
Reading Rm / Teaching Area			●															
Circulation	○		○			○												
Workroom / Storage	○					○								○		○		
Storage (A/V Stor./ Equip. / Prof. Library)	○					○								○		○		
Presentation Room	○		○			○								●				
Offices			●											●				
Group Rooms	○		○			○								●				
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Empower Center																		
Core Space	○					○		○						○		○	○	
Staging Area						○	○							○		○		

	Floor								Wall					Ceiling				
	Resilient Flooring	Porcelain Tile	Carpet Tile	Resinous Flooring (Epoxy)	Resinous Matrix Terrazzo	Polished Concrete	Sealed Concrete	Wood Athletic Flooring	Concrete Masonry Unit	Gypsum Wall Board	Porcelain/Ceramic Tile	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	Acoustical Panel Ceiling	Gypsum Board Ceiling	Exposed Structure	Specialty Ceiling	*[FUTURE PLACEHOLDER]*
Career and Technical Education																		
CTE Studio	○		○			○								●				
Low Intensity Lab	○			○		○								●				
Medium Intensity Lab				○		○	○							○		○		
High Intensity Lab						○	○		●							○	○	
Safety Vestibule						○	○											
Prep/Workroom	○		○			○	○											
Dressing / Locker/ Changing	○	○				○								○	○			
Storage						○	○											
Professional Learning Center	○		○			○								●				
Group Rooms / Breakout	○		○			○								●				
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Visual Arts																		
2D Studio	○	○			○	○										●		
3D Studio	○					○										●		
Kiln							●									●		
Storage							●									●		
Digital Arts Studio	○					○										●		
Art Gallery																		
Professional Learning Center	○		○			○								●				
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

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

	Floor								Wall					Ceiling				
	Resilient Flooring	Porcelain Tile	Carpet Tile	Resinous Flooring (Epoxy)	Resinous Matrix Terrazzo	Polished Concrete	Sealed Concrete	Wood Athletic Flooring	Concrete Masonry Unit	Gypsum Wall Board	Porcelain/Ceramic Tile	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	Acoustical Panel Ceiling	Gypsum Board Ceiling	Exposed Structure	Specialty Ceiling	*[FUTURE PLACEHOLDER]*
Music																		
Rehearsal Halls	●													○		○	○	
Practice Rooms	●													●				
Libraries / Workrooms	○		○			○								○		○		
Prep / Dressing	○					○								○		○		
Professional Learning Centers	○		○			○								●				
Storage (Uniform / Booster)	○					○	○							○		○		
Storage (Risers/ Equipment)	○					○	○							○		○		
Storage (Instruments)	○					○	○							○		○		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Theater Arts																		
Theater Arts Studio	○		○			○												
Black Box	○		○			○												
Stage (Middle School)																○	○	
Storage (Theater Arts / AV)	○					○	○							○		○		
Storage (Props / Equipment)	○					○	○							○		○		
Script Library	○		○			○								○		○		
Professional Learning Center	○		○			○								●				
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

	Floor								Wall					Ceiling				
	Resilient Flooring	Porcelain Tile	Carpet Tile	Resinous Flooring (Epoxy)	Resinous Matrix Terrazzo	Polished Concrete	Sealed Concrete	Wood Athletic Flooring	Concrete Masonry Unit	Gypsum Wall Board	Porcelain/Ceramic Tile	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	Acoustical Panel Ceiling	Gypsum Board Ceiling	Exposed Structure	Specialty Ceiling	*[FUTURE PLACEHOLDER]*
Theater / Auditorium (High School)																		
Gallery / Lobby	○	○			○	○												
Ticket Booth	○	○			○	○								○	○	○		
Proscenium and Stage																		
Wing Space	○					○	○							○		○		
Projection Control Rooms														○		○		
Storage	○					○	○							○		○		
Storage (Piano)	○					○	○							○		○		
Scenery Construction Area						○	○											
Loading Dock							○											
House			○			○												
Laundry	○					○	○							○		○		
Prep / Dressing	○					○								○		○		
Makeup Room	○					○								○		○		
Green Room	○		○			○								○		○		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Dance																		
Rehearsal Room														○		○	○	
Professional Learning Center	○		○			○								●				
Storage	○					○	○							○		○		
Locker Rooms	○	○				○			○	○	○			○	○	○		
[FUTURE PLACEHOLDER]																		

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

	Floor								Wall					Ceiling				
	Resilient Flooring	Porcelain Tile	Carpet Tile	Resinous Flooring (Epoxy)	Resinous Matrix Terrazzo	Polished Concrete	Sealed Concrete	Wood Athletic Flooring	Concrete Masonry Unit	Gypsum Wall Board	Porcelain/Ceramic Tile	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	Acoustical Panel Ceiling	Gypsum Board Ceiling	Exposed Structure	Specialty Ceiling	*[FUTURE PLACEHOLDER]*
Athletics & Wellness																		
Gym Lobby	○	○			○	○												
Competition Gym								●	●									
Multipurpose/Practice Gym								●	●									
Storage							●											
Weight Room														○		○		
PE Locker Rooms		○		○		○			○		○			○	○	○		
Athletic Locker Rooms		○		○		○			○		○			○	○	○		
Educator / Coaches Offices	○		○			○								●				
Educator / Coaches Showers		○		○					○		○				●			
Athletic Training Room														○		○		
Concession	○					○	○							○		○		
Wrestling Room									●					○		○		
Laundry Rooms	○					○	○							○		○		
Health Studio	○		○			○								●				
PE Fitness Room	○							○						○		○		
Professional Learning Center	○		○			○								●				
Group Rooms	○		○			○								●				
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Food Services																		
Dining Commons	○	○			○	○			○		○							
Serving									○		○							
Kitchen									○		○							
Storage (Chairs, Tables, After School)	○	○				○	○							○		○		
[FUTURE PLACEHOLDER]																		

	Floor								Wall					Ceiling				
	Resilient Flooring	Porcelain Tile	Carpet Tile	Resinous Flooring (Epoxy)	Resinous Matrix Terrazzo	Polished Concrete	Sealed Concrete	Wood Athletic Flooring	Concrete Masonry Unit	Gypsum Wall Board	Porcelain/Ceramic Tile	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	Acoustical Panel Ceiling	Gypsum Board Ceiling	Exposed Structure	Specialty Ceiling	*[FUTURE PLACEHOLDER]*
Administration Space																		
Private Offices	○		○		○	○								●				
Secretaries / Clerks	○		○		○	○								●				
Reception / Main Office	○	○	○		○	○												
Registrar	○		○		○	○								●				
Conference Room			●											●				
Bookkeeper	○		○		○	○								●				
Data Clerk	○		○		○	○								●				
Workroom	○		○		○	○								●				
Storage (Records)	○					○	○									●		
Testing	○	○	○		○	○								●				
Mechanical / PA	○					○	○							○		○		
ISSSC	○		○		○	○								●				
School Resource Officer (SRO)	○		○		○	○								●				
Mothers Room	○				○	○								●				
Professional Learning Center	○		○			○								●				
Commuter Shower		○		○					○		○				●			
Storage (Supply)																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

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

	Floor								Wall					Ceiling				
	Resilient Flooring	Porcelain Tile	Carpet Tile	Resinous Flooring (Epoxy)	Resinous Matrix Terrazzo	Polished Concrete	Sealed Concrete	Wood Athletic Flooring	Concrete Masonry Unit	Gypsum Wall Board	Porcelain/Ceramic Tile	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	Acoustical Panel Ceiling	Gypsum Board Ceiling	Exposed Structure	Specialty Ceiling	*[FUTURE PLACEHOLDER]*
Student Mental Wellness and Counseling																		
Offices	○		○											●				
Core Counseling	○		○											●				
Reception	○	○	○															
Storage	○					○	○							○		○		
Conference / Group Room			●											●				
College / Career Center	○	○	○			○								●				
Wellness Room	○		○											●				
School Mental Health Center	○		○											●				
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Health Services																		
Care Center	○			○		○								●				
Storage	○					○	○							○		○		
Office	○					○								●				
Isolation	○	○			○	○								●				
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Community																		
Community Room	○	○	○		○	○												
Professional Learning Center	○		○			○								●				
Group Rooms	○		○			○								●				
Office	○		○		○	○								●				
Storage	○					○	○							○		○		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

	Floor								Wall					Ceiling				
	Resilient Flooring	Porcelain Tile	Carpet Tile	Resinous Flooring (Epoxy)	Resinous Matrix Terrazzo	Polished Concrete	Sealed Concrete	Wood Athletic Flooring	Concrete Masonry Unit	Gypsum Wall Board	Porcelain/Ceramic Tile	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	Acoustical Panel Ceiling	Gypsum Board Ceiling	Exposed Structure	Specialty Ceiling	*[FUTURE PLACEHOLDER]*
Building Support / Restrooms																		
Central Plant							●		●							●		
Electrical / Telecomm Closets							●									●		
Mechanical Rooms							●									●		
Storage							●		●							●		
Book Rooms	○		○			○	○							○		○		
Custodial Office			○				○							●				
Custodial Closet							●								○	○		
All-User Restroom		●									●				●			
Single Restroom		●									●				●			
Life Skills Restroom											●				●			
Family Restroom		●									●				●			
Professional Learning Center	○		○			○								●				
School Store	○	○			○	○												
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

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

CASEWORK & DISPLAY

General Requirements:

Requirements for all schools:

1. Casework:
    A. Determine casework depth and functional needs with the Owner, unless noted otherwise.
    B. Casework can include wall cabinets, base cabinets, and full height cabinets within the combined linear footage. Continuous casework is not required in the combined linear footage.
    C. Lockable Casework:
        i. Provide two lockable cabinets for the following spaces:
            a. All elementary learning studios
            b. All maker spaces
            c. All CTE medium and high intensity labs (where casework is provided)
            d. Administrative Workrooms and Flex PLCs
        ii. Provide all lockable casework in all Special Education spaces where casework is required.
        iii. Refer to *Chapter 5, Section 123212 – Manufactured Wood-Veneer-Faced Casework* for keying requirements.
    D. Accommodate any casework-nested equipment/plumbing within the combined linear footage of casework.
    E. Mobile storage may be provided as an alternative to meet casework storage requirement, pending Owner approval.
2. Countertops:
    A. Solid Surface – Recommended as typical. Required at serving and cooking areas.
    B. Plastic Laminate – Review all locations with the Owner. Not allowed in wet locations.
    C. Acid Resistant – As required
    D. Stainless Steel – As required. Not allowed at serving.
    E. Backsplash – Provide integral backsplash; 4” typical, unless noted otherwise.

3. Writable Surface:
    A. Mounting heights:
        i. Elementary School – 2 feet above finish floor maximum to 6 feet above finish floor minimum.
        ii. Middle & High School – 2 feet 6 inches above finish floor maximum to 6 feet above finish floor minimum.
    B. Linear footage of writable surface is allowed as a combination of fixed and mobile writable surfaces. Refer to *Chapter 6, Furniture Standards* for mobile writable surfaces.
    C. Linear footage of writable surface does not include clear glass.
    D. Provide magnetic writable surfaces where possible.
4. Tackboard/Tackwall/Tackstrip:
    A. Mounting heights:
        i. Elementary School – 2 feet above finish floor maximum to 6 feet above finish floor minimum.
        ii. Middle & High School – 2 feet 6 inches above finish floor maximum to 6 feet above finish floor minimum.
    B. Provide tackable surfaces in corridors / circulation space to meet campus needs. Confirm linear footage and locations with the Owner.
    C. Magnetic markerboards are an acceptable substitute in lieu of tackboards in learning studios.
5. Adjustable Shelving:
    A. Determine the adjustable shelving depth and functional needs with the Owner, unless noted otherwise.
    B. Provide fire-resistant materials for adjustable shelving in the Kiln Room.
6. Display Case:
    A. Can be located within designated space or adjacent circulation space.
    B. Provide lockable display cases with lighting and tackwall. Tackwall is not required at dual sided display cases.
    C. Determine depth and functional needs with the Owner, unless noted otherwise.
7. Instrument Storage:
    A. Provide protected storage for musical instruments.
    B. Determine location, size, and functional needs with the Owner, unless noted otherwise.

Additional requirements for middle & high schools:

1. Staff and Educator Personal Storage:
    A. Provide furniture solution. Refer to *Chapter 6, Furniture Standards.*
2. Learner Personal Storage.
    A. Refer to *Chapter 6, Furniture Standards.*
3. Garment / Uniform Storage:
    A. Provide fixed or mobile equipment solution. Confirm with the Owner.
4. Learning Studios:
    A. No casework is allowed in learning studios. Provide furniture solution. Refer to *Chapter 6, Furniture Standards.*
5. Workroom and Faculty Workroom:
    A. Provide educator mailboxes. Confirm location and quantity with the Owner.
6. Black Box Studio:
    A. Provide mobile writable surface for required linear feet of writable surface. Refer to *Chapter 6, Furniture Standards* for mobile writable surface requirements.
7. 2D Art and 3D Visual Art Laboratories:
    A. Provide a minimum of 2 feet of backsplash at countertops with sinks, at each sink.
8. Science Labs:
    A. Provide perimeter lab casework and mobile lab tables. Refer to *Chapter 6, Furniture Standards* for mobile lab tables.
    B. Consider providing markerboard at floor height to support measurement-based learning activities.
9. Fine Arts Rehearsal Halls:
    A. Provide 6 feet of music staves within the required writable surface length.
10. Library Media Center Reading Room:
    A. Provide furniture solution for book storage. Refer to *Chapter 6, Furniture Standards.*
    B. Provide mobile writable surface for a minimum of 50% of the required combined linear footage of writable surface. Refer to *Chapter 6, Furniture Standards* for mobile writable surface.
11. Special Education Shared Vocational Lab:
    A. Provide a mobile, modular, island work surface furniture solution for up to 12 learners. Refer to *Chapter 6, Furniture Standards.*
    B. Provide a minimum of 2 cooking stations.

12. Empower Center – Core Space
    A. Provide mobile writable surface for required linear feet of writable surface. Refer to *Chapter 6, Furniture Standards* for mobile writable surface.
    B. Refer to *Educational Specifications, Appendix B* for additional information regarding the Empower Center.
13. Career and Technical Education
    A. Collaborative technologies and screens can be used in lieu of writable surfaces for all CTE spaces. Coordinate with the Owner's CTE department to determine if this option is acceptable at the programs and campuses.
    B. CTE Studios
        i. Refer to *Chapter 6, Furniture Standards* for furniture storage requirements in CTE Studios.
    C. High and Medium Intensity Labs
        i. Provide linear feet of casework and counterspace as appropriate for the intended programmatic uses. Coordinate with the Owner's CTE department to determine casework needs.
        ii. Consider mobile writable surface for required linear feet of writable surface. Refer to *Chapter 6, Furniture Standards* for mobile writable surface.

Master Charts:

	Combined Linear Footage						
	Casework (max.)	Countertop (min.) **length included w/in casework*	Writable Surface (min.)	Tackboard/Tackwall (min.)	Adjustable Shelving	Display Case (max.)	*[FUTURE PLACEHOLDER]*
Learning Neighborhood							
Professional Learning Center	8	8	8				
PLC Meeting Room			4				
Maker Space	10-16	8	16	8			
Science Lab	•	•	16	8			
Storage / Prep (Science)	12	12					
Studio / Studio (SPED Flex)			16	8			
Open Collaboration			20				
Group Rooms			8-12				
Neighborhood Storage					•		
Studio (Life Skills)	10-16	6	16	8			
[FUTURE PLACEHOLDER]							
[FUTURE PLACEHOLDER]							
Dedicated Instructional							
Journalism Studio / Lab	10-16	6	16	8			
Storage (Journalism)					•		
Video Production Lab	6	6					
[FUTURE PLACEHOLDER]							
[FUTURE PLACEHOLDER]							
[FUTURE PLACEHOLDER]							

Legend					
Closed Requirement	•	Combined Linear Footage	#	Open to Design	
Open Requirement	o	Quantity	#		

* Casework & Display Closed Requirement – Determine Combined Linear Footage with the Owner.

	Combined Linear Footage						
	Casework (max.)	Countertop (min.) **length included w/in casework*	Writable Surface (min.)	Tackboard/Tackwall (min.)	Adjustable Shelving	Display Case (max.)	*[FUTURE PLACEHOLDER]*
Special Education							
Vocational Lab	•	•	16	8			
Speech / Diagnostics			4				
Academic Intervention			4				
Office / Conference			4				
Sensory Motor Lab							
Washer/Dryer					•		
Storage (Equipment)					•		
[FUTURE PLACEHOLDER]							
[FUTURE PLACEHOLDER]							
[FUTURE PLACEHOLDER]							
Media Resource Center							
Reading Rm / Teaching Area			16	12		8	
Circulation							
Workroom / Storage	12	6	4		•		
Storage (A/V Stor./ Equip. / Prof. Library)					•		
Presentation Room			16				
Offices			4				
Group Rooms			8-12				
[FUTURE PLACEHOLDER]							
[FUTURE PLACEHOLDER]							
[FUTURE PLACEHOLDER]							
Empower Center							
Core Space			32				
Staging Area					•		

	Combined Linear Footage						
	Casework (max.)	Countertop (min.) **length included w/in casework*	Writable Surface (min.)	Tackboard/Tackwall (min.)	Adjustable Shelving	Display Case (max.)	*[FUTURE PLACEHOLDER]*
Career and Technical Education							
CTE Studio			16	8			
Low Intensity Lab	10-16	8	16	8			
Medium Intensity Lab			16	8			
High Intensity Lab			16	8			
Safety Vestibule							
Prep/Workroom	8	8	4				
Dressing / Locker/ Changing							
Storage					•		
Professional Learning Center	8	8	8				
Group Rooms / Breakout			8-12				
[FUTURE PLACEHOLDER]							
[FUTURE PLACEHOLDER]							
Visual Arts							
2D Studio	30-40	20-30	16	16		8	
3D Studio	30-40	20-30	16	16		8	
Kiln							
Storage					•		
Digital Arts Studio			16				
Art Gallery				•		•	
Professional Learning Center	8	8	8				
[FUTURE PLACEHOLDER]							
[FUTURE PLACEHOLDER]							

Legend					
Closed Requirement	•	Combined Linear Footage	#	Open to Design	
Open Requirement	o	Quantity	#		

* Casework & Display Closed Requirement – Determine Combined Linear Footage with the Owner.

	Combined Linear Footage						
	Casework (max.)	Countertop (min.) **length included w/in casework*	Writable Surface (min.)	Tackboard/Tackwall (min.)	Adjustable Shelving	Display Case (max.)	*[FUTURE PLACEHOLDER]*
Music							
Rehearsal Halls	6		16			4	
Practice Rooms			4				
Libraries / Workrooms	6	6			•		
Prep / Dressing							
Professional Learning Centers	8	8	8				
Storage (Uniform / Booster)					•		
Storage (Risers/ Equipment)							
Storage (Instruments)							
[FUTURE PLACEHOLDER]							
[FUTURE PLACEHOLDER]							
[FUTURE PLACEHOLDER]							
[FUTURE PLACEHOLDER]							
Theater Arts							
Theater Arts Studio			16	4			
Black Box			16			4	
Stage (Middle School)							
Storage (Theater Arts / AV)					•		
Storage (Props / Equipment)					•		
Script Library	6	6					
Professional Learning Center	8	8	8				
[FUTURE PLACEHOLDER]							
[FUTURE PLACEHOLDER]							
[FUTURE PLACEHOLDER]							
[FUTURE PLACEHOLDER]							

	Combined Linear Footage						
	Casework (max.)	Countertop (min.) *length included w/in casework	Writable Surface (min.)	Tackboard/Tackwall (min.)	Adjustable Shelving	Display Case (max.)	*[FUTURE PLACEHOLDER]*
Theater / Auditorium (High School)							
Gallery / Lobby						8	
Ticket Booth	•	•					
Proscenium and Stage							
Wing Space							
Projection Control Rooms	•						
Storage					•		
Storage (Piano)							
Scenery Construction Area	•	•					
Loading Dock							
House							
Laundry	8	8			•		
Prep / Dressing							
Makeup Room		•	8				
Green Room			8				
[FUTURE PLACEHOLDER]							
[FUTURE PLACEHOLDER]							
Dance							
Rehearsal Room			16			4	
Professional Learning Center	8	8	8				
Storage					•		
Locker Rooms							
[FUTURE PLACEHOLDER]							

Legend					
Closed Requirement	•	Combined Linear Footage	#	Open to Design	
Open Requirement	o	Quantity	#		

* Casework & Display Closed Requirement – Determine Combined Linear Footage with the Owner.

	Combined Linear Footage						
	Casework (max.)	Countertop (min.) **length included w/in casework*	Writable Surface (min.)	Tackboard/Tackwall (min.)	Adjustable Shelving	Display Case (max.)	*[FUTURE PLACEHOLDER]*
Athletics & Wellness							
Gym Lobby				4		12	
Competition Gym			24				
Multipurpose/Practice Gym			16				
Storage					•		
Weight Room					•		
PE Locker Rooms							
Athletic Locker Rooms							
Educator / Coaches Offices			4	4			
Educator / Coaches Showers							
Athletic Training Room			16	4			
Concession	12-16	12-16			•		
Wrestling Room			4				
Laundry Rooms	8	8					
Health Studio			16	4			
PE Fitness Room			8	4			
Professional Learning Center	8	8	8				
Group Rooms			8-12				
[FUTURE PLACEHOLDER]							
[FUTURE PLACEHOLDER]							
Food Services							
Dining Commons							
Serving							
Kitchen							
Storage (Chairs, Tables, After School)					•		
[FUTURE PLACEHOLDER]							

	Combined Linear Footage						
	Casework (max.)	Countertop (min.) *length included w/in casework	Writable Surface (min.)	Tackboard/Tackwall (min.)	Adjustable Shelving	Display Case (max.)	*[FUTURE PLACEHOLDER]*
Administration Space							
Private Offices			4	4			
Secretaries / Clerks			4				
Reception / Main Office	•	•		12			
Registrar			4				
Conference Room			8				
Bookkeeper			4				
Data Clerk			4				
Workroom	6	6	4	4			
Storage (Records)							
Mechanical / PA							
ISSSC			12	8			
School Resource Officer (SRO)				4			
Mothers Room	3-6	6					
Professional Learning Center	8	8	8				
Commuter Shower							
Storage (Supply)							
[FUTURE PLACEHOLDER]							
[FUTURE PLACEHOLDER]							
[FUTURE PLACEHOLDER]							
[FUTURE PLACEHOLDER]							
[FUTURE PLACEHOLDER]							

Legend					
Closed Requirement	•	Combined Linear Footage	#	Open to Design	
Open Requirement	o	Quantity	#		

* Casework & Display Closed Requirement – Determine Combined Linear Footage with the Owner.

	Combined Linear Footage						
	Casework (max.)	Countertop (min.) **length included w/in casework*	Writable Surface (min.)	Tackboard/Tackwall (min.)	Adjustable Shelving	Display Case (max.)	*[FUTURE PLACEHOLDER]*
Student Mental Wellness and Counseling							
Offices			4	4			
Core Counseling	8	4	8	4			
Reception	•	•		8			
Storage					•		
Conference / Group Room			8				
College / Career Center			16	4			
Wellness Room			8	8			
School Mental Health Center			8				
[FUTURE PLACEHOLDER]							
[FUTURE PLACEHOLDER]							
Health Services							
Care Center	16	12	4				
Storage					•		
Office			4				
Isolation							
[FUTURE PLACEHOLDER]							
[FUTURE PLACEHOLDER]							
Community							
Community Room	6	6	4	4			
Professional Learning Center	8	8	8				
Group Rooms			8-12				
Office			4	4			
Storage					•		
[FUTURE PLACEHOLDER]							
[FUTURE PLACEHOLDER]							
[FUTURE PLACEHOLDER]							

	Combined Linear Footage						
	Casework (max.)	Countertop (min.) **length included w/in casework*	Writable Surface (min.)	Tackboard/Tackwall (min.)	Adjustable Shelving	Display Case (max.)	*[FUTURE PLACEHOLDER]*
Building Support / Restrooms							
Central Plant							
Electrical / Telecomm Closets							
Mechanical Rooms							
Storage					•		
Book Rooms					•		
Custodial Office				4			
Custodial Closets					•		
All-User Restroom							
Single Restroom							
Life Skills Restroom							
Family Restroom							
Professional Learning Center	8	8	8				
School Store	6-10	4-6					
[FUTURE PLACEHOLDER]							
[FUTURE PLACEHOLDER]							
[FUTURE PLACEHOLDER]							

Legend					
Closed Requirement	•	Combined Linear Footage	#	Open to Design	
Open Requirement	o	Quantity	#		

* Casework & Display Closed Requirement – Determine Combined Linear Footage with the Owner.

EQUIPMENT

General Requirements:

Requirements for all schools:

1. Equipment included in this section:
    A. Equipment that has significant size/clearance requirements
    B. Equipment that requires dedicated:
        i. Floor or wall space
        ii. Casework or countertop space
        iii. Power or data
        iv. Plumbing or mechanical
    C. Determine any additional equipment needs with the Owner.
    D. Refer to *Appendix C, OFCI / CFCI Responsibilities Matrix*.
    E. Refer to LEED, AEGB, and AISD Sustainability Scorecard as applicable for water efficiency requirements for equipment and appliances.
2. Technology:
    A. Determine required equipment with the Owner.
3. Fire Extinguishers:
    A. Provide ceiling or wall-mounted signage.
4. AED:
    A. Provide AED at the following locations:
        i. Provide one AED per each noncontiguous building on campus
        ii. Provide one AED per each floor in a building
        iii. Provide one AED near the main administration area.
        iv. Provide additional AEDs as requested by Owner or as required by state laws.
    B. Provide ceiling or wall-mounted signage
5. Lock box (safe):
    A. Locate within administration suite.
6. Paper Towel Dispensers and Hand Dryers:
    A. Locate at all non-restroom sinks. Add compost waste receptacles to paper towel stations in accordance with Waste Bin Capacity by Room Type Table below, and Austin ISD Indoor Zero Waste Station Specifications.

B. To avoid disruptions, provide electric, high-velocity hand dryers in toilet rooms that are not connected to learning spaces and where learning spaces are connected provide paper towel dispensers.
C. Non-battery electric hand dryers are the recommended standard; however, should not be disruptive to learning or performance spaces
D. If a paper towel dispenser is to be used (not the preferred choice because of waste and cost of paper towels), then non-battery models are preferred.

7. Food Service Kitchen Equipment
    A. Refer to *Appendix C, Kitchen Equipment Requirements*.
8. Administration Workrooms:
    A. Die-cut machine
    B. Large paper cutter
    C. Butcher paper dispenser
    D. Bubble sheet machine
    E. Spent battery recycling container
9. Health Services:
    A. Wheelchair
    B. Stadiometer weight scale
    C. Epi pens
    D. Bleeding Control Kit
    E. Narcan Spray
    F. Locking medicine cart or cabinet
    G. Full-sized refrigerator with compressor
    A. Recovery cot
        i. Refer to *Educational Specifications, Part 5 – Space Programs* for count.
        i. Provide one recovery cot in the Privacy Rooms
10. Restrooms:
    A. All Restrooms
        i. Paper towel dispensers and/or electric hand dryers
            a. Refer to *Chapter 4 – Elementary School: Equipment (#6 Paper Towel and Soap Dispensers)* for requirements regarding paper towel dispenser and hand dryer requirements
        ii. Trash receptacles (built in or mobile)
            a. Since stalls typically have individual landfill waste cans, only

compost receptacles are required if paper towel dispensers are installed.

iii. Toilet paper dispenser

iv. Soap dispenser - non-battery models preferred.

v. Sanitary napkin disposal

a. Provide sanitary napkin disposal at all, all-user restrooms.

ii. Mirrors

B. Life Skills Studio Restroom(s):

i. Lift system (refer to *Chapter 5, Section 117300 – Patient Care Equipment)*

ii. Changing table (refer to *Chapter 5, Section 117300 – Patient Care Equipment)*

iii. Ensure access to onsite washer/dryer

C. Family Restrooms:

vi. Baby changing station

11. Central Custodial Storage

A. Provide a washer and dryer. Refer to *Chapter 5, Division 11 – Equipment* for basis of design.

12. Mother's Room

A. Provide a paper towel dispenser and trash receptacle near the sink in the mother's room.

B. Provide a wall-mounted, 2-foot by 6-foot mirror.

13. Provide wall-anchored shelving at the following locations, where adjustable shelving is required in the charts below:

A. Storage Rooms

B. Custodial Closets

C. Learner Record Storage / Administrative Vault

14. Washer and Dryer Units

B. Coordinate overall quantity of washer and dryer units provided at any given campus with the Owner.

16. School Resource Officer

A. 36-inch tall electrically-operated gun safe bolted to ground or wall studs, with backup key. Refer to *Chapter 5, Division 10 – Specialties*.

B. Lockable evidence storage (can be incorporated into gun safe)

C. Desktop monitor

17. Principal and Assistant Principal Offices
    A. Provide wall-mounted presentation equipment.
18. Stages and Theater/Auditoria
    A. Refer to *Chapter 5, Section 116133 – Theater Rigging Systems and Controls* for stage requirements for all schools.
    B. Refer to *Chapter 5, Section 116143 – Stage Curtains* for stage requirements for all schools.

Additional requirements for middle & high schools:

1. Provide motorized projection screens and ceiling/wall-mounted projectors at the following locations:
    A. Dining Commons (where the Stage does not open into the Dining Commons)
    B. Auditorium / Theater Stages
    C. Empower Center
    D. Black Box (HS Only)
    E. Competition Gymnasium (HS) and Large Multipurpose Gymnasium (MS)
    F. Other locations as determined by Owner.
2. Science Lab:
    A. Safety goggles
    B. Fire blanket
    C. Consider a Slotted channel framing system.
    D. Pass-through fume hood between Science Lab and Science Prep (chemistry only)
    E. Test tube drying racks
3. Science Storage / Prep:
    A. Flammable storage cabinet (chemical storage only)
    B. Test tube drying rack
4. Maker Space:
    A. Consider a Slotted channel framing system.
5. Library Media Center:
    A. Consider theft detection. Confirm with the Owner.

6. Visual Arts General Lab:
    A. Kiln
    B. Horizontal drying racks
    C. Rolling carts
    D. Large paper cutters
    E. Easels (for 1 class size)
    F. Unistrut system
7. Visual Arts 3D Lab:
    A. Jig saw
    B. Potter's wheels
    C. Vises
    D. Wedging tables w/ wire
    E. Printing press
    F. Mat cutters
    G. Flammable cabinet
    H. Saws
    I. Safety goggles
8. Choral Music / Piano Lab:
    A. Rehearsal Hall
        i. Choral risers
        ii. Choral shells
        iii. Seated platforms (for chairs)
        iv. Utility carts
        v. Stackable chairs with dolly
        vi. 3 (100 slot) Folio cabinets on wheels
        vii. Grand piano w/ hand truck
        viii. Digital upright piano
    B. Auxiliary Rehearsal Hall/MIDI Lab
        i. Stackable chairs with dolly
        ii. Digital pianos
        iii. Conductor stand

9. Music / Instrument – Band:
    A. Music stands (approximately 225)
    B. Stackable chairs with dolly
    C. Concert folio racks on wheels
    D. Marching folio racks on wheels
    E. Utility carts
10. Band Exterior Storage:
    A. Refer to *Chapter 5, Site Design Requirements* for band equipment storage.
11. Music / Instrument – Orchestra:
    A. Music stands (approximately 225)
    B. Stackable chairs with dolly
    C. Concert folio racks on wheels
    D. Utility carts
    E. Platform risers
12. Makeup Room:
    A. Lighted make-up mirrors
13. Dance:
    A. Provide freestanding double-barred adjustable ballet barres (Confirm bar install heights with the Owner).
    B. Provide integrated sound system in Rehearsal Hall.
14. Large Gym and Storage:
    A. Refer to *Appendix C, Middle-High Gym – Athletic Equipment Layouts*.
    B. Motorized glass basketball backboards / goals (3 Pairs)
    C. Volleyball standards (7 Pairs)
    D. 4 to 6 wrestling scoreboards (confirm with the Owner)
    E. 4 to 6 wrestling mats (confirm with the Owner)
    F. 4 Electric scoreboards (can operated individually/together)
    G. Scorer table (confirm length and storage requirements with the Owner)
    H. Team chairs (40 minimum)
    I. Bleachers
    J. Shooting machine
    K. Vertec machine

15. Multipurpose Gym and Storage:
    A. Motorized glass basketball backboards / goals (3 Pairs)
    B. Volleyball standards (3 Pairs)
    C. 2 Electric scoreboards (can operated individually/together)
    D. Scorer table
        i. Confirm length and storage requirements with the Owner.
    E. Team chairs (40 minimum)
16. Weight Room:
    A. Power rack
    B. Weights
    C. Bars
    D. Incline bench press
    E. Exercise machines
    F. Weights machines
17. Athletic Training Room:
    A. Ice machine
    B. Full size whirl pool (full body)
    C. Small whirl pool (extremities)
    D. Ultrasound system combo w/ electric muscle simulator unit
    E. Treatment tables
    F. Modular taping tables
    G. Game-ready compression unit
    H. Large hydro-collator
    I. Stationary exercise bike
    J. Elliptical bike
    K. Weight scale
    L. Utility roller carts
18. PE Fitness Room
    A. Weight racks (8)
    B. Free weights
    C. Cardio machines
    D. Exercise mats
19. Athletics Exterior Storage:
    A. Refer to *Chapter 5, Site Design Requirements* for athletics equipment storage.

20. Dining Commons:
    A. Large scale trash, recycling, and compost.
21. Custodial Closets:
    A. Custodial cart
    B. Vacuum cleaner
    C. Hand truck
    D. Utility wall hangers
    E. MSDS book holder
22. Main Storage:
    A. Wet/dry vacuums
    B. Platform trucks
    C. Hand truck
    D. Carpet cleaner
    E. Vacuum cleaner
    F. High speed burnishers
    G. Auto scrubber
    H. Multi-length ladders
    I. Rider auto scrubber
    J. Scrubbing machines
23. Career and Technical Education (CTE)
    A. Equipment for Career and Technical Education is dependent on programs provided at each individual campus. Coordinate with Owner's and campus CTE departments to determine equipment needs.
    B. Refer to *Educational Specifications, Appendix B – CTE* for additional information regarding use and support space requirements based on program and pathway.
24. Empower Center
    A. Provide an integral A/V system with speakers at each Core Space.
    B. Refer to *Educational Specifications, Appendix B* for additional information regarding the Empower Center.

Master Charts:

	Appliances									Miscellaneous								
	Refrigerator	Under-counter Refrigerator	Microwave	Oven/ Range/ Exhaust Hood	Washer/ Dryer	Commercial Washer / Dryer	Dish Washer	Vending Machine	*[FUTURE PLACEHOLDER]*	Floor Printer / Copier	Wall Mounted TX & USA Flags	Metal Lockers	Presentation Equipment	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Learning Neighborhood																		
Professional Learning Center		●	●							●			●					
PLC Meeting Room																		
Maker Space											●		●					
Science Lab											●		●					
Storage / Prep (Science)	●						●											
Studio / Studio (SPED Flex)											●		●					
Open Collaboration											●		●					
Group Rooms													●					
Neighborhood Storage																		
Studio (Life Skills)	●										●		●					
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Dedicated Instructional																		
Journalism Studio / Lab													●					
Storage (Journalism)																		
Video Production Lab																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

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

	Appliances									Miscellaneous								
	Refrigerator	Under-counter Refrigerator	Microwave	Oven/ Range/ Exhaust Hood	Washer/ Dryer	Commercial Washer / Dryer	Dish Washer	Vending Machine	*[FUTURE PLACEHOLDER]*	Floor Printer / Copier	Wall Mounted TX & USA Flags	Metal Lockers	Presentation Equipment	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Special Education																		
Vocational Lab	●		●	●	●								●					
Speech / Diagnostics																		
Academic Intervention																		
Office / Conference													●					
Sensory Motor Lab																		
Washer/Dryer					●													
Storage (Equipment)																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Media Resource Center																		
Reading Rm / Teaching Area										●	●		●					
Circulation																		
Workroom / Storage																		
Storage (A/V Stor./ Equip. / Prof. Library)																		
Presentation Room													●					
Offices																		
Group Rooms													●					
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Empower Center																		
Core Space													●					
Staging Area																		

	Appliances									Miscellaneous								
	Refrigerator	Under-counter Refrigerator	Microwave	Oven/ Range/ Exhaust Hood	Washer/ Dryer	Commercial Washer / Dryer	Dish Washer	Vending Machine	*[FUTURE PLACEHOLDER]*	Floor Printer / Copier	Wall Mounted TX & USA Flags	Metal Lockers	Presentation Equipment	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Career and Technical Education																		
CTE Studio											●		●					
Low Intensity Lab											●		●					
Medium Intensity Lab																		
High Intensity Lab																		
Safety Vestibule																		
Prep/Workroom		●	●															
Dressing / Locker/ Changing												●						
Storage																		
Professional Learning Center		●	●							●			●					
Group Rooms / Breakout													●					
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Visual Arts																		
2D Studio											●		●					
3D Studio											●		●					
Kiln																		
Storage																		
Digital Arts Studio											●		●					
Art Gallery													●					
Professional Learning Center		●	●							●			●					
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

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

	Appliances									Miscellaneous								
	Refrigerator	Under-counter Refrigerator	Microwave	Oven/ Range/ Exhaust Hood	Washer/ Dryer	Commercial Washer / Dryer	Dish Washer	Vending Machine	*[FUTURE PLACEHOLDER]*	Floor Printer / Copier	Wall Mounted TX & USA Flags	Metal Lockers	Presentation Equipment	*FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Music																		
Rehearsal Halls											●		●					
Practice Rooms																		
Libraries / Workrooms										●								
Prep / Dressing												●						
Professional Learning Centers		●	●							●		●						
Storage (Uniform / Booster)																		
Storage (Risers/ Equipment)																		
Storage (Instruments)																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Theater Arts																		
Theater Arts Studio											●		●					
Black Box																		
Stage (Middle School)																		
Storage (Theater Arts / AV)																		
Storage (Props / Equipment)																		
Script Library										●								
Professional Learning Center		●	●							●			●					
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

	Appliances									Miscellaneous								
	Refrigerator	Under-counter Refrigerator	Microwave	Oven/ Range/ Exhaust Hood	Washer/ Dryer	Commercial Washer / Dryer	Dish Washer	Vending Machine	*[FUTURE PLACEHOLDER]*	Floor Printer / Copier	Wall Mounted TX & USA Flags	Metal Lockers	Presentation Equipment	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Theater / Auditorium (High School)																		
Gallery / Lobby																		
Ticket Booth																		
Proscenium and Stage													●					
Wing Space																		
Projection Control Rooms																		
Storage																		
Storage (Piano)																		
Scenery Construction Area																		
Loading Dock																		
House																		
Laundry						●												
Prep / Dressing												●						
Makeup Room																		
Green Room																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Dance																		
Rehearsal Room											●		●					
Professional Learning Center		●	●							●			●					
Storage																		
Locker Rooms												●						
[FUTURE PLACEHOLDER]																		

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

	Appliances									Miscellaneous								
	Refrigerator	Under-counter Refrigerator	Microwave	Oven/ Range/ Exhaust Hood	Washer/ Dryer	Commercial Washer / Dryer	Dish Washer	Vending Machine	*[FUTURE PLACEHOLDER]*	Floor Printer / Copier	Wall Mounted TX & USA Flags	Metal Lockers	Presentation Equipment	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Athletics & Wellness																		
Gym Lobby																		
Competition Gym											●		●					
Multipurpose/Practice Gym											●							
Storage																		
Weight Room											●							
PE Locker Rooms												●						
Athletic Locker Rooms												●						
Educator / Coaches Offices																		
Educator / Coaches Showers																		
Educator / Coaches Closets																		
Athletic Training Room	●																	
Concession ~~/ Storage~~																		
Wrestling Room											●		●					
Laundry Rooms						●												
Health Studio											●		●					
PE Fitness Room											●		●					
Professional Learning Center		●	●							●			●					
Group Rooms													●					
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Food Services																		
Dining Commons											●		●					
Serving																		
Kitchen												●						
Storage (Chairs, Tables, After School)																		
[FUTURE PLACEHOLDER]																		

	Appliances									Miscellaneous								
	Refrigerator	Under-counter Refrigerator	Microwave	Oven/ Range/ Exhaust Hood	Washer/ Dryer	Commercial Washer / Dryer	Dish Washer	Vending Machine	*[FUTURE PLACEHOLDER]*	Floor Printer / Copier	Wall Mounted TX & USA Flags	Metal Lockers	Presentation Equipment	*FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Administration Space																		
Private Offices																		
Secretaries / Clerks																		
Reception / Main Office											●		●					
Registrar																		
Conference Room													●					
Bookkeeper																		
Data Clerk																		
Workroom																		
Storage (Records)																		
Testing																		
Mechanical / PA																		
ISSSC																		
School Resource Officer (SRO)																		
Mothers Room		●																
Professional Learning Center		●	●							●			●					
Commuter Shower																		
Storage (Supply)																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

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

	Appliances									Miscellaneous								
	Refrigerator	Under-counter Refrigerator	Microwave	Oven/ Range/ Exhaust Hood	Washer/ Dryer	Commercial Washer / Dryer	Dish Washer	Vending Machine	*[FUTURE PLACEHOLDER]*	Floor Printer / Copier	Wall Mounted TX & USA Flags	Metal Lockers	Presentation Equipment	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Student Mental Wellness and Counseling																		
Offices																		
Core Counseling											●		●					
Reception										●	●							
Storage																		
Conference / Group Room													●					
College / Career Center											●		●					
Wellness Room											●		●					
School Mental Health Center													●					
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Health Services																		
Care Center	●																	
Storage																		
Office																		
Isolation																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Community																		
Community Room	●		●								●							
Professional Learning Center		●	●							●			●					
Group Rooms													●					
Office																		
Storage																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

	Appliances									Miscellaneous								
	Refrigerator	Under-counter Refrigerator	Microwave	Oven/ Range/ Exhaust Hood	Washer/ Dryer	Commercial Washer / Dryer	Dish Washer	Vending Machine	*[FUTURE PLACEHOLDER]*	Floor Printer / Copier	Wall Mounted TX & USA Flags	Metal Lockers	Presentation Equipment	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Building Support / Restrooms																		
Central Plant																		
Electrical / Telecomm Closets																		
Mechanical Rooms																		
Storage																		
Book Rooms																		
Custodial Office																		
Custodial Closet																		
All-User Restroom																		
Single Restroom																		
Life Skills Restroom																		
Family Restroom																		
Professional Learning Center		●	●							●		●						
School Store																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

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

*Door opening width is not limited to a typical personnel door.

PLUMBING

General Requirements:

Requirements for all schools:

1. Bottle Fillers
    A. Provide at least one bottle filling station on each floor, wing, or other building section of a school building
    B. Provide at minimum one, centrally-located bottle filler in each learning neighborhood.
    C. Provide one bottle filling station in all school food service areas
    D. Provide one bottle filling station near gymnasiums and outdoor learning and activity areas, including playgrounds and athletic facilities
2. Kitchen / Serving:
    A. Coordinate with Owner's food services department for additional plumbing requirements in this area.
    B. Refer to *Appendix C, Kitchen Equipment Requirements* for additional plumbing requirements in this area.
    C. Provide garbage can washer and hose bib at kitchen receiving docks.
    D. Provide a 3 compartment, learner dishwashing sink at the scullery. Coordinate location and height with the Owner.
    E. Provide 3 learner hand washing lavatories at entrance to serving. Coordinate location and height with the Owner.
3. Building Exterior:
    A. Provide exterior, lockable, freeze-proof wall hydrants on all sides of each building.
    B. Provide exterior, freeze-proof roof hydrants within 50 feet of roof-top mechanical equipment.
    C. Provide exterior, lockable, freeze-proof roof hydrants within 50 feet of ground-mounted mechanical equipment (cooling towers, condensing units).
4. Art Laboratories:
    A. Provide point use clay traps at a minimum of one sink with signage.
    B. Distribute sinks to eliminate congestion.
5. Student Mental Wellness and Counseling
    A. Provide close proximity to an all-user restroom for shared lavatory access.

6. Floor Drains/Floor Sinks:
    A. Provide floor drain directly adjacent to all mop sinks.
    B. Provide floor drain directly adjacent to all clothes washing machines and other places where water is present.
    C. Provide floor sinks in applications expected to receive large and/or continuous streams of effluent.
7. Lavatories:
    A. Confirm with the Owner whether a wash fountain is appropriate in locations where lavatories are noted.
8. Ice Machine / Washer Machine Connection:
    A. Provide an ice machine connection at locations where full-size refrigerators are planned.
    B. Provide a washing machine connection at washing machine locations.
9. Community Suite
    A. Locate required water cooler and bottle filler in the corridor of the Community Partner's Suite (refer to *Educational Specifications, Part 2 – A Flexible Campus* for adjacencies*)* for improved accessibility.

Additional requirements for middle & high schools:

1. Science Lab / Lecture Studio:
    A. Provide one sink for every four learners in addition to one sink for educator demonstration.
        i. Provide acid neutralization at high schools only.
        ii. Provide laboratory faucets at all sinks in science labs.
    B. Provide natural gas as required. Confirm locations with the Owner.
        i. Refer to *Chapter 5, Section 221125 – Natural Gas Systems*
        ii. Refer to *Chapter 5, Section 221116 / 221119 – Valves*
2. SPED Flex Studios
    A. Provide shared access to a sink between two studios or in an adjacent open collaboration space.
3. Career and Technical Education Dressing / Lockers / Changing
    A. Provide infrastructure for showers in all dressing / locker / changing rooms. Finish out showers if showers are required for currently intended Career and Technical Education programming.

4. Athletic Training Rooms:
    A. Provide fill faucets for hydro therapy tubs.
5. Athletics & Wellness:
    A. Do not locate water coolers and bottle fillers in the Gymnasiums.
6. Empower Center
    A. Refer to *Educational Specifications, Appendix B* for additional information regarding the Empower Center.

Master Charts:

	Plumbing Fixtures & Equipment																
	Lavatory	Sink	Oil / Water Separator	Solid Separator	Acid Neutralization	Mop Sink	Floor Sink	Floor Drain	Shower	Water Cooler and Bottle Filler	Utility Sink	Emergency Eye Wash	Emergency Eye Wash/Shower	Hose Bib	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Learning Neighborhood																		
Professional Learning Center		●																
PLC Meeting Room																		
Maker Space		●						●				●						
Science Lab		●						●				○	○					
Storage / Prep (Science)		●						●				○	○					
Studio / Studio (SPED Flex)																		
Open Collaboration										●								
Group Rooms																		
Neighborhood Storage																		
Studio (Life Skills)		●																
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Dedicated Instructional																		
Journalism Studio / Lab																		
Storage (Journalism)																		
Video Production Lab																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

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

	Plumbing Fixtures & Equipment																	
	Lavatory	Sink	Oil / Water Separator	Solid Separator	Acid Neutralization	Mop Sink	Floor Sink	Floor Drain	Shower	Water Cooler and Bottle Filler	Utility Sink	Emergency Eye Wash	Emergency Eye Wash/Shower	Hose Bib	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Special Education																		
Vocational Lab		•						•			•							
Speech / Diagnostics																		
Academic Intervention																		
Office / Conference																		
Sensory Motor Lab																		
Washer/Dryer							•	•										
Storage (Equipment)																		
FUTURE PLACEHOLDER]																		
FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Media Resource Center																		
Reading Rm / Teaching Area																		
Circulation																		
Workroom / Storage		•																
Storage (A/V Stor./ Equip. / Prof. Library)																		
Presentation Room																		
Offices																		
Group Rooms																		
FUTURE PLACEHOLDER]																		
FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Empower Center																		
Core Space										•								
Staging Area																		

	Plumbing Fixtures & Equipment																
	Lavatory	Sink	Oil / Water Separator	Solid Separator	Acid Neutralization	Mop Sink	Floor Sink	Floor Drain	Shower	Water Cooler and Bottle Filler	Utility Sink	Emergency Eye Wash	Emergency Eye Wash/Shower	Hose Bib	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Career and Technical Education (Space Types)																		
CTE Studio																		
Low Intensity Lab											●							
Medium Intensity Lab			o	o	o			●			●		●					
High Intensity Lab			o	o	o			●		●	●		●	●				
Safety Vestibule																		
Prep/Workroom		o									o							
Dressing / Locker/ Changing																		
Storage																		
Professional Learning Center		●																
Group Rooms / Breakout																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Visual Arts																		
2D Studio		●		●				●										
3D Studio		●		●				●										
Kiln																		
Storage																		
Digital Arts Studio																		
Art Gallery																		
Professional Learning Center		●																
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

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

	Plumbing Fixtures & Equipment																	
	Lavatory	Sink	Oil / Water Separator	Solid Separator	Acid Neutralization	Mop Sink	Floor Sink	Floor Drain	Shower	Water Cooler and Bottle Filler	Utility Sink	Emergency Eye Wash	Emergency Eye Wash/Shower	Hose Bib	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Music																		
Rehearsal Halls										●								
Practice Rooms																		
Libraries / Workrooms																		
Prep / Dressing																		
Professional Learning Centers		●																
Storage (Uniform / Booster)																		
Storage (Risers/ Equipment)																		
Storage (Instruments)																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Theater Arts																		
Theater Arts Studio																		
Black Box																		
Stage (Middle School)																		
Storage (Theater Arts / AV)																		
Storage (Props / Equipment)																		
Script Library																		
Professional Learning Center		●																
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

	Plumbing Fixtures & Equipment																
	Lavatory	Sink	Oil / Water Separator	Solid Separator	Acid Neutralization	Mop Sink	Floor Sink	Floor Drain	Shower	Water Cooler and Bottle Filler	Utility Sink	Emergency Eye Wash	Emergency Eye Wash/Shower	Hose Bib	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Theater / Auditorium (High School)																		
Gallery / Lobby										●								
Ticket Booth																		
Proscenium and Stage																		
Wing Space																		
Projection Control Rooms																		
Storage																		
Storage (Piano)																		
Scenery Construction Area		●				●		●						●				
Loading Dock			○					●						●				
House																		
Laundry							●	●										
Prep / Dressing																		
Makeup Room		●																
Green Room										●								
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Dance																		
Rehearsal Room										●								
Professional Learning Center		●																
Storage																		
Locker Rooms								●										
[FUTURE PLACEHOLDER]																		

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

	Plumbing Fixtures & Equipment																
	Lavatory	Sink	Oil / Water Separator	Solid Separator	Acid Neutralization	Mop Sink	Floor Sink	Floor Drain	Shower	Water Cooler and Bottle Filler	Utility Sink	Emergency Eye Wash	Emergency Eye Wash/Shower	Hose Bib	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Athletics & Wellness																		
Gym Lobby										●								
Competition Gym																		
Multipurpose/Practice Gym																		
Storage																		
Weight Room										●								
PE Locker Rooms								●	●					●				
Athletic Locker Rooms								●	●					●				
Educator / Coaches Offices																		
Educator / Coaches Showers								●	●									
Athletic Training Room		●					o	●			●			●				
Concession ~~/ Storage~~		●						●										
Wrestling Room										●								
Laundry Rooms							●	●										
Health Studio																		
PE Fitness Room										●								
Professional Learning Center		●																
Group Rooms																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Food Services																		
Dining Commons										●								
Serving								●										
Kitchen	●	●					●	●										
Storage (Chairs, Tables, After School)																		
[FUTURE PLACEHOLDER]																		

	Plumbing Fixtures & Equipment																
	Lavatory	Sink	Oil / Water Separator	Solid Separator	Acid Neutralization	Mop Sink	Floor Sink	Floor Drain	Shower	Water Cooler and Bottle Filler	Utility Sink	Emergency Eye Wash	Emergency Eye Wash/Shower	Hose Bib	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Administration Space																		
Private Offices																		
Secretaries / Clerks																		
Reception / Main Office																		
Registrar																		
Conference Room																		
Bookkeeper																		
Data Clerk																		
Workroom		●																
Storage (Records)																		
Testing																		
Mechanical / PA							○	●				○		●				
ISSSC																		
School Resource Officer (SRO)																		
Mothers Room		●																
Professional Learning Center		●																
Commuter Shower								●	●									
Storage (Supply)																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

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

	Plumbing Fixtures & Equipment																
	Lavatory	Sink	Oil / Water Separator	Solid Separator	Acid Neutralization	Mop Sink	Floor Sink	Floor Drain	Shower	Water Cooler and Bottle Filler	Utility Sink	Emergency Eye Wash	Emergency Eye Wash/Shower	Hose Bib	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Student Mental Wellness and Counseling																		
Offices																		
Core Counseling																		
Reception																		
Storage																		
Conference / Group Room																		
College / Career Center																		
Wellness Room																		
School Mental Health Center																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Health Services																		
Care Center		•						•				•						
Storage (Health)																		
Office																		
Isolation																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Community																		
Community Room		•								•								
Professional Learning Center		•																
Group Rooms																		
Office																		
Storage																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

	Plumbing Fixtures & Equipment																
	Lavatory	Sink	Oil / Water Separator	Solid Separator	Acid Neutralization	Mop Sink	Floor Sink	Floor Drain	Shower	Water Cooler and Bottle Filler	Utility Sink	Emergency Eye Wash	Emergency Eye Wash/Shower	Hose Bib	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Building Support / Restrooms																		
Central Plant							●	●				○	○	●				
Electrical / Telecomm Closets																		
Mechanical Rooms							●	●				○	○	●				
Storage																		
Book Rooms																		
Custodial Office																		
Custodial Closet						●	●	●										
All-User Restroom	●							●						●				
Single Restroom	●							●										
Life Skills Restroom	●							●										
Family Restroom	●							●										
Professional Learning Center		●																
School Store																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

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

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MECHANICAL

General Requirements:

Requirements for all schools:

1. Static Pressure:
    A. Design building for positive static pressure compared to the building exterior.
        i. For the areas denoted as “Negative Static Pressure”, this requirement refers to the static pressure between that area compared to spaces directly adjacent.
2. Kitchen / Serving:
    A. Refer to *Appendix C, Kitchen Equipment Requirements* for additional HVAC requirements in this area.
3. Maker Spaces:
    A. For fully enclosed maker spaces, design HVAC system to control a negative static pressure and provide an exhaust fan.
4. Kiln Rooms:
    A. Specialty exhaust systems for kiln room are typically furnished with the kiln and are directly connected to the equipment.
5. Carbon Dioxide Sensors
    A. Place all carbon dioxide sensors between 3 and 6 feet above the floor.
    B. Provide audible, visual, or building automation system alerts if the sensed carbon dioxide concentration exceeds the setpoint by more than 10%.

Additional requirements for middle & high schools:

1. Science Laboratory:
    A. Refer to specific program requirement to determine if specialty exhaust in combination with a fume hood is necessary.
2. Instrument Storage:
    A. Include provisions for HVAC humidity control, including humidification, as required to maintain the humidity levels with the recommended range for the equipment stored in this area.

3. Special Education:
    A. Include provisions for dedicated, specialized HVAC to serve ventilated cabinet.
4. Literacy Library, Book Storage, and Reading Room:
    A. Include provisions for HVAC dehumidification to maintain the humidity levels with the recommended range for stored materials in this area.
5. Fine Arts Practice Rooms:
    A. Consider provisions for HVAC variable air flow diffusers to achieve the individual room temperature control requirement.
6. Empower Center
    A. Refer to *Educational Specifications, Appendix B* for additional information regarding the Empower Center.

Master Charts:

	HVAC Systems																	
	Heated Only	Fully Conditioned	Ventilated Only	Dedicated HVAC Equipment	Redundant HVAC Equipment	Temp\Humidity Sensor	Direct Exhaust System`	Specialty Exhaust System	Positive Static Pressure	Negative Static Pressure	Carbon Dioxide Sensor	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Learning Neighborhood																		
Professional Learning Center		●				●			●		●							
PLC Meeting Room		●				●			●		●							
Maker Space		●				●				●	●							
Science Lab		●				●		●		●	●							
Storage / Prep (Science)		●						●		●								
Studio / Studio (SPED Flex)		●				●			●		●							
Open Collaboration		●				●			●		●							
Group Rooms		●				●			●		●							
Neighborhood Storage		●																
Studio (Life Skills)		●				●	●		●		●							
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Dedicated Instructional (High School)																		
Journalism Studio / Lab		●				●			●		●							
Storage (Journalism)		●				●			●		●							
Video Production Lab		●				●			●		●							
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

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

	HVAC Systems																
	Heated Only	Fully Conditioned	Ventilated Only	Dedicated HVAC Equipment	Redundant HVAC Equipment	Temp\Humidity Sensor	Direct Exhaust System	Specialty Exhaust System	Positive Static Pressure	Negative Static Pressure	Carbon Dioxide Sensor	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Special Education																		
Vocational Lab		●				●	●		●		●							
Speech / Diagnostics		●				●			●		●							
Academic Intervention		●				●			●		●							
Office / Conference		●				●			●		●							
Sensory Motor Lab		●				●	●		●		●							
Washer/Dryer		●				●												
Storage (Equipment)		●																
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Media Resource Center																		
Reading Rm / Teaching Area		●		●		●			●		●							
Circulation		●							●									
Workroom / Storage		●				●			●		●							
Storage (A/V Stor./ Equip. / Prof. Library)		●				●			●									
Presentation Room		●				●			●		●							
Offices		●				●			●		●							
Group Rooms		●				●			●		●							
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Empower Center																		
Core Space		●		●		●			●		●							
Staging Area		●				●			●									

	HVAC Systems																
	Heated Only	Fully Conditioned	Ventilated Only	Dedicated HVAC Equipment	Redundant HVAC Equipment	Temp\Humidity Sensor	Direct Exhaust System	Specialty Exhaust System	Positive Static Pressure	Negative Static Pressure	Carbon Dioxide Sensor	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Career and Technical Education																		
CTE Studio		●				●			●		●							
Low Intensity Lab		●				●			●		●							
Medium Intensity Lab		●				●	○	○		●	●							
High Intensity Lab		●		●		●	○	○		●	●							
Safety Vestibule		●																
Prep/Workroom		●				●			●		●							
Dressing / Locker/ Changing		●				●				●	●							
Storage		●				●			●		●							
Professional Learning Center		●				●			●		●							
Group Rooms / Breakout		●				●			●		●							
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Visual Arts																		
2D Studio		●				●	●				●							
3D Studio		●				●	●				●							
Kiln		●					●	●										
Storage		●																
Digital Arts Studio		●				●					●							
Art Gallery																		
Professional Learning Center		●				●			●		●							
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

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

	HVAC Systems																	
	Heated Only	Fully Conditioned	Ventilated Only	Dedicated HVAC Equipment	Redundant HVAC Equipment	Temp\Humidity Sensor	Direct Exhaust System	Specialty Exhaust System	Positive Static Pressure	Negative Static Pressure	Carbon Dioxide Sensor	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Music																		
Rehearsal Halls		●				●			●		●							
Practice Rooms		●				●			●		●							
Libraries / Workrooms		●				●			●		●							
Prep / Dressing		●				●				●	●							
Professional Learning Centers		●				●			●		●							
Storage (Uniform / Booster)		●				●			●									
Storage (Risers/ Equipment)		●				●			●									
Storage (Instruments)		●		●		●			●									
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Theater Arts																		
Theater Arts Studio		●				●			●		●							
Black Box		●				●			●		●							
Stage (Middle School)		●				●			●		●							
Storage (Theater Arts / AV)		●																
Storage (Props / Equipment)		●																
Script Library		●				●			●		●							
Professional Learning Center		●				●			●		●							
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

	HVAC Systems																	
	Heated Only	Fully Conditioned	Ventilated Only	Dedicated HVAC Equipment	Redundant HVAC Equipment	Temp\Humidity Sensor	Direct Exhaust System	Specialty Exhaust System	Positive Static Pressure	Negative Static Pressure	Carbon Dioxide Sensor	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Theater / Auditorium (High School)																		
Gallery / Lobby		●				●			●		●							
Ticket Booth		●				●			●		●							
Proscenium and Stage		●		●		●			●		●							
Wing Space		●				●			●		●							
Projection Control Rooms		●		●		●			●		●							
Storage		●																
Storage (Piano)		●		●		●			●									
Scenery Construction Area		●				●	○	○			●							
Loading Dock	●																	
House		●		●		●			●		●							
Laundry		●				●	○	○		●								
Prep / Dressing		●				●				●	●							
Makeup Room		●				●				●	●							
Green Room		●				●			●		●							
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Dance																		
Rehearsal Room		●				●			●		●							
Professional Learning Center		●				●			●		●							
Storage		●																
Locker Rooms		●				●				●								
[FUTURE PLACEHOLDER]																		

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

	HVAC Systems																	
	Heated Only	Fully Conditioned	Ventilated Only	Dedicated HVAC Equipment	Redundant HVAC Equipment	Temp\Humidity Sensor	Direct Exhaust System	Specialty Exhaust System	Positive Static Pressure	Negative Static Pressure	Carbon Dioxide Sensor	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Athletics & Wellness																		
Gym Lobby		●				●			●		●							
Competition Gym		●		●		●			●		●							
Multipurpose/Practice Gym		●		●		●			●		●							
Storage		●																
Weight Room		●				●				●	●							
PE Locker Rooms		●				●	●			●								
Athletic Locker Rooms		●				●	●			●								
Educator / Coaches Offices		●				●			●		●							
Educator / Coaches Showers		●					●			●								
Athletic Training Room		●				●	●			●								
Concession		●				●												
Wrestling Room		●				●				●	●							
Laundry Rooms		●				●	○	○		●								
Health Studio		●				●			●		●							
PE Fitness Room		●				●			●		●							
Professional Learning Center		●				●			●		●							
Group Rooms		●				●			●		●							
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Food Services																		
Dining Commons		●		●		●			●		●							
Serving		●		●		●		●		●								
Kitchen		●		●		●		●		●								
Storage (Chairs, Tables, After School)		●																
[FUTURE PLACEHOLDER]																		

	HVAC Systems																
	Heated Only	Fully Conditioned	Ventilated Only	Dedicated HVAC Equipment	Redundant HVAC Equipment	Temp\Humidity Sensor	Direct Exhaust System	Specialty Exhaust System	Positive Static Pressure	Negative Static Pressure	Carbon Dioxide Sensor	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Administration Space																		
Private Offices		●				●			●		●							
Secretaries / Clerks		●				○			●		○							
Reception / Main Office		●				●			●		●							
Registrar		●				●			●		●							
Conference Room		●				●			●		●							
Bookkeeper		●				○			●		○							
Data Clerk		●				○			●		○							
Workroom		●				●			●		●							
Storage (Records)																		
Testing		●				●			●		●							
Mechanical / PA		●				●			●									
ISSSC		●				●			●		●							
School Resource Officer (SRO)		●				○			●		○							
Mother's Room		●				●			●		●							
Professional Learning Center		●				●			●		●							
Commuter Shower		●					●			●								
Storage (Supply)																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

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

	HVAC Systems																
	Heated Only	Fully Conditioned	Ventilated Only	Dedicated HVAC Equipment	Redundant HVAC Equipment	Temp\Humidity Sensor	Direct Exhaust System	Specialty Exhaust System	Positive Static Pressure	Negative Static Pressure	Carbon Dioxide Sensor	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Student Mental Wellness and Counseling																		
Offices		•				•			•		•							
Core Counseling		•				•			•		•							
Reception		•				•			•		•							
Storage		•																
Conference / Group Room		•				•			•		•							
College / Career Center		•				•			•		•							
Wellness Room		•				•			•		•							
School Mental Health Center		•				•			•		•							
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Health Services																		
Care Center		•				•			•		•							
Storage		•																
Office		•				•			•		•							
Isolation		•				•	•			•	•							
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Community																		
Community Room		•		•		•			•		•							
Professional Learning Center		•				•			•		•							
Group Rooms		•				•			•		•							
Office		•				•			•		•							
Storage		•																
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

	HVAC Systems																
	Heated Only	Fully Conditioned	Ventilated Only	Dedicated HVAC Equipment	Redundant HVAC Equipment	Temp\Humidity Sensor	Direct Exhaust System	Specialty Exhaust System	Positive Static Pressure	Negative Static Pressure	Carbon Dioxide Sensor	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Building Support / Restrooms																		
Central Plant	●					●	●			●								
Electrical / Telecomm Closets		●	●	●	●	●												
Mechanical Rooms	●					●												
Storage		●																
Book Rooms		●		●		●			●									
Custodial Office		●				●			●		●							
Custodial Closet	●						●			●								
All-User Restroom		●					●			●								
Single Restroom		●					●			●								
Life Skills Restroom		●					●			●								
Family Restroom		●					●			●								
Professional Learning Center		●				●			●		●							
School Store		●				●			●		●							
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

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

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General Requirements:

Requirements for all schools:

1. Technology:
    A. Meet with the Owner to determine all technology and technology requirements.
2. General Power:
    A. Provide a minimum of two receptacles in walls designated to receive power in addition to equipment needs unless noted otherwise.
    B. Provide duplex receptacles unless noted otherwise.
    C. Floor power allowed only in carpeted locations except all performance stages.
    D. All floor boxes for floor power and data to be flush or low profile with elevation of finished floor.
    E. Where walls are constructed of glass or movable partitions, relocate power as additional power to an adjacent wall.
3. Room Specific Power:
    A. Studios – Provide at minimum 2 receptacles on each wall around the perimeter of each room, in addition to receptacles for required equipment. In locations where the minimum number of receptacles cannot be met, provide floor/ceiling power or additional receptacles on adjacent walls. At walls where receptacles are more than 12-feet apart, provide additional receptacles.
    B. Offices –
        i. For offices sized 150 SF or smaller, provide 2 receptacles total, dispersed on different walls.
        ii. For offices sized greater than 150 SF, provide a minimum of one receptacle on each wall. Confirm the quantity of telecommunications outlets required with the Owner.
    C. Conference Rooms – Provide a floor box with power and USB ports in all conference rooms. Coordinate location with room layout and specified furniture (refer to *Chapter 6 – Furniture Standards, Performance Requirements* for conference room furniture requirements). In lieu of available furniture selection, locate floor box in center of the room.
    D. Restrooms – Provide one convenience receptacle minimum. Circuit receptacle with

the adjacent corridor.

E. Storage rooms – Provide one convenience receptacle for every 100 square feet, one receptacle minimum. Circuit receptacle(s) with the adjacent corridor.

F. Copier Room – Provide a dedicated 120v, 20amp circuit for each copier minimum. Confirm copier power requirements with the Owner to determine need for a 208v outlet.

G. MDF and IDF Rooms – Provide one convenience receptacle near the door designated as 'dirty' power. Circuit this receptacle with receptacles in the adjacent corridor but do not circuit receptacle with other receptacles within the MDF or IDF. Provide a minimum of one receptacle on each wall. Provide additional receptacles as directed by the Owner to support equipment. Confirm requirements of UPSs and other equipment with the Owner.

H. Media Center Reading Room – Provide evenly distributed floor power to allow for maximum flexibility.

I. Mother's Room – Provide one receptacle at above the countertop and at minimum one receptacle at a typical mounting height.

J. Life Skills Studio Restroom(s) – Provide at minimum one receptacle directly adjacent to the changing table.

4. Outdoor Building Power:
    A. Provide lockable convenience outlet(s) at all outdoor learning areas. Confirm location and quantity with the Owner.
5. Room Specific Data
    A. SRO Offices – Provide three data drops in a singular faceplate. Coordinate location with furniture design.
    B. Offices, Typical
        i. For offices sized 150 SF or smaller, provide two data drops total, dispersed on different walls.
        i. For offices sized greater than 150 SF, provide a minimum of one data drop on each wall (total of four data drops). Confirm the quantity of telecommunications outlets required with the Owner.
    C. Professional Learning Centers (PLCs)
        i. For PLCs sized 300 SF or smaller, or serving two staff or less, provide two data drops total, dispersed on different walls.
        ii. For PLCs sized greater than 300 SF, or serving three or more staff, provide

a minimum of one data drop on each wall (total of four data drops). Confirm the quantity of telecommunications outlets required with the Owner.

D. Administration Reception
    i. Provide two data drops per station at Reception desks. Confirm quantity of stations with Owner.

6. Wireless Access Points:
    A. Provide additional data for wireless access points for 100% wireless coverage of the building based on building configuration and input from the Owner.
    B. Ensure access to WiFi for all storage areas for storing mobile technology or learner devices to support maintenance needs. Wireless Access Points can be provided in nearby or adjacent spaces, provided storage areas have access.
    C. Provide additional Wireless Access Points in storage areas as directed by the Owner.
7. Public Address:
    A. Ensure all storage and accessory spaces without a public address system requirement are within proximity of a speaker for safety announcements. Public address speakers can be provided in nearby or adjacent spaces, including corridors, provided announcements can be heard throughout the building.
    B. Provide additional speakers as directed by the Owner.
    C. Provide volume control in additional areas as directed by the Owner

8. Synchronous Clock
    A. In addition to locations outlined in this section, provide synchronous clocks in all publicly accessible areas including but not limited to:
        i. Hallways and corridors
        ii. Lobby and reception areas
9. Lighting:
    A. Consider ceiling height and access to all lighting for cleaning and maintenance.
    B. Provide color tuning for SPED rooms allowing occupant to vary the color temperature of the fixtures from warm to cool.
    C. Provide lighting within crawl spaces.
10. Kitchen / Servery
    A. Provide two data drops to support POS and phone systems within the server.

11. Time Clocks
    A. Provide data connections 45" AFF for time clocks as follows. Timeclock locations require approval by the Owner, especially at campuses with multiple buildings.
    B. Elementary schools: minimum one timeclock at the administration area and one at the kitchen.
    C. Middle schools: minimum one timeclock at the administration area and one at the kitchen.
    D. High schools: minimum two time clocks for administration areas and one at the kitchen.
12. Vending Machines:
    B. Confirm location of vending machines with the Owner and provide the appropriate power.
15. Theatrical Lighting
    A. Refer to *Chapter 5, Section 265561 – Theatrical Lighting* for lighting fixture and controls requirements for all schools.
16. Life Skills Restrooms
    B. Coordinate location to provide a GFI receptacle with cover behind intended location of changing table. Refer to *Chapter 4, Equipment* and *Chapter 5, Section 117300 – Patient Care Equipment* for changing table requirements.
16. Desktop VOIP Phones
    A. Library Media Center – Circulation Desk: Provide a hard-wired VOIP phone at the circulation desk. Coordinate data location with planned location of circulation desk.
    B. Care Center Office / Desk - Provide an additional data drop connection for a desktop VOIP phone at the campus Registered Nurse's primary workstation.

Additional requirements for middle & high schools:

1. 3D Art and 2D Art:
    A. Provide track lighting at tackwall locations.
    B. Provide daylight temperature fixtures for general lighting.
2. Visual Arts – Art Galleries
    A. Provide minimum 4 feet of track lighting at each Art Gallery.

3. Stages and Theater/Auditorium:
    A. Middle School
        i. Provide two data drops in the required floor box at Middle School Stages. Coordinate location with Owner.
    B. High School
        i. Provide aisle lighting integrated in seating.
        ii. Provide wide-angle general use lighting on a separate switch from theatrical lighting over both the stage and house.
    C. Refer to *Appendix C, HS UIL Plot Plan* and *Appendix C, MS UIL Plot Plan* for lighting plot plans.
4. Black Box Studio:
    A. Refer to *Chapter 5, Section 265561 – Theatrical Lighting*. Review design with the Owner.
    B. Provide general use lighting on a separate switch from theatrical lighting.
5. Career and Technical Education
    A. Medium Intensity Labs
        i. Provide a combination of 120V and 220V outlets. Provide single and double phase 220V outlets.
6. Empower Center
    A. Refer to *Educational Specifications, Appendix B* for additional information regarding the Empower Center.
7. Gymnasiums
    A. Provide two electrical outlets and two data drops in a floor box outside the extents of the gymnasium striping, on the home team side, to support scoring tables for basketball, volleyball, and wrestling. Coordinate locations with the Owner to minimize tripping.
    B. Confirm floor power and data needs for Multipurpose and Practice Gyms with Owner.
    C. Provide a minimum of two electrical and two data outlets on walls for future display monitors. Coordinate locations with the Owner.
    D. Review electrical and data layouts with the Owner to ensure all audiovisual needs for athletic and non-athletic school functions are supported.

Master Charts:

	Power				Data							Miscellaneous						
	One-Wall	Perimeter	Floor	Ceiling	One-Wall	Perimeter	Floor	Wireless Access Point	Wall-Mounted VoIP Phone	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	Public Address Speaker	Synchronous Clock	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Learning Neighborhood																		
Professional Learning Center		●				●		●	●			●	●					
PLC Meeting Room		●			●													
Maker Space		●			●			●	●			●	●					
Science Lab		●			●			●	●			●	●					
Storage / Prep (Science)		●			●			●				●						
Studio / Studio (SPED Flex)		●			●			●	●			●	●					
Open Collaboration		○		○	●			●				●	●					
Group Rooms		●			●			●				●	●					
Neighborhood Storage	●																	
Studio (Life Skills)		●			●			●	●			●	●					
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Dedicated Instructional																		
Journalism Studio / Lab		●				●		●	●			●	●					
Storage (Journalism)	●																	
Video Production Lab		●				●		●	●			●	●					
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

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

	Power				Data							Miscellaneous						
	One-Wall	Perimeter	Floor	Ceiling	One-Wall	Perimeter	Floor	Wireless Access Point	Wall-Mounted VoIP Phone	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	Public Address Speaker	Synchronous Clock	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Special Education																		
Vocational Lab		●			●			●	●			●	●					
Speech / Diagnostics		●				●		●				●	●					
Academic Intervention		●				●		●				●	●					
Conference		●					●	●				●						
Sensory Motor Lab		●		●	●			●	●			●						
Washer/Dryer		●										●						
Storage (Equipment)	●																	
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Media Resource Center																		
Reading Rm / Teaching Area		●	●		●			●				●	●					
Circulation		●					●	●				●						
Workroom / Storage		●			●			●				●	●					
Storage (A/V Stor./ Equip. / Prof. Library)		●			●			●				●						
Presentation Room		●			●			●	●			●	●					
Offices		●				●		●				●						
Group Rooms		●			●			●				●	●					
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Empower Center																		
Core Space		●		●				●	●			●	●					
Staging Area	●				●													

	Power				Data							Miscellaneous						
	One-Wall	Perimeter	Floor	Ceiling	One-Wall	Perimeter	Floor	Wireless Access Point	Wall-Mounted VoIP Phone	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	Public Address Speaker	Synchronous Clock	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Career and Technical Education																		
CTE Studio		●	○	○		●		●	●			●	●					
Low Intensity Lab		●	●			●		●	●			●	●					
Medium Intensity Lab		●	○	○	●			●	●			●	●					
High Intensity Lab		●		●	●			●	●			●	●					
Safety Vestibule	●												●					
Prep/Workroom		●			●			●				●						
Dressing / Locker/ Changing		●										●						
Storage	●																	
Professional Learning Center		●				●		●	●			●	●					
Group Rooms / Breakout		●			●			●				●	●					
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Visual Arts																		
2D Studio		●		●		●		●	●			●	●					
3D Studio		●		●		●		●	●			●	●					
Kiln	●																	
Storage	●																	
Digital Arts Studio		●				●		●	●			●	●					
Art Gallery		○	○	○								●						
Professional Learning Center		●				●		●	●			●	●					
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

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

	Power				Data							Miscellaneous						
	One-Wall	Perimeter	Floor	Ceiling	One-Wall	Perimeter	Floor	Wireless Access Point	Wall-Mounted VoIP Phone	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	Public Address Speaker	Synchronous Clock	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Music																		
Rehearsal Halls		●			●			●	●			●	●					
Practice Rooms		●																
Libraries / Workrooms		●			●			●				●						
Prep / Dressing		●										●	●					
Professional Learning Centers		●				●		●	●			●	●					
Storage (Uniform / Booster)	●																	
Storage (Risers/ Equipment)	●																	
Storage (Instruments)	●																	
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Theater Arts																		
Theater Arts Studio		●			●			●	●			●	●					
Black Box		●			●			●	●			●						
Stage (Middle School)		●	●		●		●	●				●						
Storage (Theater Arts / AV)	●																	
Storage (Props / Equipment)	●																	
Script Library		●			●			●				●						
Professional Learning Center		●				●		●	●			●	●					
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

	Power				Data							Miscellaneous						
	One-Wall	Perimeter	Floor	Ceiling	One-Wall	Perimeter	Floor	Wireless Access Point	Wall-Mounted VoIP Phone	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	Public Address Speaker	Synchronous Clock	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Theater / Auditorium (High School)																		
Gallery / Lobby		●						●				●						
Ticket Booth		●			●			●										
Proscenium and Stage		●						●				●						
Wing Space		●						●										
Projection Control Rooms		●			●							●						
Storage	●																	
Storage (Piano)																		
Scenery Construction Area		●						●	●			●	●					
Loading Dock		●						●										
House		●						●				●						
Laundry		●										●						
Prep / Dressing		●										●	●					
Makeup Room		●						●				●	●					
Green Room		●						●				●	●					
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Dance																		
Rehearsal Room		●			●			●	●			●	●					
Professional Learning Center		●				●		●	●			●	●					
Storage	●																	
Locker Rooms	●							●				●	●					
[FUTURE PLACEHOLDER]																		

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

	Power				Data							Miscellaneous						
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Athletics & Wellness																		
Gym Lobby		●						●				●						
Competition Gym		●			●		●	●				●	●					
Multipurpose/Practice Gym		●			○		○	●				●	●					
Storage	●																	
Weight Room		●			●			●	●			●	●					
PE Locker Rooms	●							●				●	●					
Athletic Locker Rooms	●							●				●	●					
Educator / Coaches Offices		●				●		●				●						
Educator / Coaches Showers																		
Athletic Training Room		●			●			●	●			●						
Concession		●			●			●				●	●					
Wrestling Room		●			●			●	●			●						
Laundry Rooms		●										●	●					
Health Studio		●			●			●	●			●						
PE Fitness Room		●			●			●	●			●	●					
Professional Learning Center		●				●		●	●			●	●					
Group Rooms		●			●			●				●	●					
[FUTURE PLACEHOLDER]													●					
[FUTURE PLACEHOLDER]																		
Food Services																		
Dining Commons		●						●				●	●					
Serving		●			●			●				●						
Kitchen		●			●			●				●						
Storage (Chairs, Tables, After School)	●																	
[FUTURE PLACEHOLDER]																		

	Power				Data							Miscellaneous						
	One-Wall	Perimeter	Floor	Ceiling	One-Wall	Perimeter	Floor	Wireless Access Point	Wall-Mounted VoIP Phone	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	Public Address Speaker	Synchronous Clock	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Administration Space																		
Private Offices		●				●						●						
Secretaries / Clerks		●				●			●			●						
Reception / Main Office		●			●			●				●	●					
Registrar		●				●		●				●	●					
Conference Room		●	●				●	●				●	●					
Bookkeeper		●				●						●						
Data Clerk		●				●						●						
Workroom		●			●			●	●			●	●					
Storage (Records)		●																
Testing		●				●		●				●						
Mechanical / PA		●																
ISSSC		●			●			●	●			●	●					
School Resource Officer (SRO)		●			●							●						
Mothers Room	●											●						
Professional Learning Center		●				●		●	●			●	●					
Commuter Shower																		
Storage (Supply)																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

Legend					
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Student Mental Wellness and Counseling																		
Offices		●			●							●	●					
Core Counseling		●			●			●	●			●	●					
Reception		●						●				●	●					
Storage		●																
Conference / Group Room		●	●				●	●				●	●					
College / Career Center		●				●		●				●	●					
Wellness Room		●			●			●				●	●					
School Mental Health Center		●				●		●				●	●					
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Health Services																		
Care Center		●			●			●				●						
Storage	●																	
Office		●			●				●			●						
Privacy		●																
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
Community																		
Community Room		●			●			●	●			●	●					
Professional Learning Center		●				●		●	●			●	●					
Group Rooms		●			●			●				●	●					
Office		●				●						●						
Storage	●																	
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

	Power				Data							Miscellaneous						
	One-Wall	Perimeter	Floor	Ceiling	One-Wall	Perimeter	Floor	Wireless Access Point	Wall-Mounted VoIP Phone	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	Public Address Speaker	Synchronous Clock	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*	*[FUTURE PLACEHOLDER]*
Building Support / Restrooms																		
Central Plant		●			●			●				●						
Electrical / Telecomm Closets		●																
Mechanical Rooms	●							●										
Storage	●																	
Book Rooms	●																	
Custodial Office		●			●							●						
Custodial Closet	●																	
All-User Restroom												●						
Single Restroom																		
Life Skills Restroom																		
Family Restroom																		
Professional Learning Center		●				●		●	●			●	●					
School Store		●			●													
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		
[FUTURE PLACEHOLDER]																		

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

SUPPLEMENTAL INFORMATION

General Requirements:

Requirements for all schools:

1. Main Storage:
    A. Locate near the dock area to receive deliveries of cleaning materials, supplies, and other items.
2. Custodial Closets:
    A. Locate at the entrance to wing or neighborhood.
    B. Seal all penetrations at Custodial Closet walls and ceilings.

Additional requirements for middle & high schools:

1. Theater/Auditorium:
    A. Provide sightlines to the stage from all seating. Confirm seating quantity with the Owner.
    B. Provide space directly in front of the stage for orchestra pit or stage extension platforms.
    C. Determine proscenium and stage dimension requirements with the Owner.

CHAPTER 5

PERFORMANCE REQUIREMENTS

AUSTIN
Independent School District

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MaraThon Kids!
T.A. Brown
2nd Grade

SITE DESIGN REQUIREMENTS

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The following items require multi-disciplinary coordination and cover several specification sections. Design teams are required to discuss specific design solutions and recommendations on a project-by-project basis with the Owner. The Owner requires LEED certification on all new projects. Projects undergoing major renovations and additions are subject to the Owner's Sustainability Scorecard, AEGB, or LEED depending on scope of work.

SITE SELECTION

Design teams should use the following documents in the initial stages of site acquisition and preliminary design work and evaluate options with the Owner:

1. Site Evaluation Matrix (Refer to *Appendix C – Additional Materials*).
2. Phase One Environmental Site Assessment Report: Confirm this report is provided with transfer of property to the Owner. If the report indicates potential contamination, conduct a Phase II Environmental Site Assessment. If contamination is confirmed, remediate the site to meet the more stringent requirements between local, state, or federal residential (unrestricted) standards.
3. Zoning: Confirm existing site zoning is adequate to support the proposed educational facility uses (including CTE facilities and Farm Agriculture) if applicable.
4. CTE Farm Agriculture: Confirm adequate land area to support the Farm Ag functions as required by the Owner. Provide 3-5 acres minimum for these functions.
5. Austin ISD + City Agreement (Refer to *Chapter 2 – Interlocal Agreements*)
    A. Obtain latest version in electronic format from the Owner.
    B. Comply with City of Austin Watershed Protection requirements.
6. LEED/AEGB Sustainability Scorecard, as applicable to the project. (Refer to *Chapter 3 – Energy, Water, and Sustainability*)
    A. Obtain latest version in electronic format from the Owner.

SITE DESIGN

Easements

When easements are required as part of a project, follow the following protocol:

1. Identify the need for an easement.
2. Review the easement template with the Owner and provide it to the Owner's designated attorney. The easement template is either provided by the City, the utility, or in rare cases by the Owner's attorney.
3. The Owner's designated attorney will revise the document accordingly and circulate for approval.
4. Submit the proposed easement to the City reviewers for signature. If there are additional requests or comments from the City, consult with the Owner's designated attorney.
5. After the easements are signed by the City reviewers, provide the documents to the Owner for Board approval.

Site Design for Future Expansion

1. Provide designs for the building and site that include adequate space for future building additions adjacent to the school facility. Each new educational building shall accommodate at least (8) future studios or other identified facility need (i.e., auxiliary gym, performing arts, etc.) without major site utility relocations or structural modifications to the facility.
2. Site Storage Buildings: Review specific storage and service needs for athletics, band, and CTE programs with the Owner and determine if freestanding site buildings are required.
    A. Identify program storage needs and square footage for all site buildings.
    B. Building materials and construction type shall closely match or complement the primary building facility.
    C. Provide a secure, lockable building with security systems and minimal heat and ventilation.

3. Upon approval from the Owner, telecommunication towers may be installed on Owner's properties in accordance with Land Development Standards Agreement (ILA). Towers shall not be located within 50 feet of Austin ISD buildings, except for portable buildings with Owner's approval.

Parking Lot/Site Circulation

1. Provide a minimum of one off-street, car drop-off loop for parents. Two separate car loops are highly desired, but dependent on available site area. Refer to *Chapter 5, Safety and Security.*
    A. Provide a "car-only", separate loading and unloading zone to accommodate a minimum of 30 cars at each school with a minimum length of 660-feet.
    B. Use 22-feet minimum length per car for planning car stacking in drop-off areas. A minimum drive width of 24-feet is required for one-way or two-way drives to accommodate cars in a stacking lane and allow cars to pass on the inside lane.
    C. Provide 8-feet minimum width, paved, two-way bike and pedestrian path connection to the public right-of-way.
    D. Design drives to accommodate service vehicles, buses, and fire trucks using "Auto-Turn" CAD program or equal to ensure drives will accommodate prescribed vehicle turning radii.
    E. Include Owner-approved "No-Idling" signage at pick-up, drop-off, loading dock, and parking areas.
    F. Refer to the *Safe Routes to Schools* (SRTS) program for funding sources and accommodations for bikes and pedestrians. Design team to meet with SRTS prior to submission of site permit to City of Austin.
    G. Provide signage to ensure clear wayfinding for vehicular circulation through the site.
2. Provide bus loading area and drop-off loop drives, separate from car areas.
    A. Provide a bus loading and unloading zone to accommodate a minimum of 10 buses at each school with a minimum length of 400-feet. Use 40-feet per full-size bus and 30-feet for short bus space planning.
    B. Designate a one-way traffic flow for bus loading areas with signs and striping and with adequate width for buses to pass another bus in the loading area.

C. Design loading areas for learner safety and allow learners to directly enter the bus from the covered area and not pass between other buses or vehicles.
D. Provide canopy or shade structures over walkways adjacent to loading areas.
    i. Provide a minimum canopy length of 400-feet with a minimum width of 8-feet. Coordinate height of canopy with Owner to avoid conflicts with buses, emergency vehicles, etc.
E. ADA-accessible loading areas are mandatory. Locate these loading areas near the front door of the building.
F. Provide lighting for early morning and evening loading area activities.
G. Consider universal design principles when designing campus access.
H. Provide signage to designate loading areas and safety zone markings.
I. Secondary Schools: Provide parking space and drives designed for circulation to accommodate service and delivery tractor-trailer vehicles of 53-feet in length. Special school programs may have specific turning requirements and parking needs, such as the band trailer, etc. Determine exact vehicle access requirements with the Owner for each school.

3. Program-Specific Service and Loading
    A. Refer to *Educational Specifications, Part 2 – Space Type Adjacency Diagrams* for service and loading requirements for specific program areas for middle and high schools.
    B. Coordinate with Owner to identify and provide miscellaneous service/loading and parking needs for vehicles such as (but not limited to) semi tractor-trailers for transporting band equipment or delivery truck loading zones for campus CTE programs.

4. Electric Vehicle Charging Stations
    A. Provide supporting infrastructure necessary to facilitate the future installation of wiring and Level-2 electric vehicle (EV) charging stations for 10% of total parking spaces.
        i. Comply with Texas Accessibility Standards
        ii. Provide 5-year warranty and maintenance plan for charging stations.
        iii. Each station will need to generate data for learners to use with the Owner's STEM curriculum for electric vehicles, green energy, and sustainable mobility. For more information, refer to: EV for Schools program
5. Bicycle Facilities
    A. Provide bike parking for 10% of all FTEs and 5% of learners (excluding learners in 3rd grade and lower). For schools with greater than 500 learners, provide 25 spaces minimum.
    B. Protect bicycles from the elements with overhead cover for at least 5% of FTEs and learners (excluding learners in 3rd grade and lower).
        i. Must be within 300-feet of any functional facility entrance.
        ii. Provide dedicated bicycle lanes/paths that extend at least to the end of the school property with no barriers (e.g., fences) on school property.
    C. Provide an interior changing room for bicycle riders.
    D. Building Facility: Provide 1 on-site shower for bicycle riders for the first 100 regular building occupants, excluding learners, and 1 additional shower for every additional 150 regular building occupants, excluding learners. Showers can be shared with coaches' shower facilities.
6. Comply with current Interlocal Agreement between the City of Austin and the Owner for site design requirements. Refer to *Chapter 2 – Land Development Standards Agreement* and requirements below.
    A. For early childhood centers, elementary schools, and middle schools:
        i. Provide a minimum of 1.5 spaces per faculty member. Coordinate with Owner for FTE counts.

ii. Provide parking area (2-5 spaces) for service and kitchen staff located near service dock area.

B. High Schools

i. Provide 1:1 parking space for faculty.

ii. Provide additional parking for visitors.

a. 20 spaces minimum and 40 spaces maximum

iii. Provide 1:3 parking spaces for learners.

iv. Provide separate faculty, learner, and visitor parking areas.

v. Refer to *Educational Specifications – Space Programs* for band practice lot size requirements. Paint football field striping per NFHS guidelines and including field perimeter, yard lines, numbers, and hash marks in "green" or other color with minimal contrast to the striping for cars.

7. Provide at least one covered walkway between outdoor learning spaces and for campuses with multiple buildings.

STORM WATER MANAGEMENT

1. In a manner best replicating natural site hydrology processes, retain on-site runoff using low-impact development (LID) and green infrastructure (GI) practices such as rain gardens, vegetated infiltration basins, bioretention ponds and rainwater harvesting. Refer to LEED v4 / v4.1 SSc Rainwater Management.
2. Minimize site disturbance (i.e., compacted soils, riparian buffer, tree canopy), reserve existing vegetation, and minimize impervious cover.
3. Provide permeable soil mixes, stone rip-rap, native vegetation (plants/seeding) on berms and swales. Refer to the City of Austin Environmental Criteria Manual for best practices. Refer to *Section 312000 – Earth Moving* for soil and topsoil requirements.
4. Provide permeable pavements in low traffic areas as part of the overall storm water treatment strategy by the design team. Pavement types include:
    A. Permeable unit pavers with clean coarse sand joints over drainage aggregate and perforated sub-drain piping.
    B. Permeable concrete paving with clean coarse sand joints over drainage aggregate and perforated sub-drain piping.
5. Provide permeable soil mixes that meet the following criteria:
    A. Mixes shall consist of 80% clean sand and 20% coarse organic peat or approved alternative.
    B. Include sub-drainage aggregate below permeable soil mix with perforated sub-drain piping.
    C. Include filter fabric separation between aggregate and sub-grade.
6. Domestic Animal Habitats (Outdoor Learning):
    A. Permeable soil substrates: Provide soil separation and sub-drain system below permeable animal enclosures and extend to on-site storm water treatment before extending to the storm system.
7. Rain Gardens
    A. Design rain gardens according to the latest guidelines from the City of Austin Watershed Protection Department Grow Green Guidelines for Rain Gardens and in agreement with Environmental Criteria Manual 1.6.7.H. It is important to make inlets and outlets that do not erode or clog and are easy to keep clear.

ALTERNATIVE WATER SOURCES

Design teams shall evaluate system feasibility, project-specific water needs and code requirements to determine overall water system design.

1. Dual Plumbing
    A. Design and construct supply plumbing to water closets and urinals that is separate from the water supply to other fixtures. Ensure this plumbing is capable of being disconnected from the building's potable water service and reconnected to an auxiliary water source in the future, even if no such source is available at the time of construction.
    B. Refer to AEGB 2022 Basic Requirement #7
2. Municipal reclaimed water line
    A. If a project is located within 250 feet of a reclaimed water line, the project shall connect to a reclaimed water line and use reclaimed water for irrigation, cooling, toilet flushing, and other significant non-potable water uses identified in the water balance calculator. (Ord. No. 20210930-117 , Pt. 1, 12-1-21)
    B. Refer to Austin Water for plans to expand reclaimed water service
3. Onsite Non-Potable Water Collection and Storage
    A. All systems
        i. Provide above-ground cistern(s) for non-potable collection and storage. Size based on anticipated quantity and anticipated irrigation needs. Discuss with Owner whether to collect separately or combine into single cistern.
        ii. Containers can be galvanized metal or HDPE plastic.
        iii. Systems require secure and tamper-proof measures. Lock the manual valve and access to cistern to allow for use only by Owner's maintenance staff and to prevent unauthorized use by the public, educators, and learners.
        iv. Provide signage that rain collection water in cisterns is non potable and should not be used to water edible gardens.

v. Consider adding education signage and visible water level gauges to enhance learning opportunities associated with the cistern as approved by the Owner.

vi. Beginning December 1, 2023, any new commercial project greater than 250,000 SF must comply with the City of Austin's Onsite Water Reuse System. These projects will have to collect and treat either rainwater and air conditioner condensate or graywater for reuse in buildings for toilet/urinal flushing, laundry, irrigation, and cooling.
(Ord. No. 20210930-117 , Pt. 4, 12-1-23)

B. Condensate

i. Use condensate water for drip irrigation below organic wood mulch, soil, or turfgrass root zone areas. Do not spray aerially and do not use for gardens with consumable plants. Do not use in building plumbing systems.

ii. Use a small booster pump with a submersible suction intake inside the cistern and include water filtration and UV treatment systems to deliver relatively clean, non- potable water to the drip irrigation system. Confirm required water pressure. Drip irrigation tubing with emitters requires approximately 30-40 PSI.

iii. Provide float control valve and irrigation make up water valve with an air gap at the top of the cistern if continuous use is required during dry and wet seasons.

iv. Refer to *Chapter 5, Section 221116/221119 – Domestic Water Piping and Specialties*. Provide indoor condensate piping connections to connect with the outside condensate water cistern.

C. Rainwater

i. Cisterns (large capacity, for landscape irrigation)

a. Use drip irrigation pipe with special emitters that prevent root intrusion. Design for installation below organic wood mulch, soil, or turfgrass root zone areas.

b. Use a small booster pump with a submersible suction intake inside the cistern and include water filtration and UV treatment systems to deliver relatively clean, non- potable

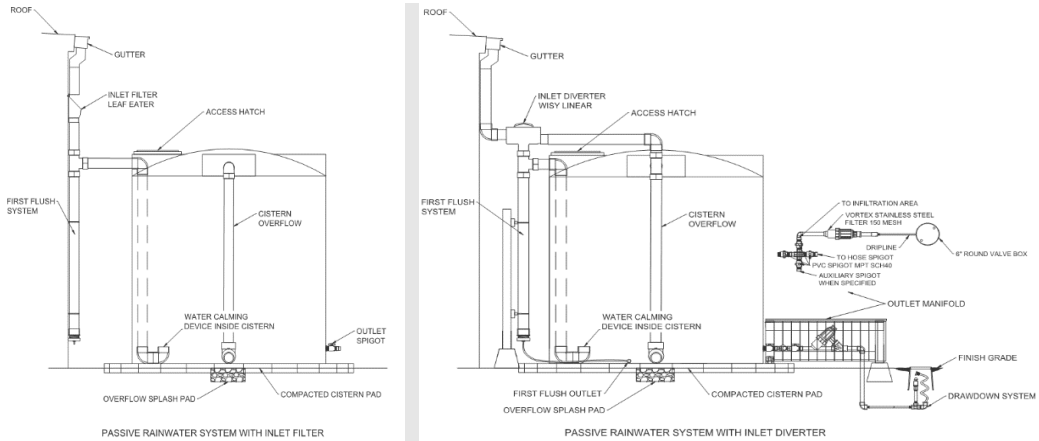
water to the drip irrigation system. Confirm required water pressure. Drip irrigation tubing with emitters require approximately 30-40 PSI.

c. Provide float control valve and irrigation make up water valve with an air gap at the top of the cistern if continuous use is required during dry and wet seasons.
d. Gravity-fed water to a “drip” pipe is allowed as a lower cost alternate to a filtered and pumped system but will increase the maintenance required to keep the system operational. Unfiltered, gravity-fed systems to a “drip” pipe are susceptible to clogging. Provide flush valves and a mechanism to drain and flush the tubing as required. Drip tube piping may require more frequent replacement.
e. Refer to *Chapter 5, Section 328400 – Planting Irrigation*.

ii. Barrels (small capacity, for school gardens)

a. Locate rain barrels near landscaped areas or outdoor studios for integration into educational curriculum.
b. Provide rain barrels that are galvanized metal or plastic.
c. Barrels must have overflow piping into the site storm water drainage system.

The diagram below shows Owner and City of Austin (COA) Watershed Protection Department approved rainwater cistern to irrigation system at Barrington School (1,500 gallon capacity) and the photo shows the cistern at Reilly Elementary School (Photo credit: City of Austin Watershed Protection Department)



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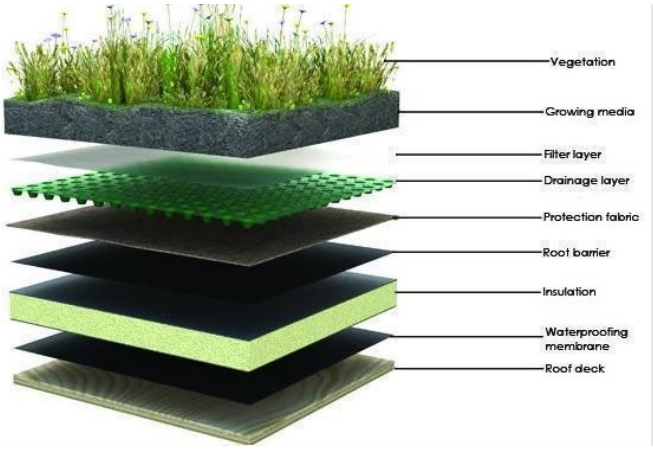
REILLY
ELEMENTARY SCHOOL
AUSTIN Independent School District

GREEN ROOFS

1. Evaluate rooftop or elevated deck planting areas as part of the design. Coordinate with on-site non-potable water collection and storage system.
2. Refer to *Chapter 5, Section 329300 – Plants* for commercially available, lightweight, permeable soil media. Provide the following design requirements:
    A. Saturated weight of 70-90 pounds/cubic foot maximum
    B. Extensive soil mixes consisting of topsoil, coarse clean sand, compost, and bio-char materials
    C. Separation fabric
3. Refer to *Chapter 5, Section 329300 – Plants* for plant material.
4. Refer to *Chapter 5, Section 328400 – Planting Irrigation* for low-flow or drip irrigation systems.
5. Refer to *Chapter 5, Division 07 - Thermal & Moisture Protection* for waterproof membranes and roof systems.
6. Refer to *Chapter 5, Section 321400 – Unit Paving* for pedestal paver systems over elevated structures.
7. Where green roofs are intended to be occupied for outdoor learning use, refer to *Chapter 5, Safety and Security – Building Exterior* for design requirements at all balconies and terraces.



OUTDOOR LEARNING SPACES

Categories of Outdoor Learning Spaces

General Guidelines for all Outdoor Learning Spaces

1. Promote creativity, use of imagination, and access for people of all abilities.
2. Promote healthy activities and school/community interaction.
3. Provide meaningful experience for all learners.
4. Offer a wide range of developmental benefits to learners and physical exercise.
5. All equipment is maintained by the Owner.
6. Provide separation from noisier soft and hard play areas to minimize sound and visual disruptions.
7. Consider outdoor ambient noise levels when designing the location for outdoor learning spaces and the intended activities.
8. Where possible, locate outdoor learning and play spaces away from roadways.
9. Consider universal design principles for all outdoor learning spaces.

Outdoor Studios

1. Locate outdoor learning away from areas that are potentially disrupted by future school expansion.
    A. Refer to *Educational Specifications, Part 4 - Outdoor Learning* for adjacency requirements and considerations.
2. Outdoor studios include community and school gardening spaces, nature trails, community gardens, etc. that align with the outdoor learning space, as described in the Owner's Educational Specifications.
3. Outdoor learning spaces should have multiple easy access to interior learning neighborhoods.
    A. Provide seating and furniture or amphitheater style concrete or local stone seat walls for at least 30 learners.
    B. Design learning environments with plants that have an educational story. For example, use native plants or non-invasive adapted plants that highlight the use of

plants by Native Americans as a dye, the use of plant by certain species of wildlife, the use of native plants by environmental professionals for water filtration, etc. Refer to region-appropriate, "child-friendly" plants listed in the Texas Nursery Landscape Association database.

4. Where outdoor studios are located adjacent to established wildflower meadows, provide educational signage in compliance with requirements outlined in *Chapter 5, Section 329300 – Plants*.
5. Shade: Provide shade structures or incorporate existing or new shade trees for outdoor learning spaces.
6. Outdoor Dining: Provide shaded concrete plaza areas for outdoor dining with fixed tables and chairs to accommodate at least 30 persons. Locate immediately outside the dining commons with visibility from the commons to the outdoor dining plaza. This area can double as an outdoor studio.
7. Design requirements:
    A. Materials
        i. Prefer natural turf grass and landscape materials. (Refer to *Division 32* for *Lawns and Grasses and Planting*).
        ii. Minimize, or limit use of synthetic turf in outdoor spaces.
        iii. Provide durable, hardscape surfaces.
        iv. Provide flexible, multi-purpose seating areas.
    B. Use of chalkboard type surfaces is discouraged. Provide areas for collaboration and pin-up surfaces with weather-resistant and durable materials. Provide outdoor-rated, maintenance-free surfaces or freestanding smooth walls for large "Post-It" notes, artwork, etc.
    C. Technology and power requirements
        i. Provide wi-fi and power outlets.
        ii. Consider solar powered outlets in outdoor learning spaces.
    D. Structural elements
        i. Provide level or tiered amphitheater-style seating, if set into the slope of the site.
        ii. Provide concrete or native stone seat walls.
    E. Balconies or Terraces – Refer to *Chapter 5, Safety and Security – Building Exterior* for design requirements at all balconies and terraces.

F. Security
    i. Unless approved by Owner, all outdoor learning spaces should be located within the secure perimeter.
    ii. Fencing is not required for outdoor learning spaces located within the secure perimeter fence.
    iii. Provide fencing and lockable access gates for Owner-approved outdoor learning spaces located outside of the secure perimeter fence. Refer to *Chapter 5, Section 281300 – Access Control Systems.*
    iv. Consider decorative fencing. Refer to *Chapter 5, Safety and Security.*
    v. Ensure line of sight for staff to view learners within outdoor learning areas.
    vi. Provide security lighting in outdoor areas.

G. Site furnishings: Provide moveable site furnishings and coordinate with the Owner. Specify fixed site furnishings as part of the general construction contract.
    i. Use flexible, moveable site chairs and tables in secured locations.
    ii. Refer to *Chapter 6, Furniture Standards* for design requirements for outdoor furniture.

Active Playgrounds

1. Refer to *Chapter 5, Section 116800 - Play Equipment*
2. Refer to *Chapter 5, Section 321816 – Playground Cushioned Surfacing.*
3. Consider universal design principles when designing active playgrounds.
4. Design separate playgrounds for the following age groups per IPEMA:
    A. Ages 2-5
    B. Ages 5-12

5. Soft Play
    A. Cushioned playground surfacing complying with IPEMA and ADA requirements and specified fall heights is required. Three surfaces are acceptable:
        i. Provide synthetic turf over unitary cushioned pad material over drainage aggregate and subdrain system.
        ii. Provide unitary or poured-in-place mat. Note: these systems may harden and degrade due to UV over time.
        iii. Provide engineered wood-fiber (EWF) over drainage aggregate and subdrain system. Note: EWF creates wheelchair maneuverability challenges.
    B. Unacceptable play surfacing:
        i. Aggregates consisting of washed pea gravel or sand are not acceptable as cushioned play.
6. Covered PE Play Slab/Hard Play:
    A. Concrete paving is preferred over asphalt to minimize heat island effects for cooler play surfaces. Asphalt paving shall have a reinforced concrete curb at least 12" wide by 6" thick to contain the asphalt and keep the edges from breaking.
    B. Locate near the gymnasium and connect with paved walkways.
    C. At elementary schools, match gymnasium striping/layout in the covered PE play slab area.
    D. Provide basketball equipment and striping to match interior Fitness Space Instructional Area. Refer to *Chapter 5, Athletic Facilities* for outdoor equipment requirements and *Appendix C, Elementary Gym – Floor Striping Options*.
    E. Incorporate durable, UV resistant low-VOC paint materials for striping, court games, trike paths, map diagrams, and other bright colors for pavement markings.
    F. Provide separation from play equipment in soft play areas and court games to keep activities separate.
7. Adventure pathways:
    A. Provide asphalt or concrete-paved, accessible walking and tricycle paths to connect to onsite play areas. Incorporate ways to simulate cities, communities, and street systems with play traffic signs and pavement striping. Create areas designed to encourage looping activities along the pathway.
8. Shade structures. Provide the following requirements:
    A. Shade structure to cover 100% of all play equipment at hard and soft play.
    B. Provide shade trees around the play equipment.

9. Nature-Based Play
    A. Provide delegated design specification requirements for play equipment and play structures that include securing to footings or concrete substrates to address live and dead structural loading.
        i. Locate near traditional playground areas within the secure site area and visible from the playground by Owner's staff.
        ii. Provide a well-designed environment that promotes natural study and play with sand and water. Include stumps and logs, engineered wood fiber or sand, soft surfacing, looping pathways, and other natural materials. Nature-based play may include, but is not limited to, mud kitchens, space for digging, dry creek beds, large loose parts for building, or large tree pieces for climbing.
        iii. Refer to *Appendix C – Recommended Plant List*.
    B. Several commercial companies offer these materials, including but not limited to Nature's Instruments, Bienenstock Natural Playgrounds and Outdoor Classrooms, and Greenspace Learning.

Gardens

1. Provide produce or habitat gardens per the Educational Specifications.
    A. Provide access to a potable water source for all community and school gardening spaces.
    B. Ensure that produce and habitat garden sites have a minimum of 6 hours daylight per day.
    C. Provide designs that avoid rodent or animal entrapment.
    D. Include gardens for vegetables, flowers, and other edible plants as required on a per project basis.
    E. Design gardens with minimal maintenance, since all maintenance will be done by the campus.
    F. Provide elevated planters made from stone or wood to keep out aggressive Bermuda grass and other noxious weeds. Install planters on pervious surfaces, with weeps if necessary to ensure proper drainage, and fill with high quality "gardening" soil.
    G. Provide ADA accessible planting tables.
    H. Provide a shed as required by the Educational Specifications to support storage of materials and equipment storage and potting supplies.
    I. Provide freeze-proof hose bib(s) within 25-feet of the garden area. Consider path from hose bib to garden to ensure no hoses become tripping hazards.
    J. Consider providing a short, latched fence to keep loose animals from wandering into produce gardens.
2. Aquaponics are allowed as part of gardens.
3. Stock tank ponds or cisterns for interactive water learning:
    A. Stock pond tanks shall include, but are not limited to, livestock tanks or above-ground masonry ponds. Provide native plants and native fish such as gambusia. Provide large rocks or egress out of the tanks for wildlife falling into tanks.
    B. Ponds shall utilize rocks, gravel, or other materials to ensure water depth does not exceed 6 inches.
    C. In-ground ponds are not acceptable outdoor learning components.
    D. Refer to *Chapter 5, Site Design Requirements – Storm Water Management* within this section.

Domestic Animal Habitats

1. Design in accordance with City of Austin animal enclosure requirements.
2. Obtain Domestic Animal Husbandry Management Plan for each school from the Owner to ensure design for safe animal housing is accommodated.
3. Provide designs that accommodate the Owner's animal waste management plan. Run-off from these areas is not allowed to run-off into the storm water system.
4. Fencing and gate systems
    A. Provide galvanized steel enclosures designed appropriately for designated animals. Include gates for animal pen maintenance.
    B. Provide gates with heavy-duty, internally lubricated barrel-type hinges, with self-closing, latching and locking hardware.
5. Provide animal enclosures designed for predator control and vandalism.
6. Outdoor paddocks and enclosures
    A. Provide paddock areas with 80 to 100% shade coverage for animal protection to sun and heat exposure.
    B. Provide secure, outdoor areas close to science labs and near the drive access to accommodate delivery and pick up of animals, feed, and waste
    C. Provide designs to encourage safe study and care for farm animals.
7. Indoor enclosures
    A. Provide well-ventilated spaces with enclosures separate from people for animal security. Provide access to food and water. Provide access to natural sunlight.
8. Surfacing materials for animal pens
    A. Provide concrete, fine aggregates, or a 50/50 mixture of suitable, native, sandy, well-drained soils mixed with organic ground wood or sawdust. Alternatively, provide surfacing per local veterinary consultant recommendations depending on the animal type. Provide surfacing with a filter fabric for soil separation, over drainage aggregate and sub-drain system to keep outdoor pens relatively dry and avoid muddy conditions.
9. Feed storage areas
    A. Design to keep food dry, free from contamination and locate in rodent-proof feed bins, etc.

10. Provide hand-washing stations with disinfectant, complying with the Owner's Green Cleaning Plan.
11. Utilities
    A. Provide potable water for animal use and for cleaning areas.

Nature Trails

1. Consider connections to community walking trails and surrounding neighborhoods.
2. Consider looped trails around the perimeter of the school or trail to connect and/or extend through an existing on-site native prairie, wooded area, or areas of geologic interest that would provide additional learning opportunities by providing accessible learner access to those spaces.
3. Provide accessible connections to the various outdoor learning spaces.
4. Avoid the use of concrete for trail surfacing at trails located in or running through the critical water zone as established by the Watershed Protection Ordinance.

CTE PROGRAMS

Provide facility programming and design for the following types of curriculum and technology education (CTE) programs, as directed by the Owner, for each school. Programs may include, but not be limited, to the following:

1. Green learning for renewable energy (solar panels), water resources, and sustainable food/gardening
2. Medical and Health
3. Auto Repair and Auto Body
4. Construction Management
5. Animal Health and Veterinary
6. Site areas to incorporate the following for each high school:
    A. Determine space requirements for education and storage facilities with Owner.
    B. Outdoor visual screen walls and security systems
    C. Outdoor maker spaces
    D. Delivery dock with overhead door
    E. Heavy-duty concrete paved surfacing and drainage system
    F. Fenced and secured covered storage areas for cars, automotive, construction materials, etc. Refer to *Chapter 5, Safety and Security*.
    G. Include adequate space for landfill, recycling, and compost dumpsters.
7. Refer to *Chapter 5, Safety and Security – Building Exterior* for requirements at balconies or terraces for outdoor learning use for CTE.

ATHLETIC FACILITIES

1. All athletic facilities and fields must meet the Texas Accessibility Standards (TAS), Universal Design Standards, the State and National Federation of State High School Associations (NFHS) and Texas University Interscholastic League (UIL) standards.
2. Austin ISD sponsors the following U.I.L. and club sports:
    A. Baseball
    B. Basketball
    C. Cross Country
    D. Football
    E. Golf
    F. Lacrosse (club sport)
    G. Soccer
    H. Softball
    I. Swimming
    J. Tennis
    K. Track & Field
    L. Volleyball
    M. Wrestling
3. Refer to the *Educational Specifications, Part 5 – Space Programs* for requirements regarding types of fields and courts for Elementary, Middle, and High School campuses. Refer to *Appendix C, Gym Striping Plans* for schematic striping layouts for gymnasiums.
4. Provide field house and ticketing plaza for centralized athletic facilities.
5. Provide programming and design for restroom and concession facilities including exterior hose bibs for potable drinking water and jug fill.
6. If a restroom/concession building with hose bibs is not located near an athletic venue on campus (I.e., remote tennis courts or athletic field) provide a keyed, freeze-proof hose bib(s) or ground hydrant(s) for portable team drinking stations. Provide necessary signage or other means to identify hose bibs or ground hydrants as potable water supply. A freeze-proof drinking fountain with jug filler device may be provided in addition to noted hose bibs or ground hydrants.

7. Provide concrete or aluminum grandstands with a press box and filming platform for centralized athletic facilities. Provide permanent or portable aluminum bleachers for athletic facilities at middle and high school campuses as required by the Owner.
8. For site security and fencing, refer to *Chapter 5, Safety and Security*.
9. For lighting standards, refer to *Chapter 5, Division 26 – Electrical*.
    A. Minimum of 50 foot-candles for football, baseball, softball, and track and field
    B. Minimum of 75 foot-candles for soccer and tennis
    C. Comply with City of Austin Outdoor Light Ordinance, or Sunset Valley if required, and LEED v4/4.1 (or most recent version) SSc Light Pollution Reduction for exterior lighting for backlight/uplight/glare.
10. Track and field
    A. Secure track and field with a 4-feet high chain link fence for fan control. Provide gates to allow controlled field entry and at least one 12-feet wide double service access gate.
    B. Refer to *Chapter 5, Section 323113 – Chain Link Fences and Gates*.
    C. Provide delegated design specification for the tension netting system for soccer or other play fields to keep balls out of adjacent properties.
    D. Provide "Rules of Use" signage for the track and field in coordination with the Owner's requirements.
11. Synthetic track and turf surfacing requirements
    A. Refer to *Chapter 5, Division 32 – Exterior Improvements* for synthetic turf surfacing and resilient track surfacing requirements.
12. Natural turf surfacing requirements
    A. Refer to *Chapter 5, Division 32 – Exterior Improvements*.
13. Hard play surfacing and equipment requirements
    A. Refer to *Chapter 5, Division 11 – Equipment* and *Chapter 5, Division 12 - Furnishings* for athletic equipment and play equipment requirements.
14. Incorporate sub-drainage systems below synthetic turf fields and soft play surfaces.
15. Provide electrical outlets required for athletic facilities including, but not limited to, baseball/softball pitching machines, scoring equipment, etc. Provide multiple gymnasium floor outlets for basketball, volleyball, wrestling, etc. scoring tables
16. Provide A/V presentation systems for non-athletic events held in gymnasiums as required by the Owner.

SITE SERVICE AREA

1. Coordinate with the Owner for specific requirements for each school project. Review waste, recycling, and composting pick-up frequency with Owner. Review vehicle access requirements with service providers.
2. Typical dumpster container sizes:
    A. Compost: 4-6 CY
    B. Landfill: 8 CY
    C. Recyclables: 8 CY
        i. Confirm single stream recycling for plastics, metals, paper, glass, and cardboard with the Owner to determine quantity of recycling dumpsters required at each campus.
3. Dumpster enclosure and gates
    A. Locate dumpsters in one enclosure within 50-feet of the kitchen receiving area.
    B. Size enclosures to allow for 2-3 dumpsters side-by-side within. Do not stack dumpsters.
    C. Secondary schools may need to identify two locations for dumpster enclosures (i.e. near kitchen and near CTE program).
    D. Provide 8-feet minimum high screening enclosures for all refuse dumpsters.
    E. Provide a combination of architectural masonry, metal panels, or composite wood to complement building materials.
    F. Provide gates with heavy-duty hinges and lockable hasps to prevent unlawful dumping. Provide hold-open hardware to secure gates in both the open and closed positions.
4. Collection containers for electronic waste
    A. Designate dedicated area for safe collection, storage, recycling and disposal of batteries and electronic waste for recycling.

5. The dumpster container is typically provided by the Owner's waste and recycling service provider. The below waste volumes and learner population are typical, and can help in planning the waste collection needs of the school. Haul frequency and dumpster size shall comply with the diversion proportions specified in the City of Austin Universal Recycling Ordinance (Austin Ordinance No. 20140612-010) for a commercial business or property: dumpster capacity for recyclables and compostables shall together equal or exceed dumpster capacity for landfill trash.

School size (learner population)	Total Weekly Waste Volume (yd^3)
0-500	30
500-1000	60
1000-1500	90
1500-2000	120
2000-2500	150
2500-3000	180

6. Locate dumpsters on a heavy-duty concrete pad, with a heavy-duty concrete apron, sloped to drain at 1.0 percent minimum slope. Contact Owner's service provider for more specific requirements.
    A. Apron width: Extend a minimum width of the trash enclosure plus 10-feet either side of the enclosure.
    B. Apron length: Provide a minimum of 40-feet, unobstructed area extending out from the enclosure gates or as required to accommodate truck turning movements.
7. The route to all dumpsters should be direct ground-level access for staff and devoid of stairs, curbs, or any other barrier to a cart on wheels.

8. Dumpsters should be positioned for access to people of all heights, particularly shorter people. This is to prevent injury when lifting heavy objects into the dumpster. The opening for waste should not be elevated such that some people might have to lift heavy objects over their head.
9. Docks:
    A. Early childhood centers and elementary schools: Provide at-grade service area with no curb for deliveries.
    B. Middle schools and high schools: Provide 4-feet height dock with dock bumpers and 8-feet wide vehicle clearance with no obstructions like bollards, rails, etc.
10. Signage and striping
    A. Include Owner-approved "No Dumping" and "Do not Block" signs in English and Spanish in areas visible to the public at the dumpsters.
    B. Include "No Parking" striping on the ground in front of the dumpsters to prevent cars from blocking service access.
11. Service delivery
    A. Design to accommodate a minimum of one loading space for up to a 53-feet tractor-trailer vehicle. Provide 14-feet minimum width loading area for each school.
    B. Service delivery and site service areas must be located outside of the secure perimeter for Owner coordination of services with contracted waste hauler.
12. Provide outdoor, shaded break area with tables and seating for staff in an area that is convenient to access from the kitchen but far enough away to avoid the odors of the dumpsters.

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GENERAL REQUIREMENTS

Submittals

1. Provide sustainability documentation, including VOC content, formaldehyde content, and all information required to achieve the Owner's sustainability objectives.
2. Provide energy performance data for MEP systems to meet the Owner's energy efficiency objectives.
3. Provide water use performance data for plumbing systems to achieve the Owner's water efficiency objectives.

Space Requirements and Access

1. Design equipment rooms to facilitate service and removal of the largest item in the space without removal of other items or equipment. Provide egress paths from mechanical spaces to the exterior of the building.
2. Equipment rooms are dedicated for the intended use and are not allowed to serve as joint use spaces such as custodial closets or storage rooms.
3. Provide walk-in chases with a minimum clear width of 24-inches for group restrooms with more than three fixtures that require access from the chase. This requirement is not optional, unless specifically voided by the Owner.

ENERGY EFFICIENCY

1. Comply with Energy requirements of *Chapter 3 – Energy, Water, and Sustainability* and below.

Minimum Energy Performance Requirement

Design new construction projects or additions greater than 10,000 square-feet to achieve the following Energy Performance Standard and comply with the Energy Performance Approach:

1. Energy Performance Standard:
    A. Elementary Schools: Site EUI of 25 kBTU/sf/yr
    B. Middle Schools: Site EUI of 30 kBTU/sf/yr.
    C. High Schools: Site EUI of 35 kBTU/sf/yr.
2. Energy Performance Approach:
    A. Provide a preliminary energy performance target and simple box energy modeling analysis per LEED Integrative Process with the schematic design deliverable.
    B. At the completion of the schematic design, provide a COMcheck report that shows the building design at this point in the project complies with the applicable version International Energy Conservation Code (IECC) and local amendments, or as required by Authority having Jurisdiction.
    C. At the completion of the design development, provide a computer simulation of the total building performance that shows the building design at this point in the project complies with the Owner's EUI requirement, applicable version of the International Energy Conservation Code (IECC) and local amendments, or as required by Authority Having Jurisdiction.
    D. At completion of each construction document phase (50%, 95%, 100%, etc.), provide an updated computer simulation of the total building performance that shows the building design at this point in the project complies with the Owner's EUI requirement, the applicable version International Energy Conservation Code (IECC) and local amendments, or as required by Authority Having Jurisdiction. Document the projected reduction in energy use when compared to a baseline, code-compliant building.

Energy Performance Criteria

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

1. Occupancy
    A. Consult with the Owner for the design building occupancy including learners, instructional, and other staff.
2. Indoor Design Conditions
    A. Consult with Owner's Energy Manager for the approved design and set-back, set-point temperature and humidity conditions.
3. Outdoor Design Conditions
    A. Refer to *Chapter 5, Division 23 - Mechanical*.
4. Hours of Operation
    A. Use the following hours of operation in the computer simulation to verify that the minimum energy standard is achieved. Use these values as assumptions for occupants, lighting, and ventilation calculations:
        i. Elementary Schools:
            a. Full- occupancy: 1,500 hours
            b. 25% occupancy: 1,000 hours
            c. 10% occupancy: 6,260 hours.
            d. Distribute these occupancy levels over known school calendar recesses, holidays, and weekends.
        ii. Middle Schools:
            a. Full- occupancy: 2,000 hours
            b. 25% occupancy: 2,500 hours
            c. 10% occupancy: 4,260 hours.
            d. Distribute these occupancy levels over known school calendar recesses, holidays, and weekends.
        iii. High Schools:
            a. Full- occupancy: 2,500 hours
            b. 25% occupancy: 3,500 hours
            c. 10% occupancy: 2,760 hours.
            d. Distribute these occupancy levels over known school calendar recesses, holidays, and weekends.

iv. Use the following hours of operation in the computer simulation to verify that the minimum energy standard is achieved. Use these values as assumptions for operating HVAC equipment.
    a. Media Resources: Same as administration areas
    b. MDF and IDF Rooms: 24/7/365
    c. Music instrument storage: 24/7/365
    d. Administration: Monday thru Friday, 7 am to 5 pm, all year long
    e. Fine arts: Sunday thru Saturday, 7 am to 9 pm, all year long
    f. Fitness, athletics: Sunday thru Saturday, 7 am to 9 pm, all year long
    g. Studios: Monday thru Friday, 7 am to 5 pm, school year (9 months/year)
    h. Food service: Monday thru Friday, 5 am to 3 pm, school year (9 months/year)
    i. Dining areas: Same as studios
    j. Community room: Sunday thru Saturday, 7 am to 9 pm, all year long Building support: Same as studios
    k. Projects submitted for LEED certification / AEGB are bound by the computer simulation requirements prescribed by the USGBC and Austin Energy Green Building, respectively.

Domestic Water Consumption Efficiency

1. Plumbing system design will meet or exceed the requirements for water efficiency issued by the City of Austin Water Utility.
2. Provide a preliminary water budget analysis per LEED Integrative Process with the schematic design deliverable.
3. Comply with Water requirements in *Chapter 3 - Energy, Water, and Sustainability*.
4. Plumbing fixtures:
    A. For new buildings or additions, design fixture flow rates to allow the school to achieve the minimum water consumption provided in *Chapter 5 –Division 22*.
    B. For renovations, where low-flow faucets or fixtures are not practical, request a special directive from the Owner.

Renewable Energy

1. Design the building infrastructure to achieve the City of Austin Solar Ready Ordinance.
2. Design the building infrastructure for all new and addition projects greater than 25,000 square-feet to readily accept photovoltaic solar systems. Requirement is for infrastructure only and does not include the photovoltaic solar system which is encouraged if project budget allows.
3. Design solar system infrastructure to support a system that will offset the entire annual energy consumption of the facility.
4. Include in the roof design at least 5-lbs/sf allowance in the areas identified to receive the rooftop solar equipment.
5. Provide space in main electrical equipment for interconnection of photovoltaic solar array.
6. Refer to *Chapter 5, Division 7 – General Requirements* for roofing requirements where solar system equipment is located.

Indoor Air Quality

1. Indoor air quality standards shall comply with ASHRAE 62.1, latest version of LEED (if applicable), or the requirements of the Authority Having Jurisdiction, whichever is more stringent.

ACOUSTICS

Meet acoustical requirements, criteria and guidelines in the following categories:

1. HVAC Background Noise
2. Exterior Noise Intrusion
3. Reverberation Time
4. Airborne Interior Sound Isolation
5. Structure-Borne Impact Sound Isolation
6. Construction Methods to Achieve Sound Isolation Criteria
7. Reference Standards

HVAC Background Noise

1. Guidance for HVAC Background Noise is provided in ANSI Standard S12.60-2010, Par 1, Annex A.1 Acoustical Performance Criteria, Design Requirements and Guidelines for Schools.
2. Achieve a maximum background noise level of 40 dBA from heating, ventilating and air conditioning (HVAC) systems in studios and other core learning spaces.
    A. Design team shall consult with equipment manufacturers to assess the potential for noise and vibration that is objectionable to the Owner or its neighbors. Include provisions to minimize objectionable noise and vibration.
    B. As far as is practical, HVAC systems serving acoustically sensitive occupied areas should be "self-balancing." Do not locate balancing dampers immediately upstream of diffusers. Incorporate a minimum of 5 feet of acoustical flexible duct or internally lined sheet metal duct between the damper and the connection to the diffuser. Do not incorporate dampers into grilles, and do not use diffuser blades for balancing of the air system.
    C. Provide flexible pipe connectors for HVAC piping connected to vibration-isolated equipment and where piping and ductwork exit mechanical rooms. Suspended, rooftop piping and pipe risers shall be resiliently isolated from the building structure.

D. Select vibration isolators so that the deflection of the support structure due to the weight of the mechanical equipment is no more than 8-10% of the isolator deflection.
E. Select volume control boxes and similar terminal devices, diffusers, air grilles, etc., with a maximum sound level of 35 dBa.
F. Design fully-ducted return air systems where crosstalk is a concern. If this is not the case, incorporate crosstalk control at air transfer openings.
G. Incorporate appropriate vibration isolators for transformers and distribution panels.
H. For plumbing systems, incorporate resilient support for plumbing lines, flexible pipe at connections to vibration isolated equipment, and select moderate plumbing fluid velocities and vibration isolation for the pumps.

Exterior Noise Intrusion

1. Achieve a maximum background noise level of 45 dBA in studios and other core learning spaces from exterior noise sources.
2. At high-noise sites (peak-hour Leq above 60 dBA during school hours), conduct an acoustic study to identify design measures needed to minimize noise intrusion from exterior.
3. Provide documentation that the exterior noise environment is appropriately quantified and that the design will achieve the performance criteria.
4. Guidance for exterior noise studies is provided in ANSI/ASA S12.9 Part 2 and ANSI/ASA S12.9 Part 3.

Reverberation Time

1. Incorporate absorptive finishes to achieve reverberation time criteria. Specify materials with an NRC of 0.70 or higher.
2. In core learning spaces (including open collaboration spaces) the maximum reverberation times for sound pressure levels in octave bands with midband frequencies of 500, 1000, and 2000 Hz (s) are:
    A. Core learning spaces with volume less than 10,000 ft^3: 0.6 seconds
    B. Core learning spaces with volume between 10,000 ft^3 and 20,000 ft^3: 0.7 seconds
    C. Core learning spaces with volume greater than 20,000 ft^3 and ancillary learning spaces: 1.0 second
3. Verify conformance with the reverberation time requirements by either of the two options detailed in ANSI/ASA S12.60-2010, Part 1, Section A.4.

Airborne Interior Sound Isolation

1. Where doors are not proposed, demising assemblies including partitions, penetrations, HVAC return air boots, and ceilings, shall meet or exceed the STC criteria in the tables on the following pages.
    A. Criterion for operable glass partitions and doors between learning studios and collaboration spaces shall be treated the same as the partition where they exist, or as outlined in the tables on the following pages.
    B. The isolation criterion between occupied spaces and mechanical equipment rooms shall meet the STC criteria in the tables below, unless it is shown that the sound level in the mechanical equipment room combined with a lower STC rating can achieve the required background noise level from building services in the adjacent occupied space. In no case shall the design STC between such spaces be less than 45.
    C. The isolation criterion between occupied spaces and IDF, MDF, or electrical equipment rooms shall meet the STC criteria in the tables below, unless it is shown that the sound level in the equipment room combined with a lower STC rating can achieve the required background noise level from building services in the adjacent occupied space. In no case shall the design STC between such spaces be less than 45.
    D. Criterion applies only to restrooms that do not open into the occupied space.
    E. Dining spaces may also be used for learning activities. These performance criteria are for dining spaces that are immediately adjacent, but not directly connected to other program spaces.
    F. Dining and Kitchen/Servery are typically directly connected. If they are not, then incorporate partitions that are minimum STC 50.
    G. Provide a minimum STC Rating of 50 for partitions used to subdivide the Empower Center.
    H. Refer to the chart below for the STC Rating of operable partitions connecting Dining and Gymnasium spaces at elementary schools.
2. Where field verification is required for acoustically sensitive spaces (e.g., care office, counseling, etc.), provide in accordance with the procedures in ASTM E336.
3. Consider the impact of mechanical noise into adjacent neighborhoods.

		Receiving Space - STC							
		Learning Space / Library-Media Center	Collaboration Space	SPED / ECSE Learning Space	Circulation / Stairwell	Administrative Space/ Office	Mechanical Space	IDF/MDF/Electrical Room	Restroom/Locker Room
Source Space - STC	Learning Space / Library-Media Center	45							
	Collaboration Space	45a	45a						
	SPED / ECSE Learning Space	45	45a	45					
	Circulation / Stairwell	40	40	40	40				
	Administration Space / Office	40	40a	40	40	40			
	Mechanical Space	60b	60b	60b	50	60b	NR		
	IDF/MDF/Electrical Room	50c	50c	50c	45	50c	NR	NR	
	Restroom/Locker Room	53d	53d	53d	45	53d	40	40	40
	Kitchen / Dining	53	53	53	40	53	53	45	40
	Gymnasiums	50	50	50	40	50	60b	50c	53d
	Music Studio / Rehearsal Halls	60	60	60	60	60	60	60	60d
	Practice Rooms	50	50	50	40	50	60b	50c	53d
	Theater Arts Performance Space / Empower Center	60	60	60	60	60	60b	50c	60
	Gymnasium / Fitness Activity Space	50	50	50	40	50	60b	50c	53d
	Maker Space	50	50	50	40	50	60b	50c	53d

Source Space - STC	Receiving Space - STC: Kitchen / Dining	Gymnasiums	Music Studio / RehearsalHalls	Practice Rooms	Theater Arts Performance Space / Empower Center	Fitness Activity Space	Maker Space	
Learning Space / Library-Media Center								
Collaboration Space								
SPED / ECSE Learning Space								
Circulation / Stairwell								
Administration Space / Office								
Mechanical Space								
IDF/MDF/Electrical Room								
Restroom/Locker Room								
Kitchen / Dining	NR							
Gymnasiums	50	45						
Music Laboratory / Rehearsal Halls	60	60	60					
Practice Rooms	53	50	60	45				
Theater Arts Performance Space / Empower Center	60	60	60	60	60			
Fitness Activity Space	53	50	60	50	60	50		
Maker Space	53	50	60	50	50	60	50	

Structure-borne Impact Sound Isolation

1. Design the floor-ceiling assemblies of normally occupied rooms located above learning spaces for a laboratory test rating of:
    A. At least IIC 45 if they are located above core learning spaces
    B. IIC 40 if they are located above ancillary learning spaces.
2. These IIC ratings shall apply without carpeting on the floor in the room above the learning space.
3. In new construction do not locate gymnasia, dance studios, or other rooms with high floor-impact activity above studios or other core learning spaces.
4. For renovations with existing gymnasia, dance studios, and similar rooms with high floor-impact activity located above core learning spaces, either relocate or provide the IIC rating of the separating floor-ceiling assembly as follows:
    A. At least 70 when located above a core learning space with an enclosed volume not greater than 566 m3 (20 000 ft3);
    B. At least 65 when located above a core learning space with an enclosed volume greater than 566 m3 (20 000 ft3);
    C. At least 65 when located above an ancillary learning space

Construction Methods to Achieve Sound Isolation Criteria

~~1.~~ Develop architectural and structural details to avoid sound leakage and flanking at the connections of partitions at the building perimeter. Do not terminate partitions into glazing.
2. Avoid back-to-back electrical outlets in partitions. Install 'outlet box pads' at all acoustically rated partitions. Close off all open knock-outs.
3. Where enclosed spaces are surrounded by partitions which extend slab to slab, provide a sound isolating return air boot or sound trap to meet the documented NIC value above the entry door to the space.
4. Provide a continuous seal at all slab-to-slab acoustical partitions at the partition base and structure above. All penetrations, such as for duct, pipe and conduit, should have a 1/8" gap minimum between the penetrating service line and the partition with a resilient acoustical sealant.

5. All gypsum board sheets should run vertically. No joints allowed except at studs. Stagger joints of gypsum board where multiple layers occur and do not glue multiple layers of gypsum board together.
6. Refer to *Chapter 5, Section 092900 – Gypsum Board* for performance requirements for sound attenuation batts.

Reference Standards

LEED v4/v4.1 Reference Guide for Building Design and Construction;
Indoor Environmental Quality Prerequisite: Minimum Acoustic Performance
Indoor Environmental Quality Credit: Acoustic Performance

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

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

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

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

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

ASTM E 413 "Classification for Rating Sound Insulation"

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

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

ANSI/ASA S12.9-1993/Part 3 (R2008), American National Standard Quantities and Procedures for Description and Measurement of Environmental Sound, Part 3: Short-Term Measurements with an Observer Present

COMMISSIONING

General

1. In addition to the Owner's Project Manager, Design Team, and General Contractor, a list of all deficiencies shall be provided to the Owner's Director of Maintenance and MEP Supervisor.
2. At each phase of design, the design team shall provide written responses to review comments issued by the Owner, Sustainability Manager, and Commissioning Authority.
3. Design team shall include the Owner's standard commissioning specifications for Divisions 01, 22, 23, and 26 in the project manual.
4. During submittal phase, the design team shall review comments issued by the Commissioning Authority and include in formal comments to contractor.
5. During construction commissioning, the design team shall respond to observation reports issued by the Commissioning Authority and provide directives for resolution of issues.

Envelope

1. Design and construction teams shall coordinate with the Owner's Commissioning Authority to define, implement, and document required testing.
2. Design and construction teams shall coordinate with the Owner's Commissioning Authority for testing of air, water, and vapor barriers and retarders.

Plumbing

1. Design and construction teams shall coordinate with the Owner's Commissioning Authority to define, implement, and document the commissioning of plumbing systems in accordance with the Owner's standard commissioning specifications and the requirements of Chapter 3.

HVAC

1. Design and construction teams shall coordinate with the Owner's Commissioning Authority to define, implement, and document the commissioning of mechanical systems in accordance with the Owner's standard commissioning specifications and the requirements of Chapter 3.

Electrical Systems

1. Design and construction teams shall coordinate with the Owner's Commissioning Authority to define, implement, and document the commissioning of electrical systems in accordance with the Owner's standard commissioning specifications and the requirements of Chapter 3.
2. Lighting Control
    A. Provide testing, programming, and training by a manufacturer-trained technician. Once requested, a technician must be available on-site within 24-hours until completion of commissioning.
    B. Provide a minimum of 2-hours of training for Owner's maintenance staff on adjusting settings and programming schedules. Provide initial programming as directed by the Owner.

SAFETY AND SECURITY

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PHILOSOPHY

The following standards apply for all facilities and is a supplemental guide for design teams. Complete the form at the following LINK to request access to owner's Safety & Security (Internal) Guidelines.

Request a meeting with Austin ISD to review the site and building designs for specific direction on facility requirements. Work with Owner to determine the appropriate design phase to engage the Austin ISD Police Department and other stakeholders. The Austin ISD Police Department has policies, procedures, and standards for school facilities and operations.

Safety and security conversations and documentation are generally considered confidential and are often protected from public disclosure under state or federal law. Work closely with the Owner when discussing safety and security-related matters with campus communities and the public.

Professional Conduct and Field Experts

1. The Austin ISD Police Department employs full-time sworn Police Officers and civilian employees, that oversee safety and security for all facilities.
2. These professionals work together to establish a ***safe and secure environment*** for all Austin ISD employees and our future leaders to learn, grow, and succeed both inside and outside of the learning environment.
3. **District campuses and facilities** are required to comply, and in many areas exceed, requirements outlined in TEC §37.108. These Safety and Security standards implemented in the Austin ISD culture include, but are not limited to:
    A. Campus Emergency Operations Plan and District Wide Emergency Operations Plan annual update requirement.
    B. Critical incident as well as safety and security best practices training is required for all Austin ISD employees annually.
    C. Emergency response practice drills are required.
    D. Austin ISD updated response procedures to comply with the Texas Edition of the Standard Response Protocols-in accordance with the Texas School Safety Center.
    E. Safety and Security Audits are performed.
    F. Must comply with the Texas Unified School Safety and Security Standards.

SAFETY AND SECURITY STANDARDS

Site and Perimeter

1. Provide a clear line of sight from the reception area to the main building entrance.
2. Protect exterior, high-traffic pedestrian areas from accidental vehicular damage. Examples of high-traffic areas include: main entries, bus entries, and "highway" sidewalks (sidewalks leading to portables or separate buildings frequently used by learners), etc. Provide site elements to protect these areas:
    A. Benches, ornamental planters, or boulders in lieu of bollards.
    B. Utilize existing site features, such as elevation changes, when possible.
    C. For additional design options, refer to:
        i. *Chapter 5, Section 129300 – Site Furnishings*
        ii. *Chapter 5, Section 329400 – Planting Accessories*
3. Coordinate knox box locations with the fire department.
4. Control vehicular access to the following areas:
    A. Service and delivery areas, loading docks, garbage and recycling containers, water and electrical meters, above ground utility boxes, and ground level HVAC components. Controlled vehicular access is not required for main visitor drives. Coordinate with the Director of Emergency Management for vehicular control measures.
    B. Bus Loading
        i. Preferred gates: RFID access scanners integral to bus (driver does not scan a card to enter)
        ii. Acceptable gates: Swing gate with padlock by Owner
    C. Staff parking lots and garages
        i. Required gates: Provide boom barriers with automatic gate, bar, or pole synced with card access readers for controlled entry and exit. Provide adequate site queuing.
    D. Learner parking garages
        i. Required gates: Provide boom barriers with automatic gate, bar, or pole synced with card access readers for controlled entry and exit. Provide adequate site queuing.

E. Learner parking lots
    i. Required gates: Provide swing gate with padlock by Owner.
F. For additional information, refer to:
    i. *Chapter 5, Section 281300 – Access Control System*
    ii. *Chapter 5, Section 323113 – Chain Link Fences and Gates*
    iii. *Chapter 5, Section 323119 – Decorative Metal Fences and Gates*

5. Fencing
    A. Property Perimeter Grounds Fence
        i. Provide fully-enclosed 6-feet high, chain link fence along perimeter of property.
        ii. Coordination locations with Owner.
    B. Outdoor Secure Area Fence:
        i. Provide fully-enclosed, 6-feet high, anti-climb secure area fence (or an 8-foot high chain link fence) to separate learner areas from vehicular areas and to secure site access. Utilize building and site elements to reduce overall fencing quantity when possible. Coordinate with City of Austin to enclose any adjacent property owned by City of Austin so the school can maintain access to the adjacent site. Austin ISD is exempt from the City of Austin requirements that do not allow for 6-feet, anti-climb fencing.
        ii. Additional fencing requirements for elementary and middle schools: Provide an additional layer of 6-feet high fencing in addition to the secure area fence at the following locations and under the following conditions:
            a. Outdoor learning spaces: Secure area with additional fencing if outdoor learning spaces are not contained within secure perimeter fence, are immediately adjacent to a building access door, *and* if exterior door to outdoor learning spaces is to remain unlocked for free-flow of educator and learner access during the day.
            b. Breezeways between buildings: Secure area within perimeter fencing if exterior doors between buildings in breezeway are to remain unlocked during school hours for free-flow of educators and learners.
            c. Provide fencing around any water source deeper than 6-inches.

C. Animal enclosures: Provide fencing type and height as appropriate to type of animal. Refer to *Chapter 5, Outdoor Learning Spaces* for additional animal enclosure guidelines.

D. Parking lots: fencing is not required at parking lots.

E. Gates: At all locations, provide ability for gates to be closed and locked or open and unlocked based on facility needs and administration policy.

   i. Perimeter fence: Walk gates with padlock and chain by Owner.

   ii. Outdoor learning spaces: Where outdoor learning spaces are approved by Owner to be outside the secure perimeter, provide emergency egress swing gate with panic hardware. Ensure panic bar cannot be tampered with to release the gate from the secure side.

F. Decorative metal fence is required at the following locations:

   i. Fences near main building entry

   ii. Campuses with multiple buildings that surround a "commons" courtyard.

   iii. Breezeways connecting two separate buildings.

   iv. Outdoor courtyards accessible to the public.

   v. Outdoor studios

G. For additional information, refer to:

   i. *Chapter 5, Section 323113 – Chain Link Fences and Gates*

   ii. *Chapter 5, Section 323119 – Decorative Metal Fences and Gates*

6. Site Lighting:

   A. Evaluate proposed lighting strategies and levels with consideration for neighbors, LEED/AEGB light pollution reduction requirements, and other existing site conditions and review with Owner.

   B. Evaluate lighting options at animal pens and housing on a case-by-case basis as appropriate to the type of animal.

   C. Provide site lighting at the following locations:

      i. Property entrances

      ii. Building entrances, including portable buildings, storage buildings, greenhouses, agricultural and barn buildings

      iii. Parking lots and garages

      iv. Delivery and loading dock areas

      v. Building perimeter

vi. Playground equipment, especially at shared public parks and community gardens
vii. Athletic areas such as tennis courts, basketball courts, tracks, fields, stadium seating, public restrooms, covered recreational areas, canopies, concession stands, etc.
viii. Gates connecting Owner's property to City of Austin property such as public parks, swimming pools, public libraries, public service buildings, etc.

D. For additional information refer to
   i. *Chapter 5, Section 265000 – Lighting*
   ii. *Chapter 5, Site Design Requirements*

7. Coordinate exterior signage identified by *Chapter 5, Division 10 – Specialties* with Owner.

Building Exterior

1. Exterior door hardware: Refer to *Chapter 5, Safety and Security - Locking Systems and Hardware* for exterior door hardware requirements.
2. Provide a single combination lock at one exterior door for emergency access. Coordinate location with Owner prior to installation.
   A. Basis of design: Best EZ Series standalone electronic keypad lock
3. Exterior signage: Provide "weapons prohibited", "alcohol prohibited", and "tobacco prohibited" signage. Place on property citing applicable codes and statutes for enforcement by Austin ISD PD.
4. Avoid recesses and niches in building footprint to prevent areas that are unsupervised or difficult to surveil.
5. Balconies and Terraces
   A. The inclusion of balconies or terraces for outdoor learning use at non-ground level program areas is subject to Owner approval.
   B. All doors accessing balconies or terraces from the interior of the building must be provided with access control for re-entry.
   C. Provide direct egress from all balconies or terraces via an exterior stair into a ground level area within the secure perimeter.

D. Provide anti-climb, open guardrails that allow for sightlines to the surrounding outdoor areas. Refer to the following for additional information:
    i. *Chapter 5, Section 055113 – Metal Pan Stairs*
    ii. *Chapter 5, Section 055213 – Pipe and Tube Railings*

Building Interior

1. Main Entry
    A. During arrival and dismissal, main entry vestibule doors are unlocked.
    B. Provide unobstructed, direct visual sightlines from Administration Reception into the secure vestibule and out to the main building entry.
    C. During school hours, main entry vestibule doors are locked.
        i. Visitor access: Provide multiple checkpoints at visitor's entrance (main entrance) to create a safe and secure access directly to reception. Provide two-way communications system and camera to reception for visitors at the exterior main entry vestibule doors.
        ii. Learner and educator access: Provide uninhibited access to reception for learners, educators, and staff.
    D. Community room and Community Partner's Suite: Provide access to the community room exclusively through secure vestibule.
        i. Exceptions: if required for exiting, provide an exit-only door directly to the building exterior.
    E. Coordinate with Austin ISD PD for locations and requirements for ballistic glazing.
2. Guardrails at balconies:
    A. Provide guardrails that are not climbable.
    B. Locate balcony access points in areas that are easily monitored by staff.
    C. Refer to the following for additional information:
        i. *Chapter 5, Section 055113 – Metal Pan Stairs*
        ii. *Chapter 5, Section 055213 – Pipe and Tube Railings*

3. After-hours use
    A. Provide access control doors, gates, etc., to zone building for specific off-hours use of gyms, performance spaces, commons, media center, school grounds, and/or other spaces as determined by the campus.
    B. Align access doors where possible with *Neighborhood and building wing security* topic below.
4. Neighborhood and building wing security
    A. Provide the ability to lockdown learning neighborhoods and additional campus wings with either operable partitions, doors with hold-open hardware, or other options as approved by Austin ISD PD, while still maintaining code-required building egress.
    B. Provide ability to secure access between floors similarly to above.
5. Studio security
    A. Refer to *Chapter 5, Safety and Security - Locking Systems and Hardware* for studio locking requirements.
    B. Studio glazing: Provide ability for educator or learner to quickly cover glazing or otherwise limit views into studio.
6. MDF room
    A. Provide a partition in main security panel with a security keypad.
7. Refer to the following for additional information:
    A. *Chapter 5, Section 101423.16 – Room Identification Panel Signage* for Building, Room, and Door Numbering Systems.
    B. *Chapter 5, Section 281300 – Access Control System*
    C. *Chapter 5, Section 281600 – Intrusion Detection*

Locking Systems and Hardware

1. Exterior doors
    A. At all egress-only exterior doors, do not provide exterior door pulls.
    B. At all exterior doors, provide localized, audible alarm to sound when doors have been left open for a specified duration of time. Determine duration of time for alarm for activation during Owner review.
2. Studio doors: Provide option to lock doors from both studio interior and exterior with key.
3. Card readers: Request preferred locations at Owner review meeting.

4. Keypads: Request preferred locations at Owner review meeting.
5. Double doors and gates: Provide a door pull on only one leaf or door of all double doors and gates. Any doors and gates installed cannot be double chainable with two loops on each side that can be chained shut.
6. For additional information refer to:
    A. *Appendix A, Section 87100 – Door Hardware* for door hardware.
    B. *Chapter 5, Section 281300 – Access Control Systems* for card readers and key pads.

Video Surveillance

1. Video monitoring systems: Request preferred locations at Owner review meeting.
2. Refer to *Chapter 5, Section 282300 – Video Surveillance* for additional information.

Emergency Weather Planning

1. Coordinate with Owner during review meeting to identify locations for educators and learners to occupy during inclement weather.
2. Plan areas such as stairwells, toilet rooms, and storage rooms to have a dual-purpose use during inclement weather and with limited glazing.

PERFORMANCE REQUIREMENTS

INTRODUCTION

This section outlines requirements for Austin ISD facilities and is organized by MasterSpec divisions. Performance requirements outlined are minimums. The general requirements listed apply to all subsequent specification sections for that division and outline some materials or systems not allowed. If there are materials used in the design of Austin ISD facilities, and no performance requirements are listed, review these materials and systems with the Owner at the appropriate milestones for approval and inclusion in the project. Design teams are responsible for ensuring material compatibility of all systems and assemblies, with no adverse reactions due to dissimilar or incompatible materials.

GENERAL REQUIREMENTS

Building Envelope

1. Building envelope commissioning is required on all new construction projects. Design and construction team shall coordinate with the Owner's Commissioning Authority throughout all phases of the project.
    A. Refer to *Appendix A, Full Specification – 019119.43 – Exterior Enclosure Commissioning* for full requirements for commissioning the building envelope.
2. Reduce thermal bridges, air, and water leakage at the entire building envelope, including parapets and foundations.
3. Provide the following into the design of crawl spaces:
    A. Provide a minimum 15 mil vapor retarder to mitigate moisture issues.
    B. Provide recommendations for ventilation and insulation systems to the Owner for review.
    C. Provide drainage systems tied into the stormwater system.
    D. Refer to *Chapter 5, Section 055000 – Metal Fabrications* for stair/access requirements
    E. Refer to *Chapter 5, Section 265000 – Lighting* for crawl space lighting requirements.
4. Backfilling against any veneer wall system is not allowed.
5. Consider the removal process of graffiti and other forms of vandalism in the design and materials of the exterior facades.
6. Incorporate provisions for a separate building envelope mockup measuring a minimum of 6-feet by 6-feet with a minimum of one window opening, to demonstrate the aesthetic effects, and to set the quality standards for all the major building materials, systems, fenestration, and execution. AAMA 501.2 water testing (nozzle test) minimum is required for the mockup.
7. Provide design solutions to avoid unauthorized access to low roof areas including covered loading areas, canopies, etc.

Material and Systems Testing

1. The Owner will contract directly with material and systems testing consultants or instruct the design team to procure the services as a consultant.
2. Design teams shall thoroughly review the scope required for testing of materials and systems with the Owner before submitting documents for bid and procuring services.
3. Incorporate the requirements for testing of materials and systems into each respective specification section required for the project.
4. Provide a summary of all the testing requirements to the Owner to assist with procurement of services and tracking for the project during construction.

Building Envelope Testing

1. Refer to *Appendix A, Full Specification – 019119.43 – Exterior Enclosure Commissioning* for full requirements for building envelope testing.

Exterior Wall Performance

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

DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS

The Owner will provide the design team with several required Division 00 specifications for the project. Design teams shall customize the specifications as necessary to align with the scope of work, procurement, and contracting procedures for the project and include each in the project manual in accordance with required contractual deliverables for each phase. The design team must evaluate the need for additional Division 00 specifications to align with the project scope of work and delivery methods, review them with the Owner, and incorporate them into the deliverables for the project.

DIVISION 01 – GENERAL REQUIREMENTS

The following full specifications sections for Division 01 are included in Appendix A. Editable files are available from the Owner. Design teams shall edit each specification to the requirements necessary for the project and include each in the project manual in accordance with required contractual deliverables for each phase. The design team must evaluate the need for additional Division 01 specifications to align with the project scope of work, review them with the Owner, and incorporate them into the deliverables for the project. Additional items associated with Division 01 are listed below. In Appendix A:

Section 013100 – Project Management and Coordination
Section 013200 – Construction Progress Documentation
Section 013546 – Indoor Air Quality Management
Section 015000 – Temporary Facilities and Controls
Section 016500 – General Commissioning Requirements
Section 017419 – Construction and Demolition Waste Management
Section 017700 – Closeout Procedures
Section 017823 – Operation and Maintenance Data
Section 017839 – Project Record Documents
Section 017900 – Demonstration and Training
Section 018113 – Sustainable Construction Requirements
Section 019119.43 – Exterior Enclosure Commissioning

Section 013300 – Submittal Procedures

1. The construction team is required to provide a submittal schedule concurrent with the startup construction schedule.
2. The construction team is required to issue all submittals, shop drawings, and requests for information in electronic, PDF format, and via web-based project software as directed by the Owner.
3. All sustainability submittals are required to include the Austin ISD Sustainability Submittal Sheet and all requisite supporting documentation to fully document the sustainability objectives for the project.
4. Design and construction teams are required to maintain one set of material samples on the project site for reference by any team member and the Owner.
5. Design and construction teams are required to name submittals as follows:
    A. File naming convention for submittals issued by the contractor:
        i. Name Format: *Owner Project Number– CSI Section Number – ID Number – Revision Number – Submittal Description*
            a. Owner Project Number: number issued by Owner
            b. CSI Section Number: number used for specification section
            c. ID Number: sequential numbers used if more than one submittal is needed for a specification section
            d. Revision Number: numbers used for a resubmittal.
            e. Submittal Description: brief description of submittal
        ii. Example: *170021-238119-0-0-Rooftop Units*
    B. File naming convention for submittals returned by the design team:
        i. Name Format: *Owner Project Number– CSI Section Number – ID Number – Revision Number – Submittal Description – Design Team Review*
            a. Owner Project Number: number issued by Owner
            b. CSI Section Number: number used for specification section
            c. ID Number: sequential numbers used if more than one submittal is needed for a specification section
            d. Revision Number: numbers used for a resubmittal.
            e. Submittal Description: brief description of submittal
            f. Design Team Review: Firm name and review status or category
        ii. Example: *170021-238119-0-0-Rooftop Units-Firm ABC Revise and Resubmit*

DIVISION 02 – EXISTING CONDITIONS

Section 024119 – Selective Demolition

1. Identify historic items, relics, antiques, and similar objects of value or interest with the Owner and incorporate provisions for delivery to the Owner during initial demolition activities.
2. Identify salvageable materials and document for dismantling, storage, and reuse. Incorporate provisions for storage on site.
3. Document weight of reused materials in construction and demolition waste diversion calculations.
4. Design teams are responsible to check all existing conditions for protected wildlife. Design teams are to consult with the Owner and follow PDM standards for known wildlife concerns. Refer to *Division 31 – Earthwork* and other site design requirements in this PDM for examples of protected wildlife.
5. The Owner will provide a list of existing system warranties to remain active throughout the project. Design teams shall incorporate the preservation of the warranties on these building systems into the specifications for the project.

DIVISION 03 – CONCRETE

The following full specifications sections for Division 03 are included in Appendix A. Editable files are available from the Owner. Design teams shall edit each specification to the requirements necessary for the project and include each in the project manual in accordance with required contractual deliverables for each phase.

Section 035216 – Lightweight Insulating Concrete

Section 033000 – Cast-In-Place Concrete

1. Provide broom finish at all exterior sidewalks, ramps, and door landings.
2. Provide a minimum 15 mil under-slab vapor retarder.
3. Material testing is required. Outline requirements based on the scope of work for the project and review with the Owner.
4. Provide a minimum of 3-feet clear between the bottom edge of the foundation and the crawl space surface for suspended foundations.
5. Label each foundation pier in crawl spaces with a unique location designation, and visible on at least two sides of each pier location utilizing grid lines.

Section 033543 – Polished Concrete Finishing

1. Provide requirements for a standalone, minimum, 100 square-foot mockup for approval by the design team and Owner.
2. Review level of finishing and sheen with the Owner at the campus for approval.
3. Provide requirements for staging and sequencing of concrete finishing of slabs at edges of spaces so uniformity of finishing is consistent with overall finishing. Incorporate provisions for protection of all polished concrete throughout the duration of construction.
4. Where applicable, use integrally-colored concrete in lieu of stain at high-traffic areas for durability.

DIVISION 04 – MASONRY

Section 042000 – Unit Masonry

1. Masonry is the required, primary exterior material designed as a cavity wall system.
2. Weep vents are required at masonry cavity walls to ensure a ventilated cavity and promote drying. Include weep vents at top and bottom of masonry cavity walls, and at heads and sills of windows in masonry walls at minimum. At base of walls design vents a minimum of two inches above exterior grade elevations.
3. Incorporate cavity drainage material with dovetail or stepped profile at the base of masonry wall cavities to prohibit mortar bridges in cavities.
4. Through-wall flashing assemblies are required at bases of walls, openings, etc. to promote drainage from the cavity.
    A. Through wall flashings must consist of a stainless steel drip edge extending 1/4" minimum beyond the face of the masonry wall, and with a minimum 4” tall vertical leg secured to the backup wall, with a minimum 40 mil thickness membrane through-wall flashing adhered on top, that extends a minimum of 6” vertically above the cavity drainage material.
    B. All through wall flashing membranes must be secured with a termination bar and sealant on all edges, and tied into the envelope air barrier system.
    C. Fully solder end dams and provide at heads and sills of all openings, and at all changes in flashing height. Fully solder inside and outside corners and fabricate with pieces no less than 18” in each direction.
5. “Blind fastening” of masonry ties, plaster systems, and accessories through insulation is not allowed.
6. Backfilling against masonry walls is not allowed.
7. Glazed masonry units are not allowed, unless required to match existing. Approval by the Owner is required.
8. Natural stone trim units are not allowed in exterior, horizontal conditions.
9. Provide bullnose concrete masonry units at all building interior corners, where CMU is utilized.
10. Horizontal surfaces must provide positive drainage. Horizontal surfaces made from plaster are not allowed.

DIVISION 05 - METALS

General Requirements

1. Galvanize all exterior ferrous metals scheduled for paint, including railings, gratings, bike racks, etc.
2. Galvanize all interior metal fabrications in wet environments. (kitchens, locker rooms, toilet rooms, etc.)
3. Provide stainless steel hardware for all miscellaneous metal fabrications.
4. Rubber treads, risers, and nosings on stairs are not an acceptable finish material. Review alternative finishes for stairs with the Owner for approval.

Section 055000 – Metal Fabrications

1. Provide metal ladders or ships ladders for roof and crawl space access. Provide aluminum or galvanized steel for roof access ladders, etc. Alternating tread ladders are not acceptable.
2. Consider passive solutions for bollards throughout the site in lieu of traditional, concrete-filled metal, pipe bollards. Review locations and solutions with the Owner.
3. Galvanize and paint miscellaneous steel framing at the exterior and where appropriate.

Section 055113 – Metal Pan Stairs

1. Provide the following performance criteria on the listed components:
    A. Handrails:
        i. Provide aluminum or stainless-steel handrails and brackets.
        ii. Wall-mounted handrails are preferred. Provide appropriate blocking in walls.
        iii. Consider incorporating handrails at additional, lower heights for elementary schools. Review design considerations with the Owner.
    B. Infill of Guards:
        i. Steel cable guard infill is not allowed.
        ii. Intermediate rails for infill of guards is not allowed.
        iii. Any type of infill at guards that creates a "ladder-type effect" and promotes climbing is not allowed.
        iv. Guard height of 48-inches is required.
    C. The preferred finish for metal components of interior stair systems is painted steel. Galvanize and paint all exterior stairs. Do not paint handrails.

Section 055213 – Pipe and Tube Railings

1. Follow similar performance standards outlined in *Chapter 5, Section 055113 – Metal Pan Stairs* for handrails, guards, or pipe and tube railings unassociated with stairs throughout the building.
2. Use non-shrink, nonmetallic grout for anchoring posts at all applicable locations.

DIVISION 06 – WOOD, PLASTICS, & COMPOSITES

Section 061000 – Rough Carpentry

1. Theatre Stage Flooring
    A. Provide flooring system as follows unless approved by Owner:
        i. 6 mil (minimum) vapor barrier
        ii. PVC-resilient pads
        iii. 2"X wood sleepers
        iv. Sound insulation between sleepers
        v. Two layers of ¾" inch plywood for lower and middle layer of decking
        vi. One ¼" top layer of tempered hardwood or masonite as a replaceable wearing surface
    B. Floor system shall be capable of supporting distributed loads required by codes and standards and point load of 1,000 lbs. on a 1-inch diameter pin. Top layer shall be painted black and screwed to plywood deck for future replacement.

Section 061533 – Wood Patio Decking

1. Preferred material for decking is composite plastic lumber.
2. Provide galvanized, painted steel guards, 48-inches in height, with aluminum or stainless-steel handrails and brackets.

Section 061600 – Sheathing

1. Consider the use of composite, nail base insulated roof sheathing at parapets to ensure continuous insulation throughout the building envelope and to mitigate thermal transfers through the building structure, metal stud systems, masonry etc.
2. Seal all sheathing joints and penetrations in exterior wall systems.

Section 062023 – Interior Finish Carpentry

1. At shelving and clothes rods, provide hardwood, cladded plywood, or melamine.
    A. Particleboard is not allowed.
2. Provide hardwood materials where specialty trim, seating, and benches are incorporated into the design.
3. At interior window sills, provide hardwood materials. Solid surface is also acceptable.
    A. Particleboard is not allowed.
4. All composite wood to be manufactured with no added formaldehyde or meet the requirements of CARB Ultra Low Emitting Formaldehyde (ULEF)

Section 064113 – Wood-Veneer-Faced Architectural Cabinets

1. Where custom architectural cabinets, millwork, etc. are incorporated into the design, follow similar standards outlined in *Chapter 5, Section 123212 – Manufactured Wood-Veneer-Faced Casework* for minimum performance and material standards.

Section 066400 – Plastic Paneling

1. Fiber-reinforced plastic paneling is an acceptable material to protect walls in high abuse areas, such as corridors.
2. Provide fiber-reinforced plastic paneling with the following performance criteria:
    A. Class A rating
    B. Wear resistance (cycles): minimum 3,500
    C. Flexural strength: minimum 20,000 psi.
    D. Complies with CDPH Standard Method

DIVISION 07 - THERMAL & MOISTURE PROTECTION

The following full specifications sections for Division 07 are included in Appendix A. Editable files are available from the Owner. Design teams shall edit each specification to the requirements necessary for the project and include each in the project manual in accordance with required contractual deliverables for each phase.

Section 070150 – Preparation for New Roofing
Section 071413 – Hot Fluid-Applied Waterproofing
Section 072200 – Roof and Deck Insulation
Section 075250 – Modified Bituminous Sheet Roofing
Section 075419 – Polyvinyl-Chloride (PVC) Roofing
Section 075420 – Hybrid Polyvinyl Chloride (PVC) Roofing
Section 077200 – Roofing Accessories

General Requirements

1. Walls:
    A. Incorporate a fluid-applied membrane air barrier, or similar system, into the building envelope, as part of a system compliant with NFPA 285 *(Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components*). Air barriers must form a continuous barrier for the building envelope in conjunction with roofing and waterproofing systems. Provide details to ensure continuity at intersections.
    B. EIFS (Exterior Insulation and Finish System) and other similar systems are not allowed. Direct-applied systems for exterior soffits, interior shower rooms, etc. are acceptable.
    C. Formed metal wall panels, insulated metal wall panels, and similar systems are restricted to accents for the building envelope systems and are allowable at 10-feet or greater above grade.
    D. Blind fastening of cladding systems (metal wall panels and similar) through the air barrier is prohibited. Subframing used to secure cladding must be installed and sealed at the air barrier layer prior to installation of insulation.

2. Roofing/Waterproofing:
    A. The provided specifications outlined in Appendix A the roofing and waterproofing systems acceptable to the Owner.
        i. Thermoplastic-Polyolefin (TPO) roofing systems or self-adhered modified bitumen roofing systems are available for consideration on areas of the building that are on accessory structures or are not part of a building envelope (canopies, etc.). Review the use of this type of roofing system with the Owner.
    B. Consider use of lightweight insulating concrete in lieu of rigid insulation systems for complex roof slopes to assist with cost savings (initial and long term reroof costs) and sustainability benefits.
    C. Stainless steel fasteners are required for attachment of all roof nailers and roof flashings.
    D. Detail all roof systems in accordance with the referenced specifications above, as well as current National Roofing Contractors Association and SMACNA Architectural Sheet Metal Manual guidelines.
        i. Ensure that all roof edges and parapets in details match assemblies tested in accordance with ANSI/SPRI ES-1 to pressures that meet or exceed design wind uplift loads.
        ii. Provide isometric details indicating how roof edges and parapet assemblies will tie in at intersections with walls to maintain a continuous air barrier.
    E. Designate each roof area with unique designation to include building identifier and sequence numbers (A1, A2, etc.). Designations shall identify changes in roofing systems and locations. Coordinate designations with Owner's representative.
    F. The use of fire-retardant treated plywood as a substrate for single-ply base flashings is prohibited. A roofing coverboard must be installed to ensure the roof system warranty is maintained.
    G. Provide modified bituminous sheet roofing for low slope areas supporting solar system equipment.
3. Specify thermal insulation products that comply with CDPH Standard Method and do not contain added formaldehyde.

Section 072100 – Thermal Insulation

1. The Owner encourages a higher use of continuous insulation in the building envelope, in lieu of stud cavity insulation to promote a high-performing walls system, achieve R-values, eliminate thermal bridging, and maintain dew points in the cavities of wall systems - provided that these assemblies do not require the practice of blind fastening through the air barrier system. Refer to previous section regarding requirements to seal fasteners penetrating the air barrier prior to installation of insulation and cladding.
2. Specify thermal insulation products that comply with CDPH Standard Method and do not contain added formaldehyde.

Section 072119 – Foamed-In-Place Insulation

1. Provide closed-cell spray polyurethane foam where needed at the building envelope to seal gaps and assist with elimination of thermal bridges.
2. Open cell polyurethane foam is acceptable for use where necessary to allow vapor release from within the envelope.

Section 074113.16 – Standing-Seam Metal Roof Panels

1. Provide the following performance criteria for metal roofs over interior spaces:
    A. Design the roof system to meet a minimum U.L. class 90 for wind uplift and require submittal of calculations and shop drawings sealed by an engineer registered in the state of Texas.
    B. Provide 16 to 20-inch-wide panels with 2-inch minimum seam height, and either a double locked standing seam or “T” type locked standing seam. Trapezoidal, single lock, and snap lock standing seam panels are prohibited.
    C. Provide a minimum 24-gauge, galvalume sheets mechanically fastened to a solid substrate using concealed clips and bearing plates.

D. Provide a minimum 40 mil thick, high temperature rated, self-sealing roof underlayment under all metal roof surfaces.
E. Provide a minimum 20-year warranty for weathertightness, with no monetary limitations.

Section 074213.13 – Formed Metal Wall Panels

1. At metal wall panel systems, review attachment and sealing methods with the Owner. Design systems to promote longevity and minimize short-term maintenance issues.

Section 076200 – Sheet Metal Flashing and Trim

1. The Owner requires simple roof shapes with all drainage to the perimeter of the building in lieu of interior roof drains. Larger roof areas requiring the use of internal roof drainage systems require Owner approval.
2. Gutter guards are required at all locations.
3. Lead is not allowed.
4. Metal downspout boots:
    A. Provide cast aluminum or cast-iron downspout boots at a minimum height of 4-feet above finish grade at all downspouts discharging at grade or connected to below grade piping. 18-gauge, reinforced downspouts wrapped with prefinished metal are acceptable.
    B. Galvanize and paint all cast-iron downspout boots.

Section 077200 – Roof Accessories

1. Keep rooftop equipment to an absolute minimum and provide sidewall intakes and exhausts with louvers. All approved rooftop equipment requires a minimum 1-foot flashing height above the finished roof. Equipment curbs shall be sized to account for the thickest part of the roof system and the required flashing height.
2. Roof hatches require a minimum 1-foot flashing height above the finished roof, with a powder coated galvanized steel or aluminum safety rail system and safety post by the roof hatch manufacturer.
3. Roof ladders at hatches shall extend as required to provide a maximum 6-inch distance from top rung and top of roof hatch. Roof ladders at other locations shall extend to provide 6-inch maximum distance between top rung and surface of roof edge or parapet wall.
4. All penetrations through roofing, and waterproofing systems must be clearly indicated and coordinated on the drawings.
    A. Provide 2'-0" minimum clearance between all roof penetrations.
    B. Provide 1'-0" minimum clearance between all waterproofing penetrations.
    C. Coordinate penetrations with drainage patterns to ensure 1'-0" minimum clearance from all valleys and cricket edges leading to drainage points.
    D. Hooded, curbed pipe penetrations are required for all piping and conduit penetrations through the roof, with a curb providing a 12-inch flashing height minimum. Seal to a sheet metal closure plate. Remove insulation, where present, to ensure a complete seal around piping inside at the closure plate.
5. Ensure all roof areas are accessible to Owner's service personnel utilizing roof hatches, doors, and/or permanent ladders.
6. Provide proper clearances under all rooftop equipment:
    A. 2'-0" minimum under all equipment larger than 4'-0" on one side that has roofing underneath.
    B. 3'-0" minimum under all equipment larger than 6'-0" on both sides that has roofing underneath.
    C. 8" minimum clearance under all piping and conduit lines.
7. Provide pipe and equipment supports by Portable Pipe Hangers or other manufacturers of equivalent size and durability under all non-curbed rooftop equipment and piping/conduit. Protection pads shall be adhered to the bases of all supports.

Section 079200 – Joint Sealants

1. Provide silicone-based joint sealants at exterior conditions.
2. Sealant joints require ASTM C1521 field adhesion testing. Frequency of the destructive pull testing shall be a minimum of one test per 100 linear feet for the first 1000 feet and one test for every 1000 linear feet thereafter.
3. Twenty-year product and two-year workmanship warranty is required for all sealants.
4. Do not exceed the VOC requirements of current SCAQMD Rule 1168.

Section 079513 – Expansion Joint Cover Assemblies

1. Provide aluminum expansion joint cover assemblies where required.

DIVISION 08 – OPENINGS

The following full specifications sections for Division 08 are included in Appendix A. Editable files are available from the Owner. Design teams shall edit each specification to the requirements necessary for the project and include each in the project manual in accordance with required contractual deliverables for each phase. Additional items associated with Division 08 are listed below. In Appendix A:

Section 087100 – Door Hardware

General Requirements

1. Doors
    A. Refer to *Chapter 4, Openings* for opening requirements by space type.
    B. All exterior doors, with the exception of access doors to mechanical, storage and utility rooms, shall be protected from rain by either : (a) an overhang/soffit; or (b) an exterior canopy.
        i. Canopies shall provide a through wall flashing to divert cavity drainage away from door head, and framing members shall be located to provide minimum clearance of 8 inches between the lowest point of framing and the door head for flashing purposes.
        ii. Door thresholds shall be set in a full bed of sealant and continuously sealed to flashings at jamb conditions to prevent cavity drainage migrating under door threshold.
    C. Provide self-powered electronic locks per *Appendix A, 087100 – Door Hardware*. Coordinate with Owner for locations.
    D. For specialty spaces or locations, review door and frame systems with the Owner.
    E. Coordinate locations of audible exterior alarms with the Owner.
    F. Specify products that comply with one of the following:
        i. CDPH Standard Method
        ii. Inherently non-emitting source of VOCs
        iii. Salvaged or reused material

G. Primary entry into a room may not be part of or within an operable partition.

H. Door hardware provided for all specialty doors must be compatible with the requirements outlined in *Chapter 5, Performance Requirements – Division 8 Openings* and *Appendix A, Section 087100 – Door Hardware*. Consult with Owner for further clarification.

2. Windows

   A. Align exterior perimeter window seals with the air/weather barrier plane in all exterior walls. Shifting of window systems such that perimeter seals are exterior of the air/weather barrier plane of the wall will require Owner approval.

   B. Silicone sealant is required for use at all window internal sealants and exterior perimeter sealants. A minimum of three (3) sealant joints (interior, performance exterior seal, weather seal) are required at all perimeter window seals.

Section 081113 – Hollow Metal Doors and Frames

1. Meet all requirements of the Steel Door Institute.
2. Provide removable stops at all lites, louvers, etc.
3. Provide maximum-duty doors and frames: SDI A250.8, Level 4; SDI A250.4, Level A at exterior locations.

   A. At all double-door locations, provide fixed steel mullions. Provide removeable, keyed steel mullions at primary delivery locations only.

   B. Metallic-coated steel sheet required

4. Provide extra-heavy-duty doors and frames: SDI A250.8, Level 3; SDI A250.4, Level A at interior locations.

   A. Provide maximum-duty doors and frames: SDI A250.8, Level 4; SDI A250.4, Level A at gymnasiums.

   B. Metallic-coated steel sheet required at wet locations

5. Provide full-profile welded door frames. Knock-Down frames are not allowed.

Section 081416 – Flush Wood Doors

1. Provide five-ply, flush wood veneer-faced doors with the following performance criteria:
    A. Comply with Architectural Woodwork Standards (AWI) and provide certificates indicating compliance for the project.
    B. Manufactured with no added formaldehyde or meet the requirements of CARB Ultra Low Emitting Formaldehyde (ULEF)
    C. WDMA I.S.1-A Performance Grade: Heavy Duty
    D. AWI Grade: Premium
    E. Solid core, 1-3/4-inch thick
    F. Hardwood veneer with grade AA faces
    G. Species: Hardwood as approved by the Owner
    H. Plain sliced
    I. Structural composite lumber core
    J. At exposed vertical edges provide AWI edge Type A and of same species as door faces.

Section 083613 – Sectional Doors

1. Provide heavy-duty hardware components, rollers, springs, etc.
2. At motorized sectional doors, provide manual operation capabilities.

Section 084113 – Aluminum-Framed Entrances and Storefronts

1. At locations with storefront framing provide the following performance criteria:
    A. Thermally-broken with exception of interior framing
    B. High Performance Sub-sills
    C. All frame components must be aluminum. Use of PVC fillers is prohibited – aluminum is required at jambs.
    D. Mullion end caps are required at the top of all vertical mullions and must be fully sealed.

E. Venting and Operable Windows
    i. Awning or single-hung type
    ii. Provide insect screens at kitchen locations.
F. Continuous gaskets around glazing units are prohibited. Gaskets are required to be sized, cut, and installed per manufacturer requirements.

2. At storefront locations that include entrance doors provide the following performance criteria:
    A. Thermally-broken components, except at interior entrance doors
    B. Wide stile doors
    C. Stainless-steel, continuous-gear hinges
    D. Wall or floor stops shall be used in lieu of door closers as the primary device to restrict door swings. Hollow metal frames or steel reinforcing at aluminum frames for door closer connections shall be considered if conditions prevent the installation of floor or wall stops.
3. Provide a minimum, 10-year special warranty for aluminum-framed entrances and storefront systems.
4. Finish: anodized. Painted, powder-coated, etc. systems are not acceptable.

Section 086200 – Unit Skylights

1. Skylights are not preferred and must be specifically approved for each project by the Owner. Clerestory windows with proper base flashing heights above roofs are preferred.
2. If the Owner approves the use of skylights for the project:
    A. Incorporate a minimum 1-foot curb at all skylight locations above finished roof.
    B. Review, in detail, the manufacturer's warranty for the skylight system with the Owner for approval. Confirm no conflicts with the roof membrane manufacturer's warranted system.
    C. Exposed, skyward-facing fasteners on roof caps and curbs are prohibited.
    D. Skylights must provide adequate fall protection. Provide fall protection test data to the Owner for review that demonstrates unit can withstand minimum OSHA load requirements for fall protection at openings and furnish skylights with labels indicating product meets fall protection strength requirements.

Section 087113 – Automatic Door Operators

1. Refer to *Chapter 4, Openings* for locations where automatic door operators are required.
2. Coordinate with Owner's Universal Design standards.
3. Provide the following controls for doors that have powered ADA operators and electric door locking mechanisms.
    A. Provide a relay to control power to power operated doors.
    B. Access Control System shall control the relay and only allow power to the door operator when the door is unlocked.

DIVISION 09 – FINISHES

General Requirements

1. Provide attic stock for finish materials, calculated at a minimum of three percent of the material used on the project and rounded to nearest logical quantity (gallon, box, etc.). Confirm all quantities with Owner prior to finalizing specifications.
2. Specify products that comply with one of the following:
    A. CDPH Standard Method
    B. Inherently non-emitting source of VOCs
    C. Salvaged or reused material
3. For wet-applied products, specify products that comply with the following:
    A. CDPH Standard Method
    B. VOC content limits of current SCAQMD Rule 1113 (paints and coatings) and 1168 (adhesives and sealants)

Section 092400 – Cement Plastering

1. Installation of cement plastering requires Owner approval prior to incorporating into the project.
2. Incorporate requirements for installation of metal lath in full accordance with ASTM C1063.
    A. Continuous lath behind control joints is prohibited.
    B. Wall areas exceeding maximum rations specified in ASTM C1063 are prohibited.
3. All galvanized accessories and wire ties require a G90 coating. Non-corrosive fasteners for lath are required.
4. All metal lath attachments must be observed by a qualified professional.
5. All layers must be fully cured in full accordance with code.

Section 092900 – Gypsum Board

1. Sound-Attenuation Blankets: ASTM C665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
    A. Basis-of-design for sound attenuation insulation is Owens-Corning Fiberglass Noise Barrier Batts, OCF Friction Fit Building Insulation or approved equal. Thickness to equal stud depth.

Section 093013 – Ceramic Tiling

1. At locations with porcelain tile, provide the following performance criteria:
    A. Dynamic Coefficient of Friction: not less than 0.42
    B. Through-body colored tile
    C. Rectified
2. At locations with glazed, ceramic wall tile or accents provide the following performance criteria:
    A. Rectified
    B. Provide metal edge strips with depths that match tile and setting-bed thicknesses.
3. Provide cementitious tile backing panels.
4. Waterproof membranes are required at floors and walls in toilet and shower rooms.
5. Crack isolation membranes are required at all locations and are allowable as part of the waterproofing system.
6. Incorporate TCNA standards into project specifications for all installations.
7. Consider the use of epoxy grout or more durable grout systems to promote longevity and cleanliness.

Section 095113 – Acoustical Panel Ceilings

1. At locations with acoustical panel ceilings, provide the following performance criteria:
    A. Vinyl-coated or cleanable type panels at kitchens
    B. Studios, small group spaces, etc.:
        i. Light Reflectance: 0.82
        ii. Ceiling Attenuation Class: 40 CAC
        iii. Noise Reduction Coefficient: 0.70
        iv. Articulation Class: 170
2. Specify products that comply with CDPH certification.

Section 096466 – Wood Athletic Flooring

1. At areas with wood athletic flooring, provide the following performance criteria:
    A. Hard maple
    B. Thickness: 23/32-inch
    C. 2-1/4-inches wide
    D. Grade: Second and better
    E. MFMA graded, trademarked, and certified
    F. MFMA based finishing materials
    G. 1/4-inch by 5-inch, 6063T aluminum alloy thresholds with mill finish and bevels at both sides
    H. Minimum 6-mil vapor retarder
    I. Design flooring to withstand loads required by code, point loads up to 400 psi, and area loads up to 500 lbs/wheel area. Wheel area is defined as any number of wheels within one square foot of area.
    J. Provide minimum 3/8-inch thick, and 2-1/4-inch by 3-inch rubber cushion attached to each sleeper
2. Review requirements for floor striping with the Owner and the Owner's designated representatives.

Section 096470 – Wood Dance Flooring

1. Provide sprung dance flooring at areas as specified in *Chapter 4, Finishes*.
2. Basis of Design:
    A. Basis-of-Design for Middle schools: Harlequin Liberty Latchloc
    B. Basis-of-Design for High Schools: Harlequin Woodspring
3. Alternative product: Hardwood athletic flooring with shock absorption pads may be considered pending Owner approval.
4. Surfacing:
    A. Provide slip resistant surface
        i. Basis-of-Design product: Harlequin Cascade Vinyl Performance Surface at all sprung dance floors.
5. Provide dampproofing below subfloor assemblies at all sprung wood floors per manufacturer's requirements.
6. Warranty: Provide a minimum two-year manufacturer warranty for subfloor construction and minimum five-year warranty for surfacing materials.

Section 096513 – Resilient Base and Accessories

1. Provide resilient wall base with the following performance criteria:
    A. Type: TS, rubber, vulcanized thermoset
    B. Group I: Solid homogeneous
    C. Height: 4-inches

Section 096516 – Resilient Sheet Flooring

1. At areas with resilient flooring materials provide the following performance criteria:
    A. Resilient Sheet Vinyl (Kitchens)
        i. Thickness: 3 mm minimum
        ii. Homogeneous construction
        iii. Static load limit: 2,000 psi minimum
        iv. Static coefficient of friction: 0.92 dry and 0.88 wet

v. Fully welded seams
vi. Products are required to have additional performance standards for use in kitchens, including required resistance to oils, fats, etc.

B. Linoleum
i. Fully welded seams
ii. Homogeneous construction
iii. Backing: Polyester
iv. Resistant to bacteria

Section 096519 – Resilient Tile Flooring

1. Vinyl composition tile is not allowed.
2. At areas with resilient tile flooring materials provide the following performance criteria:
A. Rubber tile
i. Smooth
B. Luxury Vinyl Tile (LVT)
i. Minimum 20-year warranty
ii. Glue-down system
iii. Minimum 20 mil wear layer
iv. Acceptable wear layer compositions:
a. Diamond infused UV-cured polyurethane
b. Enhanced urethane
c. Urethane with ceramic bead
C. Resilient terrazzo floor tile
i. Chemically-bonded and seamless
ii. Marble or granite chips embedded in a flexible, thermoset, polyester resin matrix
iii. Corrosion resistive properties
iv. Protective coating
v. Smooth wearing surface
vi. Divider strips

D. Rubber cork tile
    i. Minimum Class C fire rating, per ASTM E84
    ii. Finish: Urethane (site-applied)
E. Static-dissipative resilient tile
    i. Internal dissipative elements and components
    ii. Static dissipative adhesive
    iii. No-wax finish
    iv. Electrostatic Dissipative: STM 97.2 rating, no more than 100 volts

Section 096566 – Resilient Athletic Flooring

1. At areas with resilient athletic flooring systems, provide the following performance criteria:
    A. Basis of design material is Gerflor Taraflex Sport M Comfort Sports Flooring or similar product.
    B. Minimum 15-year warranty for surface wear
    C. Thickness: not less than 0.47 inch
    D. Wear layer thickness: not less than 0.08 inch
    E. Minimum triple durometer foam backing with 46% shock absorption
    F. Fiberglass grid layer between foam backing and top wear layer
    G. Fully-welded seams
    H. Traffic surface texture: embossed wood grain simulating random board lengths
    I. Permanent bacterial and fungicidal treatment
    J. No-wax finish
    K. Minimum roll width of 59 inches is required.
    L. Provide solid color court border, basketball court keys, and center jump circle.
    M. Providing-striping by the same manufacturer as flooring.

Section 096623 – Resinous Matrix Terrazzo Flooring

1. At areas with resinous matrix terrazzo flooring systems, provide the following performance criteria:
    A. Epoxy-resin terrazzo flooring
    B. Control joint strips
    C. Divider strips: metal or colored plastic
    D. Moisture and vapor emission control membrane
    E. Crack suppression membrane
    F. Hardness: 60-85 per ASTM D 2240, Shore D
    G. Minimum tensile strength: 3,000 psi
    H. Minimum compressive strength: 10,000 psi
    I. Impact resistance: Ability to withstand 16 foot-pounds without cracking, delamination, or chipping
    J. Aggregates: comply with NTMA gradation standards
    K. Resin-based grout

Section 096723 – Resinous Flooring (Epoxy)

1. At areas with resinous flooring systems, provide the following performance criteria:
    A. Aggregate for slip- resistance
    B. Waterproofing membrane
    C. Reinforcing membrane
    D. Primer
    E. Epoxy resin system
    F. Aggregates: colored quartz, vinyl flecks, granite, or natural silica
    G. Integral, 4-inch cove base
    H. Compressive strength: minimum of 10,000 PSI
    I. Tensile strength: minimum of 2000 PSI
    J. Water absorption: less than 1%

K. Impact resistance: no chipping, cracking or delamination. Not more than 1/16" permanent indentation according to MIL-D-3134J
L. Hardness: 85-90, per ASTM D 2240, Shore D
M. Provide a mockup illustrating aesthetic and texture qualities for design team and Owner approval.

Section 096813 – Tile Carpeting

1. At areas with tile carpeting, provide the following performance criteria:
    A. Fiber: nylon
    B. Dye method: 100% Solution dyed
    C. Maintain dye lot integrity and do not mix dye lots unless allowed to merge by confirmation with the manufacturer.
    D. Installation conditions: Relative humidity not to exceed 65 percent for at least 48 hours prior to installation, unless backing and adhesive is warrantied up to 99 percent relative humidity.
    E. pH Levels: between 5.0-9.0 prior to install
    F. Acceptable backing
        i. Thermoplastic Polyolefin
        ii. Vinyl
    G. Minimum 15-year, unlimited warranty
    H. Meet the testing requirements of current CDPH Standard Method using applicable exposure scenario
2. Provide walk-off entrance carpet with the following performance criteria:
    A. Composition: needlebond hobnail, polyester
    B. Heavy wear rating
    C. Where walk-off entrance carpet is unachievable, coordinate roll-out mats with Owner. Owner will furnish and install.

Section 097200 – Wall Coverings

1. The Owner prefers to keep wall coverings to a minimum. Review locations for these materials with the Owner for approval.
2. Wall coverings on the interior face of building envelope walls are not allowed.
3. At areas with wall coverings, provide the following performance criteria:
    A. Vinyl
        i. Mildew resistant
        ii. Weight - Type II
        iii. Fire rating – Class A
        iv. Backing – fabric
        v. Water repellent and stain resistant coating
        vi. Drywall – level 5 finish
    B. Textile
        i. Mildew resistant
        ii. Weight – Type II
        iii. Water repellent and stain resistant coating
        iv. Backing – acrylic
        v. Drywall – level 5 finish

Section 097723 – Fabric-Wrapped Panels

1. At areas designed with fabric-wrapped panels, provide the following performance criteria:
    A. Noise Reduction Coefficient: Minimum of 0.70
    B. Facing material with abrasion resistance of 250,000 double-rubs
    C. Fire rating: Class A
    D. Particleboard backing is not allowed.

Section 099123 – Interior Painting

1. Interior Paints and Primers shall comply with VOC thresholds of the current SCAQMD Rule 1113 and CDPH Standard Method emissions testing.

DIVISION 10 – SPECIALTIES

General Requirements

1. Facilities shall be equipped with automated external defibrillators (AEDs) as follows:
    A. Zoll/Cardiac Science Powerheart G5 AED, semi-automatic with ICPR electrodes, dual language (manufacturer part no. G5S-80C-S) with semi-rigid carrying case (manufacturer part no. XCAAED004A). Refer to *Appendix C, OFCI/CFCI Matrix* for furnish and installation expectations.
    B. Semi-recessed wall cabinet with audible alarm, Zoll/Cardiac Science (manufacturer part no.50-00395-20). Refer to *Appendix C, OFCI/CFCI Matrix* for furnish and installation expectations.
    C. Provide V-shaped wall signs visible from the front and sides of all AED locations.
2. Provide vaults and safes as follows:
    A. Provide one front-loading depository safe at the Administration area. Safes should allow for easy insertion of cash, checks, and receipts without unlocking and equipped with anti-fishing baffles to deter removal of contents through the opening. Fasten safes securely to the foundation and/or wall. Basis-of-design: Sentry Depository Safe Model No. UC-039K.
    B. Provide one immovable, lockable gun safe for Security Resource Officer office. Safes shall be manufactured with high-quality, rolled steel and have a minimum storage capacity of 8 firearms (4 long guns and 4 handguns). Safes shall be equipped with adjustable shelving and handgun rack. Safes shall have electrically operated locks with backup keys and fastened securely to the foundation and/or wall. Basis-of-design: Kaer 1320 Gun Safe, or approved equal.
    C. Provide a minimum of 2 keys per vault. Coordinate vault locations with Owner.
    D. The Owner will install a timeclock station at all campuses. Refer to *Chapter 4, Electrical and Data* for location requirements. Obtain cut sheets for the equipment from the Owner. .
3. EpiPen stations are provided by the Owner. Coordinate locations and requirements with the Owner and outline in the documents for approval.
4. Emergency Evacuation Chair

A. Provide power evacuation chairs for each school. Chairs shall transport persons with limited or impaired mobility up or down stairs in the event of an emergency evacuation. Basis-of-design: Evacusafe Excel-e Stair Climber, or approved equal.

5. Specify products that comply with one of the following:
    A. CDPH Standard Method
    B. Inherently non-emitting source of VOCs
    C. Salvaged or reused material
6. Exterior Building Signage
    A. Provide wall-mounted signage that contains the school name and address. Locate signage out of reach from ground level and near the public street entrance.
7. Provide miscellaneous signage as directed by Owner.
    A. Coordinate locations of Building Evacuation signage furnished and installed by Owner.
    B. Furnish and Install Handgun Carry Prohibition signage in accordance with Texas Penal Code as coordinated with Owner.
    C. Furnish and Install Ground Use Restriction signage as coordinated with Owner.
    D. Furnish and install Outdoor Learning signage as coordinated with Owner.
    E. Furnish and install Roof Warranty signage in accordance with Owner's roofing specifications.
    F. Green Building Educational Signs – coordinate signage template, content, and location with Owner.

Section 101100 – Visual Display Units

1. Provide items with the following performance criteria:
    A. Markerboards
        i. Porcelain steel over gypsum core with aluminum foil backing
        ii. Tack strip
        iii. Map rail
        iv. Glass, magnetic markerboards are also acceptable.
    B. Porcelain Markerboard Surface
        i. Magnetic PV coated porcelain coated steel
        ii. Full wall height
        iii. Dry erase
        iv. Projectable
    C. Acrylic Markerboard Surface
        i. Magnetic
        ii. Ghost-free – impervious to staining
        iii. Shatterproof
        iv. Red list chemical free
        v. Installation: z-clip or direct adhesive
    D. Tackboards
        i. Natural cork on hardboard backing
        ii. Rubberized cork is also acceptable.
        iii. Linoleum is also acceptable.
            a. Composition: Linseed Oil, Cork
            b. Through-color
            c. NRC: 0.10
            d. Bacteria resistant
        iv. At fabric-wrapped, tack surfaces, provide the following performance criteria:
            a. Composition: 87% bio-based, 13% polyethylene
            b. Fire rating – class A
            c. Self-healing

d. Topical finishes are not allowed.
e. Water with solvent and bleach cleanable surfaces and materials
f. Abrasion resistance of one-million double-rubs
g. NRC: 0.90 when wrapped around 2" thick panel

E. Tackstrips
   i. 2-inch wide
   ii. 1/4-inch thick natural cork

Section 101200 – Display Cases

1. Recessed display cases are preferred to eliminate protrusions into circulations spaces or learning environments. Review all parameters, finishes, locations, etc. with the Owner for approval.

Section 101400 – Outdoor Marquee Signage

1. Outdoor, single, or double sided, free standing, LED digital sign(s) shall be constructed for each school location. Signage shall include identification (ID) cabinet and full color LED display, required utilities and structures.
2. ID cabinet shall be internally LED illuminated with photocell, equipped with 3M vinyl graphics with lexan face. Graphics shall include school name and address. Graphic font shall be Myriad Pro Bold unless approved otherwise by the Owner.
3. LED display shall have 19 mm pixel pitch or similar, 32 x 112-pixel matrix or similar, 281trillion colors or similar, temperature probe with light sensor, PC messaging software, and wireless communication.
4. Signage shall comply with City of Austin's rules and regulations for maximum height and minimum property setback.
5. Contractor shall provide 5-year part and labor warranty, unlimited technical & software support.

Section 101416 - Plaques

1. Design according to the Owner's requirements.
2. Position near the main entrance and administration area.
3. Dedication Plaque: . Coordinate size and material of dedication plaque with Owner's Dedication Plaque Standard Operating Procedures.
4. LEED and AEGB plaques - coordinate location with Owner.
5. All Other Plaques: Coordinate with the Owner

Section 101423.16 – Room-Identification Panel Signage

1. Provide interior room-identification panel signage with the following performance criteria:
    A. Signage with permanent room numbers, coordinated and approved by the Owner.
    B. Signage with permanent room names matching those provided in nonitalicized text in the *Educational Specifications,* coordinated and approved by the Owner.
    C. Provide two additional areas or slots that allow for modifications and additions to the room signage to accommodate the flexibility of non-building support spaces.
2. Provide signage for all exterior doors that access occupied spaces to meet the following requirements (doors to service or mechanical spaces are excluded):
    A. Typeface requirements:
        i. Contrasts with background
        ii. Retro-reflective for low light or smoky conditions
    B. Requirements for signage viewed from the building exterior:
        i. Place at the top right of the door.
        ii. Where multiple doors are present, center the signage or provide on both ends of the group of doors.
        iii. Provide text size that is visible from street or closest traffic way/drive.
    C. Requirements for signage viewed from the building interior:
        i. Place on hinge side near the bottom of the door.
        ii. Text size: 4 inches, minimum.
    D. Requirements for roof hatches and roof access doors signage:
        i. Exterior text size: 6 inches, minimum
        ii. Interior text size: 4 inches

E. Provide signage for crawl space access doors adjacent to door on building interior side of door.

Building, Room, and Door Designations

1. References
    A. Refer to *Appendix C, Building, Room, and Exterior Door Numbering Standards* for examples of room and door numbering.
2. Building Designation
    A. Provide all buildings on a campus with a specific letter designation.
    B. Designate the building with the main campus entry as building A.
    C. Designate the remaining buildings in clockwise direction from building A with subsequent letters B, C, etc.
3. Room Numbering
    A. Provide the following room numbering system:

    A101

    A Building designation

    1 Floor level designation

    01 Sequential room number

    B. Designate the main entry to the building with the letter of the building followed by the number *100*. In the case of larger buildings, room numbering may be based on the number *1000*.
        i. Example: A100 or A1000
    C. Number the rooms in a clockwise fashion from the main entry using sequential numbers.
        i. Example: A101, A102, etc.,
    D. Stack similar room numbers by floor where possible.
        i. Example: A201 is above A101.
    E. Suites: Where rooms open off of a common room, number those rooms by adding a letter to the end of the common room number. Number the rooms in a clockwise direction.
        i. Example: A101A, A101B, and A101C all open off of a common reception room A101.

F. Stairs: Provide the following stair numbering system:

A-ST1

A Building designation

ST Stair designation

1 Sequential stair number

G. Elevators: Provide the following elevator numbering system:

A-EL1

A Building designation

EL Elevator designation

1 Sequential elevator number

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

A-SY1

A Building designation

SY Service yard designation

1 Sequential service yard number

4. Door numbering

A. Exterior doors (for doors to occupied spaces or building interior access)

i. Provide the following door numbering system:

A1

A Building designation

1 Door number

ii. Designate the main building entry as door 1.

a. Example: A1

iii. Number remaining entry doors in a clockwise direction from door 1.

a. Example: A2, A3, etc.,

iv. Exception: At exterior doors to unoccupied spaces without entry or access into the building interior, such as mechanical, electrical, storage, fire riser, etc., provide a modifier to the end of the number, in sequence:

A3-M

A Building designation

3 Door number

-M Non-entry door modifier

a. Example: A2, A3-M, A4, etc. where A3-M is an exterior door without building entry, located between exterior doors A2 and A4.

B. Interior doors:
    i. Match the door number to the room number.
    ii. Where rooms have multiple doors, provide the following numbering system:

    A101.1

    A Building designation
    1 Door number
    01 Sequential room number
    .1 Sequential door number

    iii. Number multiple doors per rooms in a clockwise direction.

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

    A-RH1

    A Building designation
    RH Roof hatch designation
    1 Door number

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

    A-CH1

    A Building designation
    CH Crawl space hatch designation
    1 Door number

Section 102113.17 – Phenolic-Core Toilet Compartments / Section 102113.19 – Plastic Toilet Compartments

1. NOTE: Owner's standard is full-height toilet compartments with standard wall/door construction with resilient finishes and materials suitable for toilet compartments. Materials and performance requirements noted in this specification section are included in the event some areas of the building/spaces require them; however, the intent is not for use in restrooms throughout the Owner's facilities.
2. Provide floor-mounted, overhead-braced systems.
3. Provide wall-mounted urinal screens with overhead and floor supports.
4. Provide 1-inch thick panels.
5. Provide heavy duty stainless-steel hardware and continuous hinges with clothes hooks.

6. Coordinate with the Owner to determine if tamperproof hardware fasteners are required.

Section 102116 – Shower and Dressing Compartments

1. Provide with performance criteria and components similar to *Section 102113.17 – Phenolic-Core Toilet Compartments / Section 102113.19 – Plastic Toilet Compartments*.

Section 102239 – Folding Panel Partitions

1. Provide folding panel partitions with the following performance criteria:
    A. Manual operation
    B. Heavy duty hardware
    C. Vinyl material finish
    D. Steel tracks
    E. Noise Reduction Coefficient: Minimum of 0.70
    F. STC: Refer to *Chapter 5, Acoustics* in this chapter of the PDM.
    G. Top and bottom seals
    H. Roll-formed and welded 16-gauge steel frame

Section 102239.13 – Folding Glass-Panel Partitions

1. Provide performance criteria similar *to Section 102239 – Folding Panel Partitions*.

Section 102600 – Wall and Door Protection

1. Provide 2-inch metal corner guards, up to wainscot height (minimum), throughout the interior of the building.

Section 102800 – Toilet, Bath, and Laundry Accessories

1. Provide the following accessories:
    A. High-Speed Warm Air Hand Dryers
        i. The basis-of-design is Xlerator Model XL-W.
        ii. Provide anti-microbial wall guards behind hand dryers.
        iii. Prior to implementing electric hand dryers in existing buildings, consult with the Owner for status of paper supplier contracts.
    B. Grab Bars
    C. Sanitary napkin dispensers
    D. Trash receptacles
    E. Mirrors
        i. Vandal resistant – concealed mounting system and hardware
    F. Under lavatory guards
    G. Shower seats and all necessary shower room accessories
    H. Hooks
    I. Changing stations
    J. Mop and broom holders
    K. Utility shelves
2. Refer to *Appendix C, OFCI/CFCI Responsibility Matrix* for the following items:
    A. Paper towel dispensers
    B. Toilet tissue dispensers
    C. Soap dispensers

Section 104400 – Fire Extinguisher Signage

1. Provide V-shaped wall signs visible from front and sides of all fire extinguisher locations.

Section 104413 – Fire Extinguisher Cabinets

1. Provide fire extinguisher cabinets with the following performance criteria:
    A. Solid steel cabinet and door with rolled edges and a white, baked acrylic enamel finish
    B. Semi-recessed
    C. Size cabinet to accommodate a 10-pound fire extinguisher. Coordinate with Owner.
    D. Provide with a roller catch and an audible alarm as directed by the Owner.

Section 104416 – Fire Extinguishers

1. Provide documentation to Owner indicating locations and quantity of fire extinguishers required.

Section 105113 – Metal Lockers

1. Provide metal lockers with the following performance criteria:
    A. Fully-welded
    B. Minimum 16-gauge steel
    C. Continuous hinges
    D. Include shelves, coat hooks, & number plates
    E. Fitness lockers
        i. Multi-tiered
        ii. Slanted top
        iii. 4-inch concrete base
        iv. Locking system: padlocks
    F. Athletic lockers
        i. Boys: single-tiered
        ii. Girls: double-tiered
        iii. Coordinate size requirements with the Owner.
        iv. 4-inch concrete base
        v. Locking system: padlocks

G. Kitchen Personnel Lockers
    i. Single-tiered
    ii. Louvers at top and bottom of doors
    iii. 4-inch concrete base
    iv. Locking system: padlocks

2. Corridor lockers are not allowed.

Section 107516 – Ground-Set Flagpoles

1. Locate flagpole near the main entrance of the building
2. Provide the following performance criteria:
    A. Natural aluminum finish
    B. 6-inch round, tapered pole
    C. Height: 30-feet
    D. Manual operation
    E. One rope for two flags measuring 5-feet by 8-feet
    F. Stainless steel flag clips
    G. Internal lanyard or external lock box at the cleat

DIVISION 11 – EQUIPMENT

General Requirements

1. For all design requirements regarding food services and kitchen equipment, refer to *Appendix C, Kitchen Design Requirements*.

Section 113013 – Residential Appliances

1. Washer - Basis-of-Design: Whirlpool #WFW5620HW)
2. Dryer - Basis-of-Design: Whirlpool #WED5620HW)

Section 115115 – Kiln

1. At kiln rooms, include the following:
    A. Provide a minimum of 18-inches clear between the kiln and adjacent walls and clear access to the kiln controls.
    B. Kilns shall have downdraft systems with bottom vents to allow the room air to mix with air in the kiln.
    C. The basis of design for the kiln is Skutt Model KM-1027.
    D. Provide aluminum or stainless steel exhaust ducts and operate in negative pressure unless required otherwise by the manufacturer.
    E. Reference mechanical performance requirements for separate room exhaust and requirements to provide room temperature continuously during operation of the kiln.

Section 115313 – Laboratory Fume Hoods

1. Provide laboratory fume hoods with the following performance criteria:
    A. Chemistry labs basis-of-design: Labconco Protector-Pass Through Laboratory Hood

i. Approximate size: 48-inches wide by 33-inches deep and 59-inches high
ii. Two-sided with operable sashes on each side and audible alarm for instances of simultaneous opening of sashes
iii. One electrical duplex receptacle
iv. LED lighting
v. Benchtop style
vi. 100-115 volts, 50/60 Hz, 10 amps
vii. Confirm cold and hot water, drainage, and gas requirements in fume hood with Owner.
viii. Coordinate requirements with mechanical controls and systems.

B. Basis-of-design for other labs: Labconco Protector XVS Ventilation Station with Filtermate Portable Exhauster
i. Approximate size: 48-inches wide by 29-inches deep and 32-inches high
ii. Glass tops and sides
iii. Air foil and rear baffle
iv. Portable exhauster

Pass-through laboratory fume hood:

Ventilation Station:

1. Provide uniform digital sound equipment at all school locations. Coordinate the following specifications with Owner.
    A. Digital Mixer
        i. High Schools
            a. Allen & Heath Avantis Digital Soundboard with 1 DX168 Stage Box Expander or better with Allen & Heath board. Furnish Dante card options when Dante systems are installed into the theater and consider adding the Dante Card option. Utilize the following links for product data.
            b. Product Data Allen & Heath Avantis, DX168 Stage Box Expander: https://www.allen-heath.com/avantis/ https://www.allen-heath.com/hardware/everything-i-o/dx168/
        ii. Middle Schools
            a. Allen & Heath QU32 Digital Soundboard or better (Allen & Heath board). Product Data: https://www.allen-heath.com/qu-series/qu-32
    B. Microphones
        i. Ensure frequencies for microphones and other wireless equipment are in accordance with Federal Communications Commission (FCC) rules. Refer FCC's website for further information: https://www.fcc.gov/wireless-telecommunications
        ii. High Schools
            a. Furnish a minimum of 12 Shure ULX-D digital microphones (6 handheld microphones and 12 belt packs) or better (Shure model). Product Data: Shure ULX-D Digital Wireless https://www.shure.com/en-US/products/wireless-systems/ulx-d_digital_wireless
        iii. Middle Schools
            a. Furnish a minimum of 6 Shure ULX-D digital microphones (4 handheld microphones and 6 belt packs) or better (Shure model). Product Data: Shure ULX-D Digital Wireless

https://www.shure.com/en-US/products/wireless-systems/ulx-d_digital_wireless

Section 116133 – Theater Rigging Systems and Controls

1. Theater rigging systems at elementary schools shall consist of dead-hung piping.
2. Theater rigging systems at middle and high schools shall consist of a combination – motorized and manually-operated components as outlined:
    A. Motorized operation is designated shall be used exclusively for the deployment and manipulation of control of the lighting system and acoustic shells.
    B. Manual operation is designated for all other counterweight systems and required for tasks related to the positioning and management of counterweights and other rigging systems.
    C. System shall comply with applicable Entertainment Services and Technology Association (ESTA) and American National Standards Institute's (ANSI) standards.

Section 116143 – Stage Curtains

1. Provide stage curtains with the following performance criteria:
    A. Flame resistance: passes NFPA 701
    B. 25-ounce velour
    C. Comply with CDPH Standard Method
    D. At elementary school stages provide:
        i. Curtains at elementary school stages may not be vertically retracting.
        ii. At least one front of house position for an electric and two over stage pipes for electrics. If the front of house position is in a gym, provide a cage to contain this position and protect the lighting.
        iii. One pipe overstage to hold the track for the Grand Drape and Valance attached overhead and to the proscenium to counter sway.
        iv. One Grand Drape with 50% fullness on a traveler track. Color to be determined by Owner.
        v. One Valance with 50% fullness on a traveler track. Color to be determined by Owner.

vi. Two pipes for legs and borders to share. Locate pipes 1-foot downstage of each overstage electric
vii. Two sets of legs, flat and 25% larger than required. Color to be black.
viii. Two borders with 25% fullness. Color to be black.
ix. One upstage traveler with 50% fullness on a traveler track. Color to be black.
x. Rope operation of opening and closing drapes

E. At middle school stages (or theaters where a middle school has an existing-to-remain theater) provide:
i. At least front of house position for an electric and three over stage pipes for electrics.
ii. One Grand Drape with 50% fullness on a traveler track. Color to be determined by Owner.
iii. One Valance with 50% fullness. Color to be determined by Owner.
iv. Three pipes for legs and borders to share. Locate pipes 1-foot downstage of each overstage electric
v. Three sets of legs, flat and 25% larger than required. Color to be black.
vi. Three borders with 25% fullness. Color to be black.
vii. One upstage traveler with 50% fullness on a traveler track. Color to be black.
viii. Coordinate with Owner to determine Cyc size and additional pipe needs.
ix. Operation of the lineset is by rope or motorized as determined by the Owner.

F. At high school theaters/auditoria stages:
i. Conduct a site walk through with Owner to determine exact theater rigging and curtain needs. Approved theatrical lighting and rigging vendors should be present at this walk through to fully determine expectations.
ii. Operation of the lineset is by rope or motorized as determined by the Owner.

Section 116800 – Play Equipment

Provide age-appropriate play equipment for each designated play area, compliant with all applicable guidelines and codes. Coordinate quantity of equipment with Owner and learner populations. Align with equipment and installation certification from International Playground Equipment Manufacturers Association (IPEMA) for playground safety, Americans with Disability Act (ADA), and the Texas Accessibility Standards (TAS) for accessibility.

Provide pre-engineered play equipment complying with all applicable engineering criteria for soils, live and dead loads. Equipment installation to include professionally sealed details and structural calculations. Design equipment as surface-mounted to a concrete substrate, in concrete footings with sleeves, or direct-bury into concrete footings per manufacturer recommendations. Provide equipment from one manufacturer for each school and coordinate with cushioned playground surfacing systems or pavement surfacing per *Chapter 5, Division 32 – Exterior Improvements*.

1. Provide best practices for outdoor learning and nature play for all play area designs. Helpful resources include:
    A. Safety guidelines for loose-fill surfacing, hazard prevention, entrapment, anchoring, and routine inspections are described in the.
    B. Outdoor Learning Environment Best Practice Indicators for a Model Outdoor Learning Environment from the Natural Learning Initiative.
    C. Inclusive design guidelines from Playworld best practices Inclusive Play Design.
    D. Creating and Retrofitting Play Environments: Best Practice Guidelines
    E. The Regulatory Framework for Outdoor Learning Environments in Texas Childcare Facilities (Appendix 2 has language about nature components: "Under these definitions, individual logs, boulders, and stumps, would not qualify as stationary equipment unless they were part of a structure intended for play.")
2. Playscape units shall have the capacity to accommodate 25-35 children in the 2-5 age group and 60-70 children in the 5-12 age group. Units shall have a maximum deck height of 8-feet.
3. Play equipment includes:
    A. Slides
    B. Independent swing playscape units located with fall zones clear of other play equipment areas

C. Ropes and climbing structures
D. Spinning and swaying play equipment
E. Musical instruments for outdoor use like “Percussion Play”
F. Each school is encouraged to have a themed playscape environment with play equipment.
G. Balancing and jumping components.
H. Provide permanent signs in playscape areas to denote appropriate age groups.

4. Design for innovative and challenging playscape designs that may include:
   A. Rock or tree climbing
   B. Rolling hills or fallen logs
   C. Design to minimize fall heights.
5. Crawl tubes and fire sliding poles are not acceptable.

Section 116803 - Athletic Equipment

This section primarily includes program requirements and athletic equipment for secondary schools with some outdoor equipment for primary schools. Provide equipment and layout compliant with most current adopted versions, and all applicable safety codes, such as IPEMA for playground safety, Texas Accessibility Standards (TAS), Universal Design Standards, the State and National Federation of State High School (NFHS), or the Texas University Interscholastic League (UIL) standards, whichever is more restrictive. Design athletic equipment for ease of replacement as recommended by the manufacturer.

1. Track and Field Equipment
    A. Obtain list of track events from Owner for each middle school and high school.
2. Football and Soccer Goals
    A. Provide gooseneck football goal posts and moveable soccer goals.
    B. Soccer goal to be portable with mechanical tie-down for player safety.
    C. Football goal uprights shall not be in same plane as face of soccer goal.
    D. Provide permanent or portable seating as required by Owner. Coordinate seating capacity with Owner.
    E. Provide public announcing system as required by Owner.
3. Provide multi-sport scoreboard and football play clocks.
    A. High school athletic facilities will utilize Spectrum scoreboards. Centralized athletic facilities will utilize Daxtronic scoreboards. Verify all specifications with Owner during design.
4. Baseball Field
    A. Provide 1 baseball field with netting or chainlink backstop and outfield fencing.
    B. Outfield fencing shall provide wind breaks and solid visual backgrounds for batters
    C. Provide one baseball batting cage per field.
    D. Provide one bullpen for the home team and one visiting team bullpen.
    E. Provide pre-engineered dugout roof and enclosure system with netting or chain link sides and back with concrete slab and surface mounted aluminum benches with back.
    F. Provide secured storage for baseball equipment.
    G. Baseball scoreboard
    H. Provide permanent or portable seating as required by the Owner.

I. Provide public announcing system as required by Owner.

5. Softball Field
    A. Provide 2 softball fields with netting or chain link backstops and outfield fencing.
    B. Outfield fencing shall provide windbreaks and solid visual background for batters.
    C. Provide one softball batting cage per field.
    D. Provide one bullpen for the home team and one visiting team bullpen.
    E. Provide pre-engineered dugout roof and enclosure system with netting or chain link sides and back with concrete slab and surface mounted aluminum benches with back.
    F. Provide secured storage for softball equipment.
    G. Softball scoreboard
    H. Provide permanent or portable seating as required by the Owner.
    I. Provide public announcing system as required by Owner.
6. Indoor Basketball Goals
    A. Provide adjustable height backboards and rims for each elementary school court. Backboard and rims shall be adjustable town to 8-feet and be attached to wall or structure above.
    B. Provide adjustable height backboards and rims for each middle and high school court. Backboard and rims shall be adjustable down to 8-feet and be attached to wall or structure above.
7. Outdoor Basketball Goals
    A. Elementary schools: Provide a minimum of 2 fixed height goals per school.
    B. Secondary schools: Provide a minimum of 4 fixed height goals per school.
8. Tennis Court Equipment for secondary schools
    A. Refer to the *Educational Specifications, Part 5 – Space Programs* for required number of courts for middle and high school campuses.
    B. Provide a composite “rally” or practice ball wall at the end of one court.
    C. Provide 10-feet height PVC-coated tennis court fencing around courts with one 3-feet access gate per court.
    D. Tennis Net Posts: Provide heavy-duty, internally wound post with sleeve in delegated design concrete footing.
    E. Net: Provide heavy-duty net with center tie-down system.

F. Provide wind breaks for all courts. Utilize wind break netting with use of chain link fencing. Use continuous ropes for connecting netting to supporting fence material. Avoid use of individual plastic ties which can lead to cascading failure of plastic ties.

9. Ball Netting Systems
    A. Soccer Field
    B. Batter's Eye for baseball and softball

Section 117300 – Patient Care Equipment

1. Lift Systems
    a. High Schools:
        i. Ceiling mounted, overhead mechanical lift with learner slings that access the entire bathroom area.
        ii. Coordinate specific requirements with Owner.

iii. Basis of Design: Gulman GH3 Ceiling Hoist with net polyester slings

b. Middle/Elementary Schools:

i. Portable mechanical lift with learner sling

ii. Provide a plug in or battery option for mobile use for learner transfers from wheelchair to changing table.

2. Changing Tables

a. Refer to *Chapter 4, Equipment* for locations where changing tables are required.

b. Sizes:

i. Provide adult-sized changing tables at high schools – 72" long x 30" wide.

ii. Provide pediatric-sized changing tables at middle and elementary schools – 60" long x 30" wide.

c. Treatment table: Provide flat-top treatment with vinyl or antimicrobial upholstery.

d. Height: Provide a powered, height-adjustable table with footswitch controls.

e. Provide pivoting side rails.

f. Provide lockable swivel-casters.

Section 118226 – Facility Waste Compactors

1. Adjust quantities to reflect the size of the school. Consult with the Owner to finalize requirements.
2. Refer to *Chapter 5, Site Design Requirements*.

DIVISION 12 – FURNISHINGS

General Requirements

1. Where changing tables are required, coordinate equipment type and facility requirements for this Owner-provided furnishing. Fixed and power operated changing tables are available, depending on age groups served.

Section 122413 – Roller Window Shades

1. Refer to *Chapter 4, Facility Design Standards* for locations requiring manual or motorized roller shades.
2. Materials should meet all current codes including, but not limited to NFPA and IFC.
3. No free-hanging cords.
4. Comply with CDPH Standard Method emissions test

Section 123213 – Manufactured Wood-Veneer-Faced Casework

1. Provide manufactured wood-veneer-faced casework with the following performance criteria:
    A. Provide a grade of "Premium" according to Architectural Woodwork Standards.
    B. Provide casework manufactured with no added formaldehyde or meet the requirements of CARB Ultra Low Emitting Formaldehyde (ULEF)
    C. Comply with Architectural Woodwork Standards (AWI). Provide certificates for project indicating compliance with grades specified. Provide quarter cut hardwood veneer over plywood construction.
    D. Place base cabinets on continuous, kiln-dried, 2-inch x 4-inch wood leveling base.
    E. For drawer construction, join subfronts, backs, and sides with glued and rabbeted joints supplemented by mechanical fasteners or glued, dovetail joints.
    F. Hardware:

i. Five-knuckle steel pin hinges. European hinges are not allowed.
ii. Provide accessible pulls.
iii. 180-degree throw for doors is preferred.

G. Locks
i. Where locks are provided, the manufacturer for all shall be CompX National.
ii. Provide locks with corresponding key numbers stamped on all lock cores and respective keys.
iii. Provide multiple copies of keys as per follows:
a. Provide four keys per Learning Studio or Special Education space. Provide matching cores at all lockable cabinets within each studio. Provide an additional two keys to the Owner's Locksmith.

All remaining cabinets per campus to have matching cores. Provide two keys per room with cabinets. Provide an additional two keys to the Owner's Locksmith.Section 123216 – Manufactured Plastic-Laminate-Clad Casework

1. Provide performance criteria similar to *Section 123213 – Manufactured Wood-Veneer-Faced Casework*.
2. Review laminate selections with the Owner for approval.

Section 123553.19 – Wood Laboratory Casework

1. Provide wood laboratory casework with the following performance criteria:
A. Provide solid surface or epoxy countertops at studios. Coordinate with Owner for requirements based on lab curriculum.
B. Provide casework manufactured with no added formaldehyde or meet the requirements of CARB Ultra Low Emitting Formaldehyde (ULEF)
C. Provide flexible and easily-moveable lab tables with lockable casters, etc.
D. Comply with Architectural Woodwork Standards (AWI). Comply with Architectural Woodwork Standards (AWI). Provide certificates for project indicating compliance with grades specified..
E. Grade: Premium
F. Particleboard substrate is not allowed.

Section 123661.16 – Solid Surfacing Countertops

1. Provide solid surface countertops with the following performance criteria:
    A. Comply with Architectural Woodwork Standards (AWI). Comply with Architectural Woodwork Standards (AWI). Provide certificates for project indicating compliance with grades specified.
    B. Substrate to be manufactured with no added formaldehyde or meet the requirements of CARB Ultra Low Emitting Formaldehyde (ULEF)
    C. Grade: Premium
    D. Particleboard substrate is not allowed.
    E. Integral sink bowls are acceptable.

Section 123661.19 – Quartz Agglomerate Countertops

1. Provide quartz countertops with the following performance criteria:
    A. Comply with Architectural Woodwork Standards (AWI). Comply with Architectural Woodwork Standards (AWI). Provide certificates for project indicating compliance with grades specified..
    B. Substrate to be manufactured with no added formaldehyde or meet the requirements of CARB Ultra Low Emitting Formaldehyde (ULEF)
    C. Particleboard substrate is not allowed.
    D. Composition: quartz agglomerate
    E. Thickness: 3-centimeters minimum
    F. Water absorption: negligible
    G. Stain resistant

Section 126100 – Fixed Audience Seating

1. Provide fixed audience seating with the following performance criteria:
    A. Fire rating: Class 1 fabric
    B. Fabric double rubs: minimum 250,000
2. Utilize New York-style seating designations for theaters.

Section 126900 – Bleachers and Grandstands

1. Pre-Engineered grandstand systems and performance data:
    A. I-Beam Systems
    B. Angle Frame Systems
    C. Press Box System
    D. Provide closed decking system and front skirt closure
    E. Seating: bench or premium chair systems
    F. Handrails (aluminum)
    G. Guard railings at back and sides of grandstand (galvanized chain link to match aluminum seating system)
    H. Fencing (PVC-coated chain link) below grandstand systems to restrict the public from below grandstands for safety and security. Consider storage of track equipment (hurdles) below grandstands. Provide at least two 4-feet wide lockable gates to access this area
    I. Portable aluminum bleacher systems to meet ADA requirements and have wheel systems for portability

Section 129300 - Site Furnishings

Site furnishings will consist of a "family" of furnishings with complementary design character and colors, offered by multiple manufacturers for each school project. All furnishings to be surface mounted to concrete substrate and secured with stainless steel, vandal resistant hardware as provided and recommended by the manufacturer. Site furnishings shall be steel or aluminum with high quality powder-coat finish system. (Refer to *Chapter 5, Site Design Requirements* for incorporating site furnishings into each site)

1. Benches (Refer to *Chapter 6, Outdoor Furniture*)
2. Integral Tables and Chair Systems
    A. Umbrella system
    B. Integrated ADA seating
    C. Perforations or bars in tables and seating systems to allow water to drain through for maintenance
3. Freestanding Tables and Chairs (Refer to *Chapter 6, Outdoor Furniture*)
    A. Provide movable furniture in enclosed areas.
4. Freestanding Planters
    A. Provide watering and drainage systems.
5. Waste and Recycling Receptacles
    A. Provide separate or combined receptacles.
    B. Provide signage for waste and recycling.
6. Bicycle Parking Systems (Refer to *Chapter 5, Site Design Requirements*)
    A. Provide loop type system or continuous loop system that can hold up to 12-bikes each with overhead canopy if not in a location protected from the elements.
    B. Provide stainless steel fasteners for surface mount system with tamper resistant hardware and cover for fastening plates. Mount onto concrete substrate.
    C. Bike "fix-it" stations.
7. In-ground Traffic Bollard Systems (fixed or removable, stainless steel)
    A. Owner prefers natural boulders or planter walls to provide traffic control where possible

DIVISION 13 – SPECIAL CONSTRUCTION

Section 133100 – Fabric Structures

1. The fabric structure sub-contractor is responsible for the delegated design submittal, engineered drawings and all associated components.
2. A minimum of 4-years of experience with engineering, fabrication, and erection of permanent fabric structures (not including awnings) is required. The fabric structure sub-contractor must have a local office and service department.
3. The following warranties are required:
    A. A minimum 10-year manufacturer warranty is required on the full system, fabric, and all components.
    B. A minimum 20-year warranty is required for structural integrity.
    C. A minimum 12-month warranty is required for workmanship.
4. Incorporate a 5-year maintenance program provided by the manufacturer that includes:
    A. Annual maintenance for tensioning cables
    B. 72-hour turnaround on replacement of fabric or parts
    C. Guaranteed price per square foot for fabric replacement, excluding labor
    D. All repairs are required between seams. No patching is allowed.
    E. Cost for site visits are the responsibility of the fabric structure contractor.
5. Design requirements:
    A. Use gusset plates in lieu of tube bracing at all rafter/ridge beam connections.
    B. Shape: standard hip structure
    C. Size: as outlined by the design team and approved by the Owner. Provide a minimum vertical clearance of 16-feet, where vehicular traffic or emergency vehicles are expected to travel through the play area.
    D. Finish: 3.5 mil thick, UV-inhibited, weather-resistant powder coating
    E. Fabric:
        i. High-density polyethylene with UV additives
        ii. Monofilament and tape filler – 195g per square meter
        iii. Raschel-knitted to ensure material will not unravel
        iv. Burst strength of 260 kpa

v. Tear strength: warp 220 pounds and weft 462 pounds
vi. Minimum life expectancy of 12-years with continuous exposure to the sun.
vii. Minimum fading after 5-years with continuous exposure to the sun.
viii. 82% shade protection
ix. 85% UV protection
x. Class A fire rating in accordance with ASTM E84.

6. Acceptable manufacturers include:
    A. Modern Shades, LLC
    B. Sun Ports
    C. USA Shade & Fabric Structures, Inc.

DIVISION 14 – CONVEYING EQUIPMENT

Section 142100 – Traction Elevators / Section 142400 – Hydraulic Elevators

1. Provide machine room-less hydraulic or traction elevators.
2. One of the elevators in each facility shall accommodate a gurney for emergency situations.
3. Provide card access system for all elevators.

Section 144200 – Wheelchair Lifts

1. Wheelchair lifts are only allowed in renovation projects where ramp access is not feasible and require approval by the Owner.
2. The basis-of-design for wheelchair lifts is Symmetry Vertical Platform Lift.
3. Provide a three-year parts and labor warranty.
4. Provide a five-year extended service contract.

1. Utility service
    A. Water service: Refer to *Chapter 5, Division 22 - Plumbing* for information on the water service associated with fire sprinkler system.

Section 210500 – Common Work Results for Fire Suppression

1. General installation requirements
    A. Piping penetrating exterior walls below grade should be installed to prevent breakage due to any building movement.
    B. Provide sealed sleeves for penetrations of wall, floors, ceilings and roofs.
    C. Penetrations through floors walls and roofs shall be watertight and be rated to match the fire or smoke rating of the assembly. Provide fire sealant and link-seal (or equivalent).
    D. Fire suppression shall be concealed to the greatest extent possible. Piping shall be run as directly as possible and parallel to and at right angles to walls, partitions, etc., and shall be neatly grouped in parallel lines.
    E. Provide gaseous type fire suppression systems for Supernode automation facilities. Supernode automation facilities are high automation data centers.
    F. Fire water service entrance, zone control valves, and other fire suppression equipment shall be installed in a dedicated room. Room size, clearance, access, and identification shall be consistent with the requirements of the Authority having Jurisdiction.
    G. Size, style and location of the fire department connection shall be approved by the Authority having Jurisdiction.
    H. Provide wire guards for sprinkler heads located in areas where they can be disturbed such as gymnasiums, shops, etc.
    I. The color of conceal covers on fully recessed sprinklers shall match the color of the adjacent architectural surface.
    J. Fire suppression requirements for kitchen hoods is provided in the Section 233813

2. Work in existing buildings –additional requirements
    A. Prior to the start of any work in existing facilities, all activities and working hours shall be scheduled with the Owner. This includes any shutdown of existing utilities, fixtures or equipment.
    B. All existing structures and finishes shall be protected against damage from all construction work.
    C. The Owner shall be notified prior to any drilling or cutting of concrete floors to protect the safety of occupants. Confirm with the Owner that no x-ray of slab, for electrical conduit or post tension cables, is required. This will assure drilling/cutting equipment operator safety and maintain the structural integrity of the building.
    D. If fixtures are being replaced/removed contact the Owner to discuss whether to store items that are being removed from service, or to properly dispose of them.
    E. Assess items being removed from service for any hazardous materials, if identified proceed with appropriate disposition of hazardous materials per local, state, and federal laws.
    F. No piping, fixtures or equipment being taken out of service shall be abandoned in place. All branch piping taken out of service shall be removed to the nearest pipe remaining in service. For all water and gas applications, install a valve, for future use, and a permanent cap. For all other applications install a permanent cap.
    G. All existing structures and finishes shall be protected from all demolition work.
3. Submittals
    A. Product data and sprinkler shop drawings shall be submitted to the Owner for review prior to submission to the Authority having Jurisdiction.
    B. Include the following supplemental requirements for Division-21 submittals:
        i. Product data for each specific system provided, including model number, dimensions, weight, and other characteristics as applicable.
        ii. Performance data for each specific system/equipment provided including all operating parameters, efficiency, setpoints, etc.
        iii. Installation, start-up, operation and maintenance requirements.
        iv. Scaled installation Shop Drawings for all pieces of equipment showing all field connections to power, water, gas.
        v. Detailed Plumbing Shop drawings at 1/4-inch scale. Update these daily during installation to reflect as-built condition.

vi. Overlay Coordination Drawings showing Plumbing, Mechanical, Fire Suppression Piping, and Electrical/Data Conduits, at 1/4-inch scale. Coordinate with Division-22, Division-23, and Division-26. Update these daily during installation to reflect as-built condition.

4. Warranty requirements
    A. Equipment warranties shall be clearly stated at the time of submittals and again in the close-out documentation. Warranties tied to shipping or start-up date are NOT ACCEPTABLE
    B. Consult with Owner to determine if additional warranty durations should be included as an alternate to the project.
    C. General: Minimum, one (1) year from substantial completion for parts and labor for all fire suppression equipment

DIVISION 22 – PLUMBING

The following full specifications sections for Division 22 are included in Appendix A. Editable files are available from the Owner. Design teams shall edit each specification to the requirements necessary for the project and include each in the project manual in accordance with required contractual deliverables for each phase. Additional items associated with Division 22 are listed below. In Appendix A:

Section 220100 – Commissioning of Plumbing Systems

General Requirements

1. Utility service
    A. Water service
        i. Comply with applicable requirements of the Authority having Jurisdiction and Owner's sustainability requirements.
        ii. Consult with the Owner during the design phase of utilities to confirm that the plans take advantage of ways to lower cost and align with performance requirement of the Owner.
            a. Where irrigation is proposed, consult with the Owner's Energy Manager to determine actual need. (Note: there are several examples of irrigation systems installed and metered in the district that are rarely used, and the Owner incurs a large metering cost).
            b. Provide separate consumption meters in addition to the utility-provided meters for domestic water and irrigation water. Provide consumption meters for kitchen cold-water, kitchen hot-water, cooling tower makeup (if applicable), cooling tower blow-down (if applicable), and closed hydronic systems (if applicable). Consumption meters are required to interface with the Owner's Building Automation System via BACNET.
        iii. Water service is delivered and metered by the corresponding utility at the point of delivery of each campus.

iv. All new buildings and major renovations at existing campuses will connect to the existing campus-wide domestic water underground distribution loop.

v. Prior to embarking on any design, provide a flow-pressure test to determine the adequacy of existing system to support proposed additions and renovations.

vi. Where grey water (purple pipe) is available from the utility, consult with the Owner for possible use of this system for irrigation or other purposes.

vii. High-hazard back flow preventers are required when using a pressurized system for re-irrigation or rain water collection distribution thru the irrigation system. Consult with the Authority having Jurisdiction regarding the need for building entrance or use-specific back flow preventers within each building.

viii. Make provisions for future additions to the buildings when sizing the plumbing systems. Review with the Owner.

ix. Obtain water hardness information for the domestic water service supplied to the facility during schematic design. Data must be no older than 18-months from the start of design.

x. At each site, provide a point of entry for domestic water, irrigation, and fire sprinkler service, if applicable.

xi. Provide an isolation valve immediately upon entering the site, in a valve box outside the building(s).

xii. Check to see if a new system can connect into an existing system to avoid metering and utility account costs.

B. Natural gas service

i. Prior to embarking on any design, consult with the gas utility to determine availability of gas at the site and easement requirements.

ii. Provide a dedicated gas meter for the kitchen and separate meter(s) for the remainder of the facility. Texas Gas Service offers Owner a lower utility rate for space heating and higher utility rate for kitchens. Contact Owner's Sustainability Manager if applicable natural gas utility rates are needed.

iii. For existing facilities, assess need for service upgrade to accommodate increased or decreased gas load. Provide a detailed life cycle cost analysis prior to adding additional gas meters.

2. Refer to *Appendix C, Acceptable Manufacturers List* for list of acceptable plumbing manufacturers.

Section 220500 – Common Work Results for Plumbing

1. General installation requirements
    A. Provide cut-offs on main water line serving each building in a keyed case valve outside the building.
    B. Design domestic water systems to be zoned with shut-off valves so individual areas to be turned off without affecting the entire building.
    C. Each toilet room or other space serving multiple fixtures requires accessible shut-off valves to isolate the domestic water supply to the room.
    D. Provide angle stops and isolation valves at all plumbing fixtures.
    E. Design piping penetrating exterior walls below grade to prevent breakage due to any building movement.
    F. Provide sealed sleeves for penetrations of wall, floors, ceilings, and roofs.
    G. Design penetrations through floors walls and roofs to be watertight and rated to match the fire or smoke rating of the assembly. Provide fire sealant and link-seal or equivalent and ensure air barrier system is sealed around all penetrations.
    H. Design piping to run as directly as possible, parallel to and at right angles to walls, partitions, etc., and grouped in parallel lines.
    I. Plumbing piping are NOT allowed in transformer vaults, switchboard rooms, telephone rooms, Supernodes, and IDF and MDF rooms.
    J. Label all plumbing equipment and valves with identification tags. For equipment with special warranty requirements, the identification tag shall include start and end date of the warranty.
    K. Access to all valves, working parts of plumbing devices, and items requiring periodic maintenance shall have access provided by door, panel or lift-out ceiling.
    L. Water heaters mounted on the floor are not permitted in custodial closets. Any water heater in these areas must be wall or ceiling mounted at an elevation high enough to not restrict access to plumbing or other custodial equipment.
    M. Protection against noise and vibration: Refer to *Chapter 5, High Performance Design* for additional information.

N. Refer to *Appendix C, Acceptable Manufacturers List* for list of acceptable manufacturers for plumbing equipment.

2. Special installation requirements
    A. Provide keyed hose bibs for all interior applications. Refer to *Chapter 4 – Facility Design Standards* for required locations.
    B. Provide exterior, lockable, freeze-proof wall hydrants for all exterior applications. Ensure the hydrant is properly sealed to the air barrier system prior to installation of the cladding or veneer system. Refer to *Chapter 4 – Facility Design Standards* for required locations.
    C. Provide drain down, freeze-proof, hydrants for rooftop and on-grade applications when a wall mounted device exceeds maximum distance. Ensure that all rooftop hydrants allow sufficient height to provide 1-foot minimum flashing above the finished roof system.
    D. Provide hose bibs in mechanical rooms containing equipment with hydronic coils.
    E. Provide a freeze-proof hose bib or hydrant within 50-feet of ground-mounted equipment with cooling coils.
    F. Provide hose bib adjacent to cooling tower.
    G. Provide adjustable extensions at all roof drains to coordinate height of drains with height of roof system. Provide adjustable, internal overflow dams at overflow drains. All drains must have cast iron strainer domes. Plastic domes are prohibited.
    H. Provide floor drains with trap primers in each toilet area, custodial closet, emergency shower, kitchen and mechanical room housing HVAC machinery. Provide tail-piece (non-mechanical) trap primers connected to lavatories when possible and provide access doors.
    I. Consult with Authority having Jurisdiction for use of trap-guards in areas that are not near a source of water for connection of trap primers.
    J. Provide eyewash and emergency showers as required by *Chapter 4 – Facility Design Standards*. Consult with Authority having Jurisdiction to request exemption from tempering requirements.
    K. Where possible, route mechanical equipment condensate and overflow drains to dedicated floor drains with funnel or floor sinks in mechanical rooms. Refer to Authority Having Jurisdiction's requirements for condensate reuse. Avoid use of custodial mop sinks for condensate disposal. Refer to *Appendix B, Memo Template*

for Condensate Recovery and *Chapter 5, Site Design Requirements – Stormwater Management* for additional information.

L. Provide floor sinks with strainers in lieu of floor drains in food service preparation areas where drain pipes that require air gaps are used. Size floor sink for water volume of fixture.

3. Work in existing buildings –additional requirements
    A. Prior to the start of any work in existing facilities, schedule all activities and working hours shall be scheduled with the Owner. This includes any shutdown of existing utilities, fixtures or equipment.
    B. Protect all existing structures and finishes against damage from construction work.
    C. Notify the Owner prior to any drilling or cutting of concrete floors to protect the safety of occupants. Confirm with Owner that no x-ray of slab, for electrical conduit or post tension cables, is required. This will assure drilling/cutting equipment operator safety and maintain the structural integrity of the building.
    D. If fixtures are planned for removal or replacement, contact the Owner to discuss whether to store items that are removed from service, or to properly dispose of them.
    E. Assess items planned for removal for any hazardous materials. If identified, proceed with appropriate disposal of hazardous materials per local, state, and federal laws.
    F. Remove piping, fixtures or equipment taken out of service and do not abandoned in place. Remove all branch piping taken out of service to the nearest pipe remaining in service. For all water and gas applications, install a valve, for future use, and a permanent cap. For all other applications, install a permanent cap.
    G. Protect all existing structures and finishes from all demolition work.
4. Submittals
    A. Include the following supplemental requirements for Division 22 submittals:
        i. Product data for each specific system provided, including model number, dimensions, weight, and other characteristics as applicable.
        ii. Performance data for each specific system and equipment provided including all operating parameters, efficiency, setpoints, etc.
        iii. Installation, start-up, operation and maintenance requirements.
        iv. Scaled installation shop drawings for all pieces of equipment showing all field connections to power, water, gas.

v. Detailed plumbing shop drawings at a minimum 1/4-inch scale. Update these daily during installation to reflect as-built condition.

vi. Overlay coordination drawings showing plumbing, mechanical, fire suppression piping, and electrical/data conduits, at a minimum 1/4-inch scale. Coordinate with Divisions 22, 23 and 26. Update these daily during installation to reflect as-built condition.

5. Warranty requirements

A. Equipment warranties durations are required with submittals and again in the close-out documentation. Equipment warranties begin upon acceptance of functional testing by Owner's third-party commissioning authority. Warranties tied to shipping or start-up date are NOT ACCEPTABLE.

B. Consult with Owner to determine if additional warranty durations should be included as an alternate to the project.

C. General: Minimum, 1 year from substantial completion for parts and labor for all plumbing equipment

D. Water heaters:

i. Heat exchanger: Minimum, 5 years from substantial completion for parts and labor.

ii. Control components: Minimum, 5 years from substantial completion for parts and labor.

iii. Integral storage tanks: Minimum, 5 years from substantial completion for parts and labor.

E. Storage tanks: Minimum, 5 years from substantial completion for parts and labor.

F. Pumps: Minimum, 5 years from substantial completion for parts and labor.

G. Thermostatic mixing valves: Minimum, 5 years from substantial completion for parts and labor.

Section 221116 / 221119 – Domestic Water Piping and Specialties

1. Water piping
    A. Lead-free piping, fittings, and material for joining are required.
    B. Design exterior underground piping with ductile iron with boltless restrained joints rated for 250 psi operating pressure, or type K copper, if under 2 inches. Provide anti-corrosion coating for all buried piping.
    C. Do not route pressure piping under concrete slabs that are on grade or fill.
    D. Design condensate piping to flow by gravity to the sanitary sewer system or by other means appropriate for reuse. The City of Austin requires condensate reuse system for structure with more than 200-tons of cooling capacity. Refer to *City Ordinates* for more information. Design interior condensate piping with type L copper with lead-free, solder fittings and joints.
    E. All connections between dissimilar materials in the piping system require dielectric unions, couplings or flanges.
    F. Mechanical pressed (Pro-Press and similar) fittings are acceptable for interior copper water line 4-inches and smaller.
    G. Do not use polypropylene or PVC piping or fittings in domestic water systems.
    H. Insulate all domestic water piping.
    I. Provide insulated, jacketed and heat-traced outdoor domestic water piping.
    J. Piping made in the USA is required.
2. Valves
    A. Provide full-port ball valves for all types of plumbing equipment or piping assemblies 2-1/2 inch and smaller. Provide high-performance butterfly valves for all types of plumbing equipment or piping assemblies 3 inch and larger.
    B. Science laboratories: Route water, gas, and air piping through a lockable utility control box that enables the educator to turn on or shut off all utilities to the learner stations. Use manual ball valves in a locked box for gas, water and compressed air, if provided.
    C. Provide pressure reducing valves for domestic water service lines wherever static pressure exceeds 60 psi.

Section 221125 – Natural Gas Systems

1. Design team shall evaluate capacity and availability at service entry and evaluate distribution piping capacity prior to any work involving additional gas use.
2. Locate the building pressure regulator and main shut off valve as close to the building as possible.
3. Gas-rated polyethylene (PE) pipe is required for underground applications. Provide tracer wire or mag-detectable tape for underground PE piping.
4. Provide black steel rated for service, pressure, and painted yellow for above ground gas piping.
5. Support gas piping routed on the roof of the building a minimum of 12 inches above the finished roof surface on approved roof piping supports.
6. All gas burning appliances require a full line size shut-off valve located at the equipment. Provide AGA approved bronze plug or ball valves for sizes up through 1-1/2 inch and iron body lubricated plug cocks for sizes 2 inch and larger.
7. Provide a two connection, gas turret at each workstation and fume hood in science classrooms where the program requires gas service.

Section 221316 – Sanitary Waste and Vent Piping

1. PVC piping is allowed for sanitary piping.
2. In food service preparation areas, provide cast iron piping for all drains near the exhaust hoods, discharge from dishwashers, and discharge from 3-compartment sinks. Cast iron piping shall be used, from the receptacle for a minimum on 15-feet or until the branch pipe connects with main pipeline, whichever is longest. Route all sanitary drainage piping to grease trap, as required by City of Austin.
3. No-hub cast iron piping is acceptable for sanitary piping and vent lines within the building.
4. Provide copper piping material for exposed sanitary drainage lines receiving condensate. All above grade sanitary drainage lines receiving condensate require insulation in their entirety.
5. Floor cleanouts are not allowed. Extend piping to the nearest partition for wall cleanouts as needed. Cleanouts are not allowed in crawl spaces – extend to floor level above for ease of access.

6. Provide sanitary piping and hangers located in crawl spaces from materials specifically selected to withstand the expected humid environment.
7. Piping made in the USA is required.

Section 221413 / 221423 – Storm Drainage Piping and Specialties

1. All plazas, paved areas, and unpaved areas require drainage by gravity to a public storm sewer or shall terminate with proper headwalls at approved outfall locations.
2. No-hub cast iron piping is allowable for use inside the building.
3. Insulate storm drainage piping for the first 30-feet of horizontal length within the building.
4. Connect downspouts and auxiliary drains to storm system.
5. Provide storm piping and hangers located in crawl spaces from materials specifically selected to withstand the expected humid environment.
6. Coordinate with landscape architect, civil engineer, and Owner to provide a rainwater collection and reuse system.
7. Piping made in the USA is required.

Section 221323 – Sanitary Waste Interceptors

1. Acid waste:
    A. All fixtures and equipment where acids are used require neutralization before discharging to the sanitary drainage system as required by Authority having Jurisdiction.
    B. All laboratory piping serving laboratory sinks, cup drains, floor drains, or other devices that may conduct acid wastes, extend to acid neutralizing sumps, and all vent piping serving these fixtures or system, require approved acid-resistant materials, such as acid resistant polypropylene.
    C. Glass piping is not allowed except at the direction of the Owner or the Authority having Jurisdiction.

2. Grease interceptors:
    A. A grease interceptor is required wherever any liquid waste containing large amounts of grease, fats or oils are discharged into the sanitary system and as required by Authority having Jurisdiction.
    B. Locate grease interceptors as close to the source of the grease as possible and on the exterior of the building with convenient truck access. Locate away from doors, windows, and air intake, etc. to minimize fume infiltration into building.
    C. Provide manholes where required. Provide reinforced concrete pads around manhole covers. Provide surface drainage away from the grease interceptor.
    D. Provide an oversized clean-out to serve as the sample port as required, where the sanitary waste ties into City service. Sample port to be covered with lockable fiberglass flip-top enclosure. Coordinate final location of sample port and lock box with the Owner and City of Austin.
    E. Provide insulation and electric heat trace for exposed grease piping. Controllers must have built-in ground fault protection.

Section 221513 – Compressed Air Systems

1. Provide a compressed air system for technology areas as required. Provide with filter, driers, and pressure regulators as required for use.
2. Provide schedule 40 galvanized steel or type L copper piping with 150 psi fittings.
3. Provide piping with 1/8-inch per foot slope, sloped back to the compressed air source to aid in the removal of moisture in the piping.
4. Provide line size full port ball valves to flush moisture and particulate at each air outlet.
5. Branch piping shall connect to the top of the main header pipeline to limit moisture transfer.

Section 223100 – Water Softening

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

Section 223300 / 223400 – Domestic Hot Water

1. Design hot water systems to the same general criteria as cold-water systems.
2. Configure hot water piping system for recirculation, with a temperature-controlled pump to ensure hot water is available at any fixture as required by the International Energy Conservation Code (IECC) and local amendments, or as required by Authority having Jurisdiction. Heat trace is not allowed as a replacement for hot water recirculation systems.
3. Hot water distribution piping, hot water tailpieces, roof drain fixtures, laterals, risers in non-accessible chases require insulation. Make provisions to prevent freezing of any pipe exposed to outside temperatures. Provide an electric heat tracing system with built-in ground fault protection where necessary.
4. Hot water storage temperature to be 130°F minimum, and 110°F maximum supplying fixtures.
5. Provide food service preparation facilities with a separate 140°F hot water system.
6. Provide showers for learner with limited-access blending valves to control water temperature between 105°F and 110°F. Provide a master control temperature valve to shut off water to the learner showers in the coach's office.
7. Water heaters:
    A. Provide local storage type electric water heaters to serve unisex and grouped learner bathrooms.
    B. Provide high-efficiency, storage type, non-condensing gas fired waters for gymnasium showers and food preparation areas.

C. Provide point-of-use, UL-listed electric water heaters to serve isolated, single lavatory and sink located remote from storage-type water heaters.
D. Consider heat pump water heaters for buildings with no gas service.

Section 224000 – Plumbing Fixtures

1. Plumbing fixtures shall meet EPA's WaterSense criteria.
2. Provide plumbing fixtures of commercial grade and constructed of vitreous china or stainless steel of the latest design and type for their intended use.
3. Each sink, lavatory or piece of kitchen equipment with water connections shall have a stop on each supply. All stops and hose bibs in learner or public toilets shall have removable keys.
4. Support wall-hung fixtures with concealed carriers.
5. Provide floor-mounted water closets, elongated bowl, vitreous china, siphon jet, 1.28 gpf, and wired, manually-activated flush valve. Water closets designed for 1.1 gpf are permitted for elementary learner use only, with consideration for use in other facilities on a case-by-case basis. Provide plastic, open front seats of reinforced construction with check hinges and no top.
    A. Toilet seat heights for accessible water closets shall be in accordance with the Texas Accessibility Standards. Toilet seat heights for learner restrooms in elementary schools shall be 15" to serve both 5-8 and 9-12 age groups unless requested otherwise by Owner. This includes restrooms for learning neighborhoods, music rooms, art rooms, and maker spaces.
6. Tank type water closets are not allowed.
7. Provide wall-hung urinals made from vitreous china, siphon jet, 0.125 gpf water consumption, and wired, manually-activated flush valve. Trough urinals are not allowed.
8. Provide counter-mounted or solid surface basin lavatories in secondary schools. Provide wall-hung, vitreous china or solid surface basin lavatories in staff, public and elementary schools. Provide manual push-button metering faucets.. Provide low flow aerators and grid strainers. Faucets shall have maximum flow rate of 0.35 gpm. Trough sinks may be allowed.

9. Provide column type with vandal-resistant heads, with shutoff valve in Coach's office, for learner showers. An ADA compliant manufactured shower unit is required in the athletic coach's office. Showers shall have flow rates not exceeding 1.25 gpm.
10. Provide stainless steel, self-rimming, single-compartment studio sink with side ledge, fixed, hot and cold-water gooseneck at rear, and a block knockout at the side and near the front for future bubbler. Provide maximum sink depth for accessibility.
11. Provide dual-level, ADA compliant, drinking fountains with electric water cooler and bottle filler for interior applications with filter replacement light. Refer to *Chapter 4, Plumbing* for minimum required locations of bottle fillers.
12. Provide low curb (drop front) janitorial sinks with hot and cold water.
13. Provide floor sinks with strainers in lieu of floor drains in food preparation areas and mechanical rooms where condensate drains or drain pipes are used that require air gaps. Size floor sink for water volume of fixture.

DIVISION 23 – MECHANICAL

The following full specifications sections for Division 23 are included in Appendix A. Editable files are available from the Owner. Design teams shall edit each specification to the requirements necessary for the project and include each in the project manual in accordance with required contractual deliverables for each phase. Additional items associated with Division 23 are listed below. In Appendix A:

Section 230100 – Commissioning of Mechanical Systems
Section 230926a – Direct Digital Controls for Local Building Automation Systems
Section 230926b – Integration, Reconnection & Repurposing of Existing Direct Digital Controls for Local Building Automation Systems
Section 230926c – Commissioning of Building Automation System

General Requirements

1. HVAC design conditions
    A. Design temperature conditions:
        i. Outdoor cooling: 103°F DB / 74°F MCWB
        ii. Outdoor dehumidification: 78°F WB / 81°F MCDB
        iii. Evaporation: 78°F WB
        iv. Outdoor heating: 21°F
    B. Condenser design temperature: 105°F
    C. Ventilation:
        i. Design per ASHRAE Standard 62.1, City of Austin Mechanical Code, and any permitted LEED Enhanced IAQ Strategies.
        ii. Demand control ventilation for all spaces with variable high-density occupancy (studios, libraries, conference rooms, assembly areas) is required.
        iii. For laboratories and shop areas use industry-accepted standards specific to the application and requirements of the Texas Education Agency (TEA) and Texas Safety Standards.

iv. Heat recovery devices for pretreatment of outside air are not allowed without specific authorization from the Owner and only when absolutely mandated by code.

v. Particle ionization and other similar air cleaning devices are acceptable as permitted by the applicable building and ventilation design standards. The minimum indoor CO_2 concentrations are not allowed to exceed 800ppm. Use of such devices shall not reduce the fresh air even if permitted by code.

2. Primary cooling systems and equipment:
    A. Provide primary cooling from a central plant with two or more chillers. Size each chiller to meet no less than 60% of the design cooling capacity of the facility.
3. Primary heating systems and equipment:
    A. Provide building heat by hot water from a central boiler plant with two or more natural gas-fired boilers. Size each boiler to meet no less than 60% of the design heating capacity of the facility.
    B. Electric resistance heat is not permitted.
    C. For buildings with no gas service, evaluate the use of heat pump chillers and review options with the Owner prior to specifying.
4. HVAC system capacity, zoning, and system selection
    A. HVAC system capacity:
        i. Calculate thermal loads using an ASHRAE approved methodology, and design conditions stated elsewhere in these guidelines;
        ii. Select air handler systems to meet the heating and cooling loads resulting from the sum of peak space loads, with no oversizing factors;
        iii. Select hydronic pumps to meet the sum of coil loads with no oversizing factors, but 100% redundancy and a dedicated VFD for each.
    B. HVAC system zoning:
        i. Design air handler systems to serve zones with similar thermal loads in order to minimize the possibility of simultaneous heating and cooling.
        ii. Condition each thermal zone with an individual terminal unit or fan-coil unit, with dedicated temperature sensing, humidity sensing, carbon dioxide sensing and control.
    C. HVAC system selection:
        i. Determine HVAC system selection using a life cycle cost analysis. Analysis shall use parameters provided in the Energy Performance Criteria,

maintenance cost factors provided by ASHRAE, equipment replacement costs, applicable utility tariffs, and financial parameters provided by the Owner.

ii. Refer to *Chapter 5, High Performance Design – Energy Efficiency* and *Chapter 5, High Performance Design – Acoustics* for additional design requirements.

iii. For renovation applications, the age and capacity of existing equipment planned for reuse should be verified.

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

i. Hydronic air handler system requires the following:

a. High-efficiency chillers (water or air-cooled);
b. High-efficiency boilers;
c. Variable air volume air handlers with chilled water coils;
d. Decoupled outside air coils within the air handler;
e. Single-duct, variable volume terminal units with hot water reheat;
f. Internal zones may use fan-powered terminal boxes with ECM motors and electric heat;
g. Large zones with variable occupancy (gymnasiums, dining areas, libraries) will use single-zone, variable volume air handlers with cooling and heating coils;
h. Variable speed pumping.

ii. Hydronic fan-coil system requires the following:

a. High-efficiency chillers (water or air-cooled);
b. High-efficiency, non-condensing type boilers;
c. Variable speed (ECM) fan-coil units with chilled water and hot water coils;
d. Decoupled outside air units ducted directly to the space or the return inlet of fan-coil units;
e. Variable speed pumping.

iii. Closed looped water source heat pumps (WSHP) requires the following:

a. Closed loop evaporative cooler with two cells and redundant spray pumps;
b. Two condensing type hot water boilers with dedicated primary pumps;

c. Insulated hydronic piping;
d. Individual WSHP units for each space.
e. Decoupled outside air units ducted directly to the space or the return inlet of each WSHP.
f. Redundant, variable-speed loop pumps.

iv. Packaged roof-top units require the following:
a. Allowed for new construction or direct replacement after consultation with Owner, to serve large spaces that must operate independently of chilled water system.
b. Variable air volume, variable speed compressors and dehumidification control.

v. Variable refrigerant volume (VRV) and/or variable refrigerant flow (VRF) are not allowed. See position paper on VRV and VRF prepared for the Owner in Fall 2018.

vi. Telecommunication rooms (MDF/IDF/SuperNodes) require the following:
a. MDF Rooms: Provide dedicated, redundant cooling source.
b. IDF Rooms: Provide dedicated cooling source.
c. SuperNodes: Provide dedicated, redundant cooling source.
d. Single-duct, cooling-only VAV terminal unit for general space cooling is acceptable for AHUs intended to operate 24/7/365.
e. Standalone, direct-expansion cooling system for server and equipment cooling is allowed.
f. Avoid the use of packaged roof-top equipment.
g. Where no other option exists, request approval from Owner to use mini-split type cooling unit

vii. Electrical rooms require the following:
a. For rooms with heat generating equipment less than 125 kVA, no special ventilating equipment is required.
b. For rooms with heat generating equipment between 126 kVA and 400 kVA, use a crossflow exhaust system that draws conditioned building air into the room. Use 20°F temperature difference for calculating exhaust fan capacity.
c. For rooms with heat generating capacity greater than 400 kVA, use cooling equipment similar to the description for IDF Rooms.

d. Replacement of Direct Expansion equipment in existing facilities.
    - RTUs may be used as one to one replacement for existing RTUs.
    - GSHPs may be replaced with RTUs or closed loop water source heat pumps. GSHP will not be used.
    - Split system as a direct replacement for split systems of 2 ton or less in unoccupied spaces.
    - Split systems shall not be provided for occupied space unless specifically requested by Owner and only if space is provided with de-occupied, pretreated outside air.

5. Special ventilation requirements
    A. Ventilate all storage spaces in accordance with code requirements.
    B. Provide special ventilation requirements for normal and purge modes in science laboratories in accordance with ASHRAE, Texas Education Agency (TEA), and Texas Safety Standards (TSS).
    C. Provide special ventilation requirements in shop areas.
    D. Provide exhaust duct for clothes dryers consistent with the manufacturer's installation instructions and the applicable building code.
    E. Provide a 3-minute delay (minimum) between off command and disabling fan for exhaust fans serving toilet rooms. Motors shall be selected to run at maximum frequency of 60 Hz.
    F. Implement interlocks and controls to prevent introduction of unconditioned outside air and potential condensation in conditioned spaces.
    G. Underfloor (crawl space) ventilation
        i. Evaluate groundwater conditions, including site and subsurface drainage for the building site, shall be carefully evaluated to determine the most appropriate method of ventilating underfloor spaces. Where mechanical ventilation is required, make provisions to ensure proper conditions for installation and maintenance of systems, and control fans based on temperature and relative humidity.

6. Special mechanical considerations
    A. Provide hail guards to protect exterior coils.
    B. Protection against noise and vibration: Refer to *Chapter 5, High Performance Design* for additional information. Evaluate effect of equipment noise on surrounding neighborhood(s).
    C. Construction changes or substitutions (motors and connections): The contract documents shall indicate that all motor horsepower ratings and electrical circuit ratings are the minimum acceptable ratings, based on the original design, use of the equipment, and projections for future additions to electrical system loads.
        i. Motor size changes: Any changes in motor sizes based on substitution of equipment having peculiar or unique characteristics are the responsibility of the contractor.
        ii. Electrical system changes: Any changes in system feeder circuits based on substitution of equipment having peculiar or unique characteristics, are the responsibility of the contractor.
    D. Preferred power voltages for HVAC equipment is in order of preference:
        i. 480 volts – 3 phase, 208 v – 3 phase.
        ii. 277 and 120 volts should only be used to power motors of less than ½ horsepower.
    E. The use of direct drive fans is preferred. Fan performance adjustments can be made using a VFD or other speed control device. Inlet guide vanes are not permitted for modification of fan performance. Motors shall be selected to run at maximum frequency of 60 Hz. Do not use “Performance Motors” or ““Motorized Impellers”.
    F. Provide air curtains at openings to the building exterior in food preparation area as required by the AHJ.
    G. All mechanical equipment shall be labeled with identification tags. For equipment with special warranty requirements, the identification tag shall include start and end date of the warranty.
    H. HVAC Condensate: Drain to sanitary system unless required otherwise by AHJ or the Owner. Refer to *Chapter 5, Site Design Requirements – Stormwater Management* for additional information.
    I. Refer to *Appendix A, Full Specification - 23 09 26a* for color requirements of outer jacket low voltage cabling.

J. Refer to *Appendix C, Acceptable Manufacturers List* for list of acceptable manufacturers for mechanical equipment.

Section 230500 – Common Work Results for HVAC

1. Include the following supplemental requirements for Division-23 submittals:
    A. Product data for each specific system provided, including model number, dimensions, weight, and other characteristics as applicable.
    B. Performance data for each specific system and equipment provided, including all operating parameters, efficiency, setpoints, etc.
    C. Installation, start-up, operation, and maintenance requirements.
    D. Scaled installation shop drawings for all pieces of equipment showing all field connections to power, water, gas.
    E. Detailed duct shop drawings at 1/4-inch scale. Update these daily during installation to reflect as-built conditions.
    F. Detailed hydronic piping shop drawings at 1/4-inch scale. Update these daily during installation to reflect as-built conditions.
    G. Overlay coordination drawings showing ductwork, hydronic piping, fire suppression piping, electrical conduits and data pathways, at 1/4-inch scale. Coordinate with Division 22 and Division 26. Update these daily during installation to reflect as-built conditions.
    H. Product data for each refrigerant type.
    I. Control sequences with actual programming details and using the Owner's "Point List" as a minimum. Submittals that simply repeat the sequences stated in bid documents are not acceptable.
    J. Testing, adjusting and balancing design review report, identifying any modifications to the design that are necessary to properly balance the air and hydronic systems. If no deficiencies are noted, the TAB Contractor is acknowledging that all the components are required to achieve proper balance are addressed in the documents.
2. Equipment locations
    A. Locate equipment on the floor in dedicated mechanical rooms near the spaces served.

B. Mechanical rooms shall comply with the following:
    i. Provide mechanical equipment rooms large enough to allow easy access and have a means to remove and replace all equipment for maintenance without removing or relocating other equipment or systems. If space restrictions exist, design team shall note on preliminary design documents for the Owner's consideration. Outline area to pull coils and other access areas on the drawings.
    ii. Provide concrete housekeeping pads and/or inertia pads for equipment within mechanical rooms. Coordinate height of pads with condensate piping and trap requirements.
    iii. Ventilate equipment rooms housing heat-generating equipment such as boilers, compressors, etc.
    iv. Combination mechanical equipment rooms and custodian's closet, or machine room/storage spaces are NOT acceptable.
    v. Provide access to machine and mechanical equipment room spaces without going through assigned areas, such as a custodian's closet, studios, laboratories, telecommunications areas, etc.
    vi. The minimum clearance around any piece of mechanical equipment is 3'-0".
    vii. Route piping and conduit such that it is not necessary to disconnect and/or relocate them to replace motors, coils or conduct any routine maintenance tasks. Unions, isolation valves, fittings, and appurtenances shall be provided as needed to ease maintenance such as motor change outs and coil replacements.
C. Avoid installation of equipment above ceilings (except for terminal units) and obtain approval from the Owner. Locate above ceiling equipment with electrical motors, belts, bearings, or filters in areas easily accessible for servicing without the use of lifts or scaffolding, or moving furniture. No AHU systems above 3 tons are allowed above ceilings. Outline area to pull coils and other access areas on drawings.
D. Avoid installation of roof-mounted equipment and obtain written approval from the Owner. Where roof-mounted HVAC equipment is required, the installation shall include:
    i. A roof hatch and ladder with security provisions to allow only authorized user access.

ii. Provide a 120-volt AC, ground fault protected electrical outlet within a 25-foot radius from all equipment.
iii. Provide weatherproof mounting curbs, flashed into roofing, at a minimum of 12-inches above the roof surface.
iv. Remoted mounted, NEMA 3R, disconnect.
v. Provide bracing for appropriate wind loads defined by code.
vi. Route piping external to roof curbs and equipment enclosures through separate roof penetrations and not through a pipe chase or cabinet provided by the equipment manufacturer. Provide weather-resistant valves and actuators.

E. Exterior ground-mounted equipment
i. Surround ground mounted HVAC equipment with a secure, lockable enclosure.
ii. Provide equipment clearances not less than those recommended by the manufacturer for service, ventilation, and removal.
iii. Provide an electrical outlet with ground-fault circuit breaker protection within 25-feet, in line of sight.
iv. Remoted-mounted, NEMA 3R, disconnect.

3. Work in existing buildings –additional requirements
A. Prior to the start of any work in existing facilities, schedule all activities and working hours with Owner. This includes any shutdown of existing utilities, fixtures, or equipment.
B. Protect all existing structures and finishes against damage from all construction work.
C. Notify Owner prior to any drilling or cutting of concrete floors to protect the safety of occupants. Confirm with Owner that no x-ray of slabs, for electrical conduit or post tension cables, is required. This will assure equipment operator safety and maintain the structural integrity of the building.
D. If systems are replaced or removed contact Owner to discuss options for storage or disposal.
E. When units containing refrigerants are removed as part of the scope, the contractor is required to recover the refrigerant into Owner-furnished canisters.

F. Assess items removed from service for any hazardous materials. if identified proceed with appropriate disposition of hazardous materials per local, state, and federal laws.

G. Do not abandon in place piping, fixtures or equipment taken out of service. Remove all branch piping taken out of service to the nearest pipe remaining in service. For all water and gas applications, install a valve, for future use, and a permanent cap. For all other applications install a permanent cap.

H. Protect all existing structures and finishes from all demolition work.

I. Coordinate with Owner for equipment to be salvaged and deliver to Owner at a specified location.

J. Service outages

   i. Do not schedule service outages during normal school operating hours. Require a written request for all required service outages a minimum of two weeks prior to anticipated shut-down. The contents of the written notification shall include a schedule of the work involved and an estimate of the time required to accomplish the work. Shutdown will not proceed without written authorization from the Owner. Utility outages to MDF rooms and media center longer than 24 hours may require implementation of temporary HVAC, power, life-safety, and security measures.

4. Provide phase and undervoltage protection at each three phase equipment in lieu of locating phase and undervoltage protection at main electrical service equipment. This is meant to minimize unnecessary campus wide power outages.
5. Variable frequency drives (VFD)
   A. UL labeled, pulse width modulated (PWM) inverter for HVAC applications is required.
   B. VFDs rated for operation without fault for up to plus/minus 10%, and plus/minus 5% frequency are required.
   C. Provide NEMA 1 enclosures in clean and dry indoor environment and NEMA 3R enclosures in wet indoor environments. Provide NEMA 4 enclosures outdoors.
   D. Mount top of VFD cabinet no more than 6’ above finish floor.
   E. Output reactors are required on the drive output side of the VFD drives.
   F. Total Harmonic Distortion (THD) to meet IEEE 519. Minimum 5% DC bus impedance is required.
   G. 100,000 RMS short circuit rating is required.
   H. BACnet communications protocol is required.

I. Provide redundant VFDs for the HVAC units serving VAVs.

J. Provide VFDs with Bluetooth capabilities.

K. Refer to *Appendix C* for list of acceptable manufacturers.

6. Warranty requirements

A. Clearly state equipment warranties at the time of submittals and again in the close-out documentation. Equipment warranties begin upon acceptance of functional testing by Owner's third-party commissioning authority. Warranties tied to shipping or start-up date are not acceptable.

B. Consult with Owner to determine if additional warranty durations should be included as an alternate to the project are required.

C. General: Minimum, 1-year from substantial completion for parts and labor for all mechanical equipment

D. Warranties durations:

i. Air handling units: Minimum 5-year warranty directly from the manufacturer for parts and labor.

ii. Water chillers: Minimum 5-year warranty directly from the manufacturer for parts and labor.

iii. Cooling towers/ fluid coolers: Minimum 5-year warranty directly form the manufacturer for parts and labor.

iv. Heating water boilers: Minimum 5-year warranty directly from the manufacturer for parts and labor.

v. Hydronic pumps: Minimum 5-year warranty directly from the manufacturer for parts and labor.

vi. Packaged roof-top units require a 5-year warranty for parts and labor directly from the manufacturer. Gas fired furnaces require a 15-year parts warranty directly from the manufacturer.

vii. Split-system air conditioning and heat pump units require a 5-year warranty for parts and labor directly from the manufacturer. Gas fired furnaces require a 15-year parts warranty directly from the manufacturer.

viii. Self-contained direct expansion air-cooled units require a 5-year warranty for parts and labor directly from the manufacturer.

ix. Water sourced heat pumps require a 5-year warranty for parts and labor directly from the manufacturer.

x. Mini-split type HVAC units require a 2-year warranty for parts and labor directly from the manufacturer. Warranty includes control system and refrigerant loss.
xi. Variable frequency drives require a 3-year warranty for parts and labor directly from the manufacturer.
xii. Kiln exhaust fans require a 2-year warranty for parts and labor directly from the manufacturer.
xiii. Dust collectors require a 2-year warranty for parts and labor directly from the manufacturer.
xiv. Refer to the "service" section for manufacturer's service during warranty period.

E. Additional Warranty & Closeout Documentation
   i. Provide an 8.5" x 11" letter sized sign inside protective plastic shield to clearly indicate all specified warranties listed in specifications. Sign shall include, but is not limited to, start and end warranty dates, contact information (service company name and address, main and alternate contact persons, office, mobile, pager and phone numbers, email addresses, and after hours emergency phone numbers.
   ii. Place hard copy of operating and maintenance manuals inside protective plastic shield at all installed units.

F. Manufacturer's services: All mechanical equipment shall require participation by the manufacturer's technical representative, as follows:
   i. Pre-installation: Awarded contractor shall schedule a pre-installation meeting with the equipment manufacturer's representative. The meeting requires attendance by all trades that have installation duties associated with the equipment. Manufacturer's representative shall review all aspects of the installation including water, gas, electrical, venting, condensing, and controls. Provide a written record of the pre-installation meeting including dates and names of attendees to the Owner's Commissioning Authority prior to start-up.
   ii. Start-up: Start-up of all mechanical equipment is required by a manufacturer's technical representative who will provide a written certification that the installation meets the manufacturer's requirements.

Start-up by an installing contractor who is authorized to conduct start-up on behalf of the manufacturer is not acceptable.

iii. Commissioning: Manufacturer's technical representative shall set aside a minimum of one day to coordinate field-commissioning tasks with the control's contractor. Technical representative shall set aside a minimum of one day to participate in functional testing with Owner's third-party commissioning agent. Technical representative shall issue a written report stating the systems are operational and controlled in accordance with manufacturer's requirements.

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

Section 230519 – Meters and Gauges for HVAC

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

Section 230593 – Testing, Adjusting, and Balancing for HVAC

1. Provide testing and balancing for HVAC systems by an independent firm not associated with the design engineer or installation contractor of the systems. Membership in the Associated Air Balance Council (AABC), or the National Environmental Balancing Bureau (NEBB) is required.
2. Design-build project delivery method:
    A. The T&B contractor is selected and paid by the Owner. The design team is still responsible for review of submittals and final spot checks. The design team is also responsible for the preparation of the T&B specifications, matching project condition, and inclusion in the project manual.
3. All other construction delivery methods:
    A. The T&B contractor is selected and paid by the prime consultant. The design team is responsible for review of submittals and final spot checks. The design team is also responsible for the preparation of the T&B specifications, matching project condition, and inclusion in the project manual.

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

1. Pipeline insulation:
    A. Insulation is required for chilled water, hot water, condensate drain, and refrigerant suction lines.
    B. Exterior piping and exposed interior piping below 10-feet requires an aluminum jacket cover.
    C. Phenolic foam or foamglas insulation for chilled water is required.
    D. Provide fiberglass insulation for interior hot water. Do not use fiberglass insulation for exterior uses.
    E. Closed-cell insulation for condensate piping is acceptable in non-return air, plenum areas. Provide phenolic foam or foamglas insulation in return air plenum areas.
    F. Removable/replaceable insulation covers on valves, test ports, strainers and pumps are required.
    G. All insulated piping shall receive a primer that is approved by the insulation manufacturer, prior to applying insulation.

H. Paint all condenser water piping with an epoxy-based paint.

2. Air duct insulation
    A. Externally insulate supply, return and outside air intake ductwork with 2-inch foiled faced fibrous insulation.
    B. Externally insulate the first 20 feet of exhaust duct adjacent to exterior walls or roofs with 2-inch foiled face fibrous insulation. For exhaust ducts in chase systems, insulate the entire run of ductwork.
    C. Flexible ducts require factory-applied insulation.
    D. Ductwork constructed of fibrous duct board is not allowed.
    E. Internal duct lining is not allowed, unless specifically required for acoustical performance and requires Owner approval prior to specifying.
3. All insulation shall meet fire/smoke requirements for the application and comply with Owner's sustainability requirements.
4. Provide weatherproof exterior insulations.
5. Provide vapor-sealed interior insulation.

Section 230926 – Building Automation Systems

1. For work in existing buildings with other systems, other than Tridium-BACNET, the designer will consult with the Owner and the Owner's Commissioning Authority. It is not the intent of the Owner to continue to build on existing controls other than the Tridium-BACnet solution.
2. Design team shall develop a complete design for the control system, including operational sequences, points lists, control diagrams, and initial setpoints for each system controlled. Submit controls system design for review by Owner and the Owner's Commissioning Authority at the design development phase and at construction documents phase.
3. Provide packaged direct-expansion equipment with onboard controls by the equipment manufacturer. Equipment controls shall allow for remote on/off control, setpoint adjustment, and monitoring from the Building Automation System. It is the design team's responsibility to obtain and document all requirements for interface between equipment manufacturer's controls and the Building Automation System.
4. For controls provided by equipment manufacturer, the design team shall document manufacturer's sequence, points that are accessible from the operator interface for monitoring, control and adjusting, hard-wired points from the controls system, and control

diagrams. Design team shall include notes under the equipment schedules indicating requirements for manufacturer-furnished controls and stating control/monitoring points not available from the manufacturer's controls shall be provided via external controls compliant with the Owner's BAS specification.

5. Locate temperature sensing devices away from supply air diffusers. Consider ADA requirements when specifying the installation height of temperature sensing devices.
6. Integrate each water consumption meters into the Building Automation System in the form of a dashboard that will display the following:
    A. Instantaneous consumption and peak.
    B. Cumulative daily consumption and daily average.
    C. Cumulative monthly consumption and monthly average.
    D. Cumulative annual consumption and average.
7. Integrate each natural gas consumption meters into the Building Automation System in the form of a dashboard that will display the following:
    A. Instantaneous consumption and peak.
    B. Cumulative daily consumption and daily average.
    C. Cumulative monthly consumption and monthly average.
    D. Cumulative annual consumption and average.
8. Integrate electric consumption meters into the Building Automation System in the form of a dashboard that will display for each category. Refer to *Chapter 5, Division 26 – Electrical for* additional information.
9. Refer to *Chapter 5, Division 22 - Plumbing* and *Chapter 5, Division 23 - Mechanical* for requirements on locations for consumption meters
10. The basis of design for all controls work is Tridium-BACnet system in accordance with *Appendix A, Standard Section 230926a – Direct Digital Controls, Tridium-BACNET*.
    A. Guidelines for sequences and control points are shown at the end of this section.

Basis of Design – Control Guideline Sequence and Points List

The following sequences and points lists are intended as a guideline to assist the design team in the development of a detailed design of the controls systems for each specific project. These guidelines represent the minimal considerations and are not intended for use as the de facto control sequences for any project.

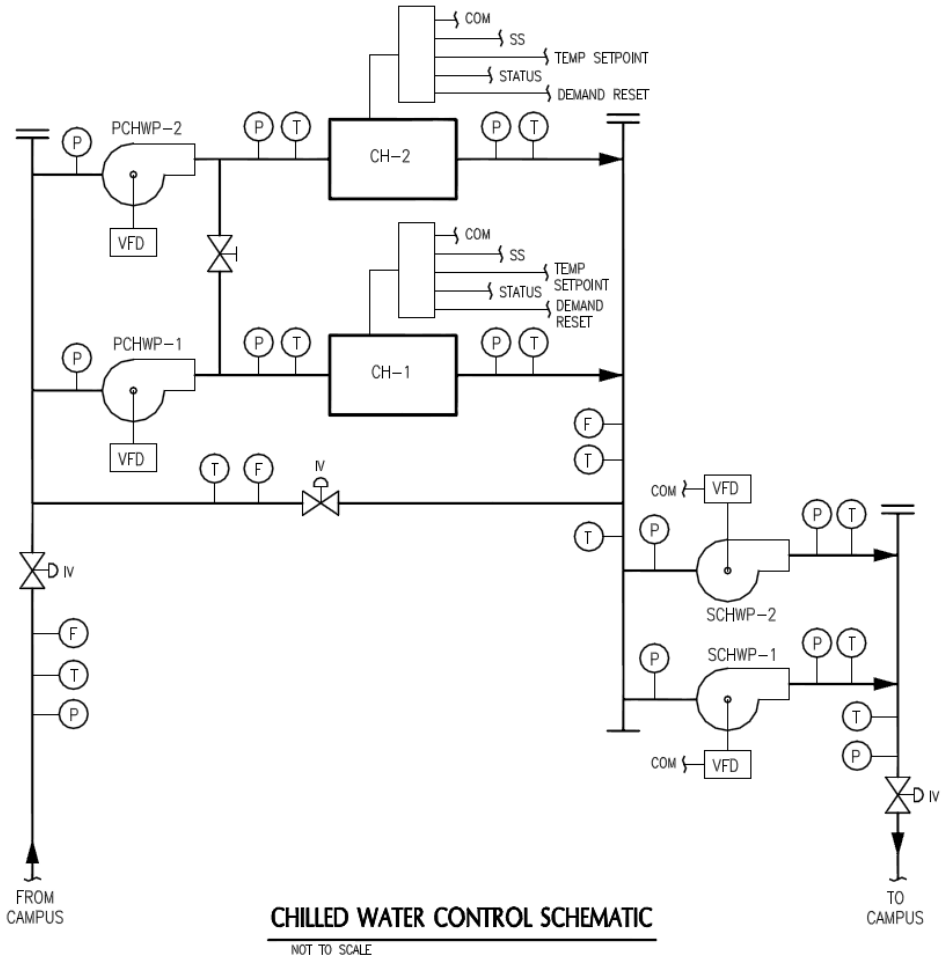
General Requirements

1. Provide controls for hydronic-based (chilled/hot water) systems via a network of controllers as outlined in *Appendix A, Section 230926a*. Design documents shall include detailed sequence of operations, instrumentation diagrams, setpoints, and control points to be integrated to the Owner's Wide Area Network Human Machine Interface (WANHMI) via the BACnet protocol.
2. Controls for direct expansion equipment are provided by equipment manufacturers. Design documents shall include a clear description of the sequence of operations, instrumentation diagram, setpoints, and control points to integrate to Owner's Wide Area Network Human Machine Interface (WANHMI) via the BACnet protocol.
3. Internal safeties associated with individual equipment shall remain integral to the equipment manufacturer's controls and not bypassed by the design team's sequences.
4. Design team shall fully investigate interface capabilities of all systems specified and document all points that will access the Owner' WANHMI.
5. Monitor all equipment for status, and control system shall issue an alarm whenever the monitored status does not correspond to the commanded value.
6. Include following safeties as a minimum:
    A. Freeze Protection
    B. High water pressure
    C. Low water pressure
    D. High duct pressure
    E. Low duct pressure
    F. High water temperature
    G. Low water temperature

Chiller Plants (2 Or More Chillers)

1. Guideline sequence:
    A. Cooling plant operation using the following performance criteria:
        i. Enable cooling plant based on outside air limit (60°F, adjustable) and call for cooling from chilled water air handler or fan-coil units. Determine the call for cooling based on a number of air handlers or fan-coil units generating a call for cooling. The number of units required to generate a call for cooling based on the minimal load required to avoid chiller plant short-cycling.
        ii. Cooling plant enable point to be commanded and overridden on and off from the local control and the WANHMI.
        iii. Do not control the cooling enable point using the occupancy schedule.
        iv. Specify freeze-protection sequences for plant and air handlers.
    B. Secondary pumps operation using the following performance criteria:
        i. Initiate the secondary pump lead/lag sequence using the cooling plant enable command.
        ii. Control number of pumps and pump speed to maintain differential pressure setpoint.
        iii. Provide pump VFD parameters in the WANHMI via BACnet card.
    C. Chillers and primary pumps operation using the following performance criteria:
        i. Initiate chiller and primary pump sequence using the cooling plant enable command.
        ii. Enable primary pump with signal from the respective chiller using appropriate delays.
        iii. Program lead/lag sequence for the chillers and primary pumps as follows:
            a. Enable the lag chiller in the event the secondary loop supply or return water temperatures is unable to maintain supply temperature for a given time period
            b. Disable the lag chiller if return temperature in the secondary loop drops below the design value for a given time period.
        iv. Program chillers to maintain supply water temperature setpoints with setpoint adjust via BACnet card.
    D. Chiller control parameters accessible to WANHMI via BACnet card.

2. Control points:
    A. Provide the following control points for the chilled water plant:
        i. Plant enable/disable (virtual point)
        ii. Chillers:
            a. On/Off (hardwired)
            b. Status (hardwired)
            c. Supply water temperature setpoint (BACnet)
            d. Supply water temperature (BACnet)
            e. Return water temperature (BACnet)
            f. Differential pressure (BACnet)
        iii. Primary pumps:
            a. On/Off (hardwired from chiller control)
            b. Status (hardwired)
            c. VFD control - optional
        iv. Secondary pumps:
            a. On/Off command and status (hardwired)
            b. Speed command (VFD hardwired)
            c. Speed feedback (VFD hardwired)
            d. Secondary supply water temperature
            e. Secondary return water temperature
            f. Differential pressure sensor
            g. Return water flow rate
            h. Bypass water temperature
            i. Bypass water flow rate



CHILLED WATER CONTROL SCHEMATIC

NOT TO SCALE

Cooling Towers (2 Or More Chillers)

1. Guideline sequence:
    A. Cooling tower fans operation using the following performance criteria:
        i. Enable cooling towers using chilled water plant enable command. The number of cooling towers enabled is independent of the number of chiller or pumps enabled.
        ii. Cooling Stage-1: Condenser water over all towers.
        iii. Cooling Stage-2: Enable lead fan at variable speed to maintain leaving water temperature set-point in the common header.
        iv. Cooling Stage-3: Modulate fans in unison to maintain leaving water temperature set-point in the common header.
        v. Control cooling tower fans to slow down to minimum speed prior to disable.
        vi. Cooling tower bypass valve to remain closed unless leaving water temperature drops below allowable limit. Modulate cooling tower bypass valve to maintain low limit set-point temperature.
        vii. Building Automation System will continuously monitor make-up water and blow down water.
    B. Condenser water pumps operation using the following performance criteria:
        i. Enable condenser water pump with signal from the respective chiller using appropriate delays.
        ii. Control lead/lag sequence for the condenser water pumps to follow the chillers lead/lag sequence.
2. Control points
    A. Provide the following control points for the cooling tower and condenser water pumps:
        i. Cooling tower:
            a. Condenser water return temperature -common
            b. Condenser water supply temperature –each chiller (BACnet)
            c. Condenser water return temperature –each chiller (BACnet)
            d. Bypass valve command –each
            e. Make-up water flow rate
            f. Blow down water flow rate
            g. Cold water basin level –each

h. Vibration switch –each

i. Oil level -each

ii. Cooling tower fans:

a. On/Off command and status (hardwired)

b. Speed command (VFD/ hardwired)

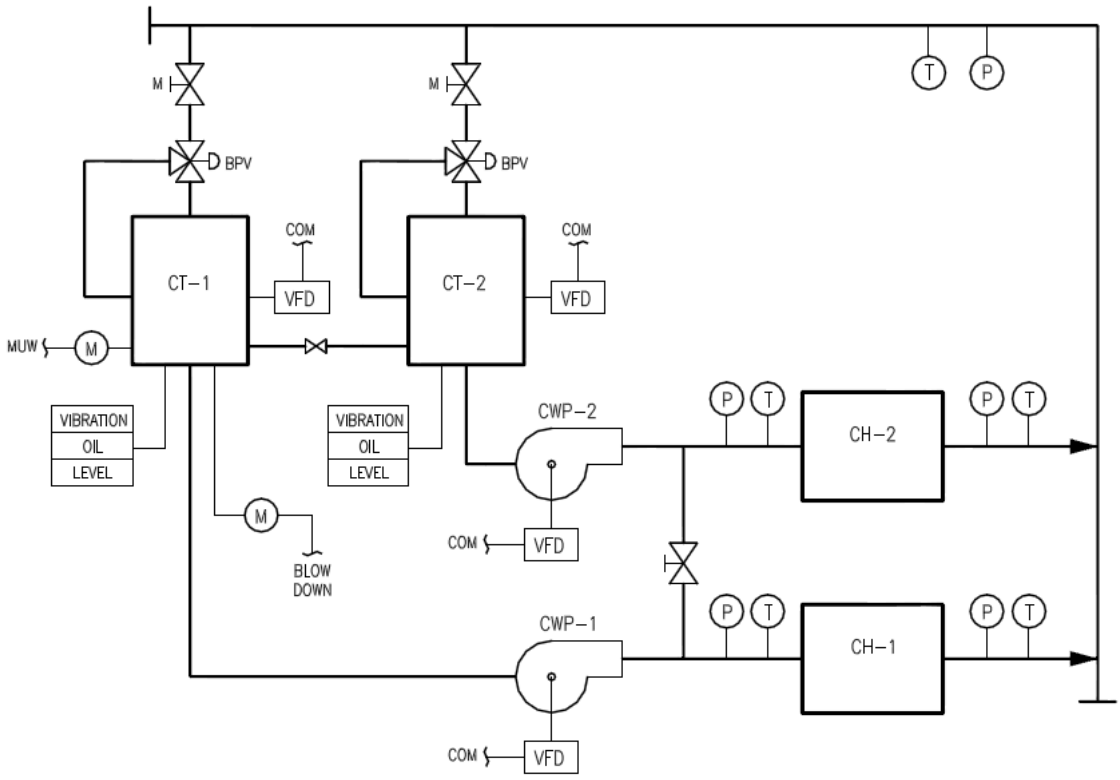
c. Speed feedback (VFD/ hardwired)

iii. Condenser water pumps:

a. On/Off (hardwired from chiller)

b. Status (hardwired)

c. VFD control –optional



CONDENSER WATER CONTROL SCHEMATIC

NOT TO SCALE

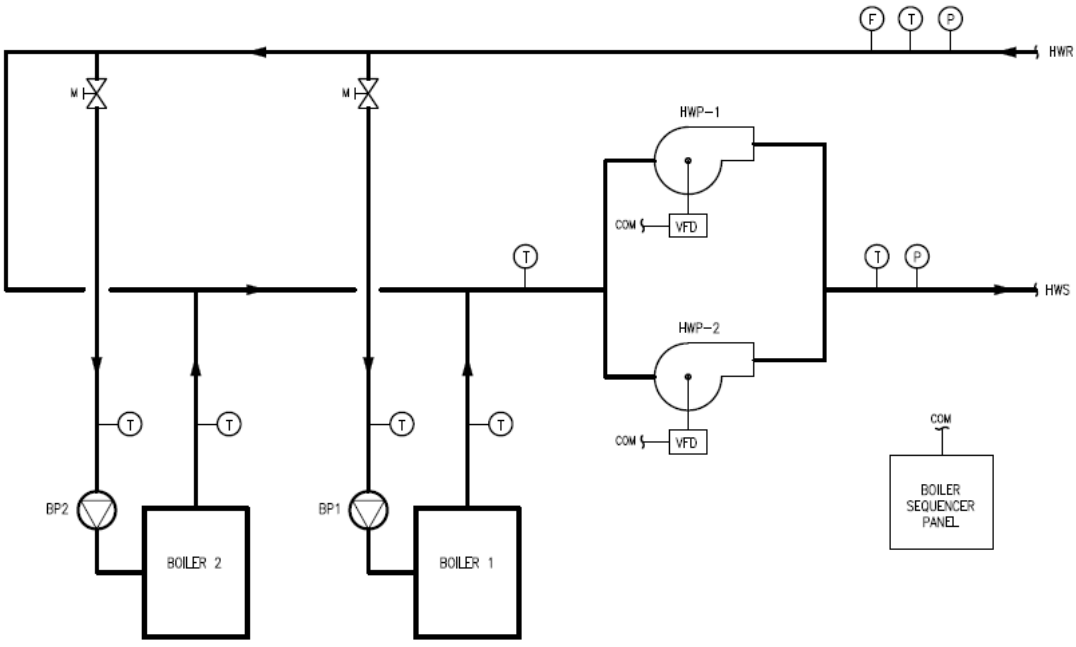
Boiler Plants (2 Or More Boiler)

1. Guideline sequence:
    A. Heating operation using the following performance criteria:
        i. Enable heating plant on outside air limit (60F or less, adjustable) and call for heating from any hot water air handler or fan-coil units.
        ii. Heating plant enable point to be commanded and overridden on and off from the local control and the WANHMI.
        iii. Do not control the heating enable point using the occupancy schedule.
        iv. Specify freeze-protection sequences for plant and air handlers.
    B. Secondary pumps operation using the following performance criteria:
        i. Initiate the secondary pump lead/lag sequence using the heating plant enable command.
        ii. Control number of pumps and pump speed to maintain differential pressure setpoint.
    C. Boilers and primary pumps operation using the following performance criteria:
        i. Initiate boiler and primary pump sequence using the heating plant enable command.
        ii. Enable primary pump with signal from the respective boiler using appropriate delays.
        iii. Program lead/lag sequence for the boilers and primary pumps as follows:
            a. Enable the lag boiler in the event the secondary loop supply or return water temperatures is unable to maintain supply temperature for a given time period
            b. Disable the lag boiler if return temperature in the secondary loop increases above the design value for a given time period.
        iv. Program boilers to maintain supply water temperature setpoints with setpoint adjust via BACnet card.
    D. Boiler control parameters accessible to WANHMI via BACnet card.
2. Control points:
    A. Provide the following control points for the heating water plant:
        i. Plant enable/disable (virtual point)

ii. Boilers:
    a. Sequencer Enable (BACnet)
    b. Status (BACnet)
    c. Supply water temperature setpoint -each (BACnet)
    d. Supply water temperature -each (BACnet)
    e. Return water temperature -each (BACnet)

iii. Primary pumps:
    a. On/Off (hardwired from boiler control)
    b. Status (hardwired)

iv. Secondary pumps:
    a. On/Off command and status (hardwired)
    b. Speed command (VFD hardwired)
    c. Speed feedback (VFD hardwired)
    d. Secondary supply temperature
    e. Secondary return temperature
    f. Differential pressure setpoint
    g. Return water flow rate



HOT WATER CONTROL SCHEMATIC

NOT TO SCALE

Single Zone, Variable Air Volume, Air Hander (SZ)

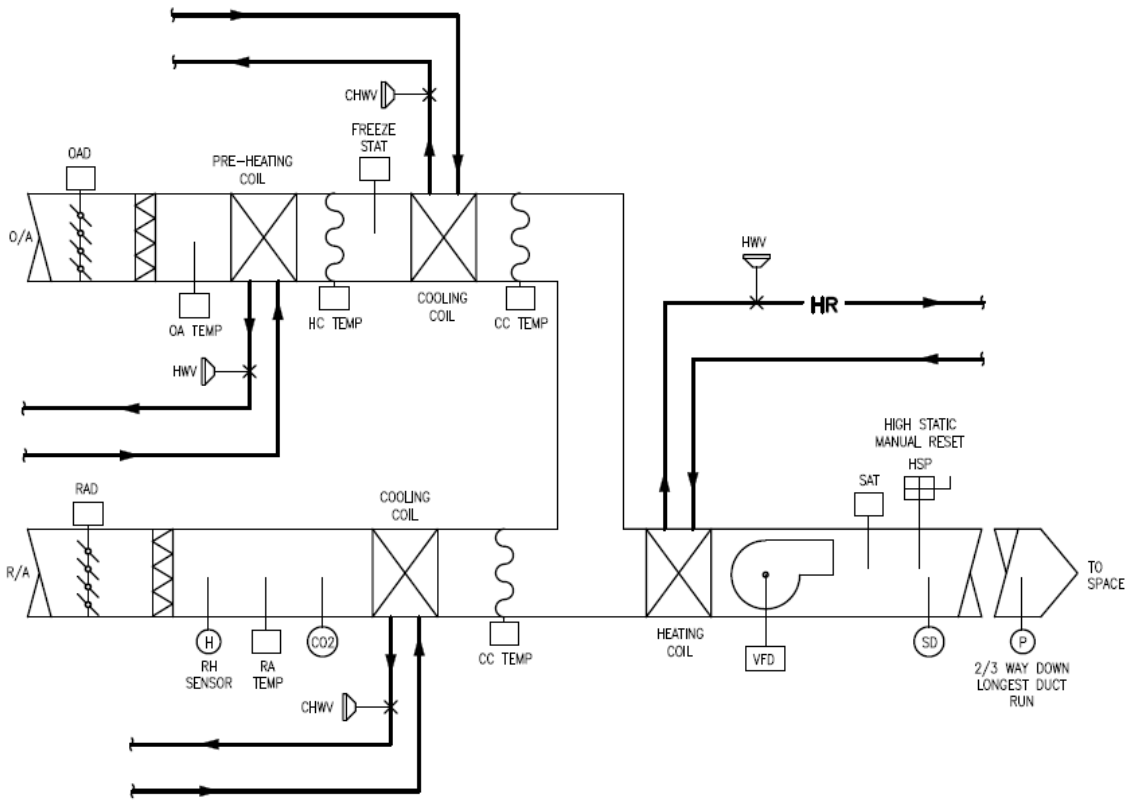
1. Description:
    A. This guideline applies to single-zone hydronic air handlers serving large areas with variable occupancy (dining areas, media resource center, gym) and no decoupled outside air unit.
2. Guideline sequence:
    A. Enabled single zone, variable air volume, air hander by one or more of the following:
        i. Occupancy schedule
        ii. Unoccupied setback/setup
        iii. Local override at zone thermostat
        iv. Remote override at WANHMI
        v. Call for override from another unit –in response to need to create plant load
    B. Cooling/heating mode determined by deviation from space temperature setpoint.
    C. Control cooling mode for single zone, variable air volume, air hander using the following performance criteria:
        i. Supply fan modulates to maintain space temperature
        ii. Chilled water valve maintains supply air temperature to control space relative humidity
        iii. When fan reaches minimal speed, enable supply air reset and/or reheat to prevent overcooling
    D. Control heating mode for single zone, variable air volume, air hander using the following performance criteria:
        i. Supply fan operates at constant speed as determined by design team to ensure adequate throw
        ii. Hot water coil modulates to maintain space temperature
    E. Control ventilation for single zone, variable air volume, air hander using the following performance criteria:
        i. Decoupled OA (normally closed) and RA (normally open) dampers
        ii. OA and RA dampers modulate to maintain space CO_2
        iii. Barometric relief dampers as required to relieve excess space pressure
        iv. Economizer operation as required by code.

F. Control freeze-protection for single zone, variable air volume, air hander using the following performance criteria:
    i. Implement a pre-freeze sequence that will protect coils while allowing unit to continue in operation with reduced/no ventilation air, without tripping freeze-stat.
    ii. Implement a freeze-protection sequence that will protect coils and shutdown the system.

G. Provide the following safeties:
    i. Smoke detection shutdown.

3. Control points:

A. Provide the following control points for a single zone, variable air volume, air hander using the following performance criteria:
    i. On/Off command and status (hardwired)
    ii. Speed command (VFD hardwired)
    iii. Speed feedback (VFD hardwired)
    iv. Return section chilled water control valve
    v. Ventilation chilled water control valve
    vi. Ventilation hot water control valve
    vii. Main hot water control valve
    viii. Outside air damper
    ix. Return air damper
    x. Space temperature
    xi. Space/return relative humidity
    xii. Space CO_2
    xiii. Return air temperature
    xiv. Mixed air temperature
    xv. Main cooling coil discharge air temperature
    xvi. Ventilation heating coil discharge air temperature
    xvii. Ventilation cooling coil discharge air temperature
    xviii. Unit supply air temperature
    xix. Duct smoke detector (monitor hand-wired point)



DUAL PATH AHU CONTROL (SZ UNIT)

NOT TO SCALE

Variable Air Volume, Air Hander Serving Multiple Spaces (MZ)

1. Description:
    A. This guideline applies to variable air volume hydronic air handlers serving multiple spaces (studios, offices) via single-duct VAV boxes with hot water coils. The unit has a return air coil section with cooling coil, a decoupled outside air section with a heating and cooling coil, and a fan section.
2. Guideline sequence:
    A. Enable variable air volume, air hander serving multiple spaces by one or more of the following:
        i. Occupancy schedule
        ii. Unoccupied setback/setup
        iii. Local override at any zone thermostat
        iv. Unoccupied setback/setup at any zone thermostat
        v. Remote override at WANHMI
        vi. Call for override from another unit –in response to need to create plant load
    B. Control main cooling section variable air volume, air hander serving multiple spaces using the following performance criteria:
        i. Enabled cooling mode if any space temperature is above cooling setpoint.
        ii. Provide cooling signal to chiller plant upon unit call for cooling.
        iii. Control main section cooling valve to maintain supply air temperature setpoint.
        iv. Reset supply air temperature based on zone with highest cooling load when fan is at minimal speed (see below). Close chilled water valve if all zones are 5°F (adjustable) below cooling setpoint.
        v. Override supply air reset if relative humidity in any space exceeds setpoint.
    C. Control ventilation coil section main cooling section variable air volume, air hander serving multiple spaces using the following performance criteria:
        i. Enable ventilation sequences during occupied hours only.
        ii. Control outside air damper to override ventilation sequence to maintain CO_2 concentration at the critical zone sensor.
        iii. Control ventilation section pre-heating coil to maintain entering air at 54°F (adjustable) using a reset schedule.

iv. Control ventilation section cooling coil shall modulate to maintain discharge air temperature at 55°F (adjustable).

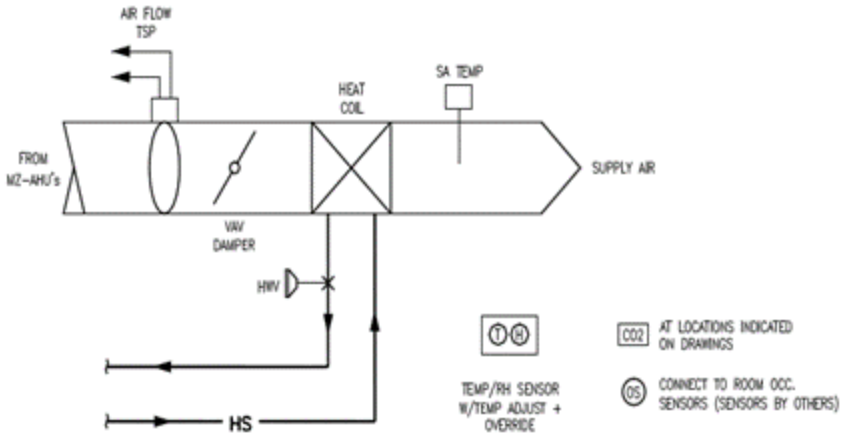
D. Control fan and terminal unit with a main cooling section variable air volume, air hander serving multiple spaces using the following performance criteria:
   i. Modulate zone VAV dampers to maintain space cooling temperature setpoint. Design team will provide minimum air flows.
   ii. Close VAV damper when occupancy sensor detects room vacancy.
   iii. Upon a call for heating in any zone, system will issue a call signal to the heating plant and the VAV box hot water coil shall modulate to maintain space temperature at the design airflow rate.
   iv. Control supply fan speed to maintain static pressure setpoint at downstream duct location.
   v. Use "Bump" sequence to reset static pressure setpoint based on critical VAV box.

E. Control freeze protection for a variable air volume, air hander serving multiple spaces using the following performance criteria:
   i. Implement a pre-freeze sequence that will protect coils while allowing unit to continue in operation with reduced/no ventilation air, without tripping freeze-stat.
   ii. Implement a freeze-protection sequence that will protect coils and shutdown the system.

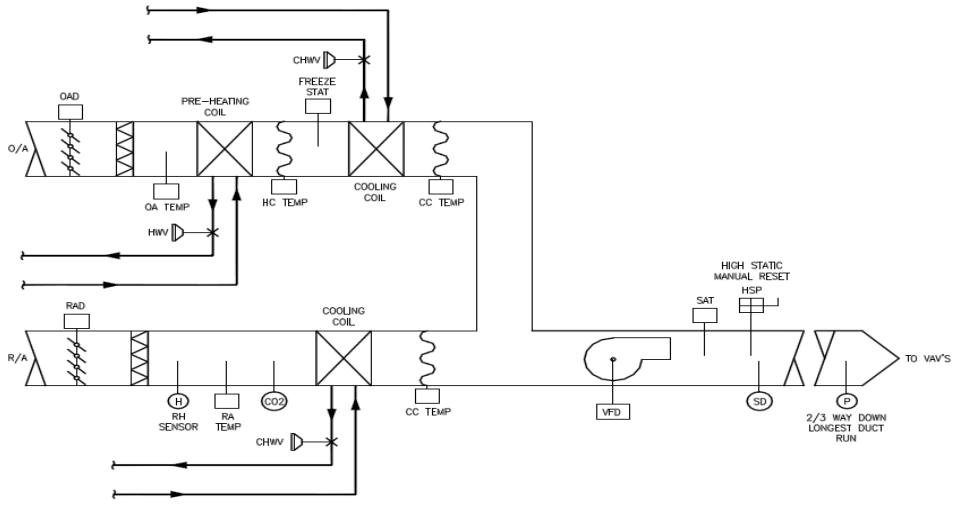
F. Provide the following safeties:
   i. Smoke detection shutdown.
   ii. High and low static duct pressure (supply, return, exhaust)

3. Control points:
   A. Provide the following control points for a variable air volume, air hander serving multiple spaces using the following performance criteria:
   B. On/Off command and status (hardwired)
   C. Speed command (VFD hardwired)
   D. Speed feedback (VFD hardwired)
   E. Main chilled water control valve
   F. Ventilation chilled water control valve
   G. Ventilation hot water control valve
   H. Outside air damper

I. Return air damper
J. Return air temperature
K. Mixed air temperature
L. Main cooling coil discharge air temperature
M. Ventilation heating coil discharge air temperature
N. Duct static pressure
O. High and low static safety
P. Duct smoke detector (monitor hand-wired point)
Q. Space temperature (VAV box controller)
R. Space relative humidity (VAV box controller)
S. Space CO_2 (VAV box controller)
T. Zone damper (VAV box controller)
U. Zone heating valve (VAV box controller)
V. Zone discharge air temperature (VAV box controller)
W. Vacancy signal from sensor



VAV BOX WITH REHEAT
NOT TO SCALE



DUAL PATH AHU CONTROL (MZ-VAV UNIT)
NOT TO SCALE

Single Duct AHU/Hydronic Fan-coil Unit with DOAS

1. Description:
    A. This guideline applies to a standalone single-duct/single zone AHU or FCU with hot water and chilled water heating coil for individual studio applications. These units require the installation of a decoupled outside air unit. Do not use without a dedicated outside air unit serving the unit mixing box (AHU) or the space directly (FCU).
2. Guideline sequence:
    A. Enable single duct AHU/Hydronic fan-coil unit with DOAS system using one or more of the following:
        i. Occupancy schedule
        ii. Unoccupied setback/setup
        iii. Local override at zone thermostat
        iv. Remote override at WANHMI
    B. Cooling/heating mode determined by deviation from space temperature setpoint.
    C. Control cooling mode for a single duct AHU/Hydronic fan-coil unit with DOAS system using the following performance criteria:
        i. Control supply fan using variable speed to maintain space temperature.
        ii. Modulate chilled water valve to maintain discharge air temperature. Provide a reset schedule when fan reaches minimal speed.

D. Control heating mode for a single duct AHU/Hydronic fan-coil unit with DOAS system using the following performance criteria:
    i. Operate supply fan at constant speed
    ii. Modulate water valve to maintain space temperature.
E. Control ventilation for a DOAS using the following performance criteria:
    i. Enable ventilation sequences during occupied hours only.
    ii. Open outside air damper.
    iii. Enable supply fan based on outside air damper end-switch
    iv. Modulate supply fan shall to maintain CO_2 concentration at the critical zone sensor.
    v. Modulate pre-heat coil shall to maintain supply air at 54°F (adjustable and with a reset schedule)
    vi. Modulate ventilation section cooling coil to maintain discharge air temperature in accordance with a reset schedule based on critical zone relative humidity.
F. Provide the following safeties:
    i. Smoke detection shutdown.

3. Control points
    A. Provide the following control points for a single duct AHU/Hydronic fan-coil unit with DOAS system using the following performance criteria:
        i. Air handling units:
            a. On/Off command and status (hardwired)
            b. Speed command (VFD/hardwired)
            c. Speed feedback (VFD/ hardwired)
            d. Outside air damper
            e. Return air damper
            f. Chilled water control valve
            g. Hot water control valve
            h. Return air temperature
            i. Mixed air temperature
            j. Cooling coil temperature
            k. Discharge air temperature
            l. Space temperature
            m. Space relative humidity

n. Space CO_2

o. Duct smoke detector (monitor hard-wired point)

ii. DOAS:

a. Outside air damper command

b. Outside air damper end-switch

c. Fan On/Off command and status (hardwired)

d. Speed command (VFD/ hardwired)

e. Speed feedback (VDF/ hardwired)

f. Hot water control valve

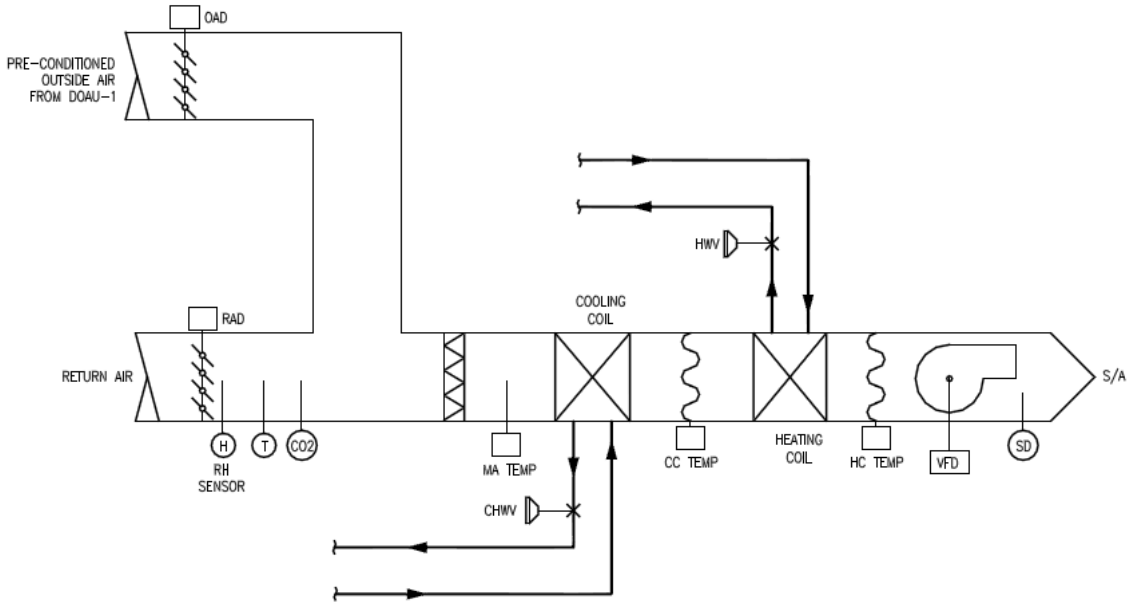
g. Chilled water control valve

h. Heating coil temperature

i. Discharge air temperature

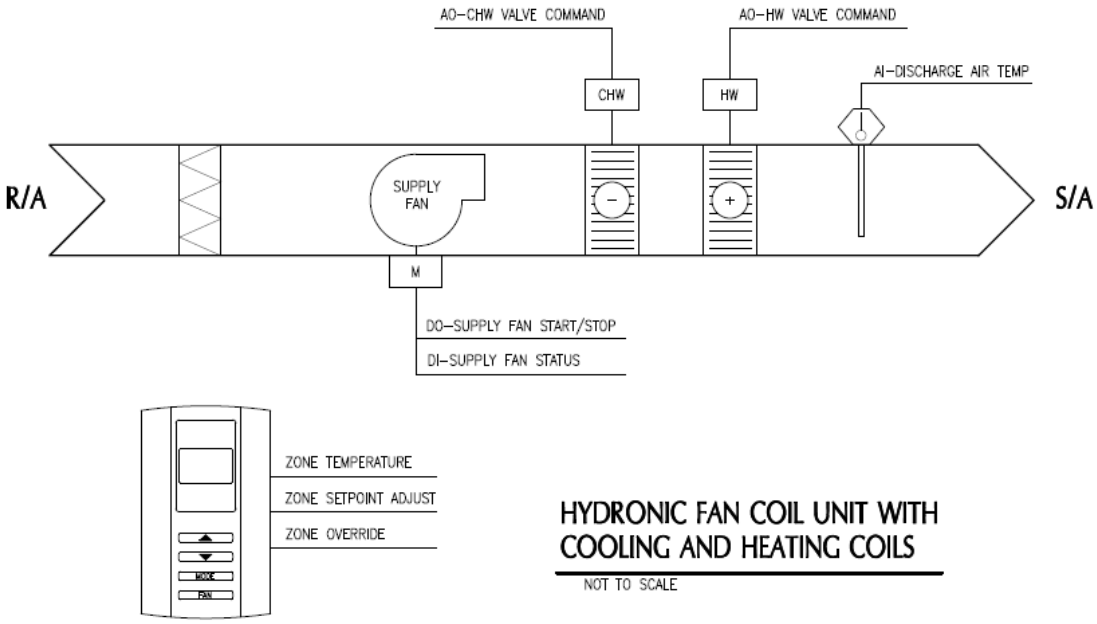
j. High-static safety

k. Duct smoke detector (monitor hard-wired point)



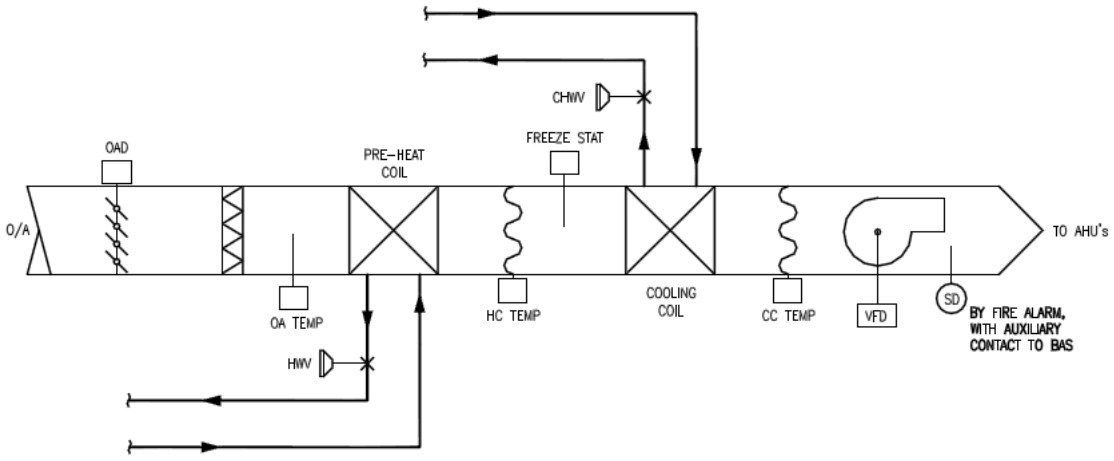
SINGLE PATH AIR HANDLING UNIT

NOT TO SCALE



HYDRONIC FAN COIL UNIT WITH COOLING AND HEATING COILS

NOT TO SCALE



DEDICATED OUTSIDE AIR HANDLING UNIT (DOAU & MAU)

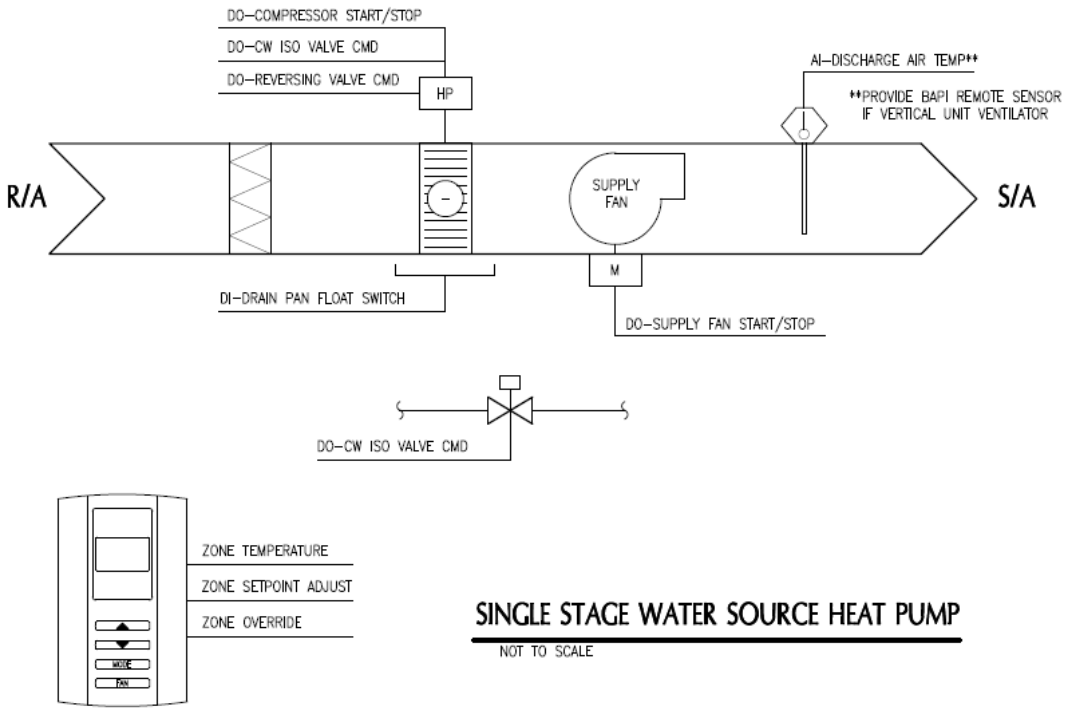
NOT TO SCALE

Water Source Heat Pumps

1. Description:
    A. This guideline applies to a water source heat pumps connected to a closed loop water system with fluid coolers/cooling tower and boilers with one or two stages of heating and cooling. These systems apply mostly to studio applications but are also used in large spaces like dining areas, libraries, and gyms. These units must be used in spaces that have decoupled outside air units to meet ventilation needs.
    B. Controls provided by equipment manufacturer with BACnet communications protocol to interface with Owner's WANHMI. Design team shall coordinate with equipment manufacturer to verify that controls provided are able to meet these guidelines, and to develop detailed sequences and interface requirements for integration to Owner's WANHMI.
2. Guideline sequence:
    A. Enable water source heat pump system one or more of the following:
        i. Occupancy schedule:
            a. Unoccupied setback/setup
            b. Local override at zone thermostat
            c. Remote override at WANHMI
        ii. Fan control:
            a. Fan shall run continuously during occupied hours.
            b. For units with variable speed fan, fan speed will vary to maintain space temperature and relative humidity.
        iii. Isolation valve and plant call:
            a. Unit controls command the isolation valve open.
            b. Upon opening valve, system issue a call for heating or cooling to the plant depending operating mode.
        iv. Temperature control:
            a. Unit controls shall be programmed with adjustable discrete occupied and unoccupied heating and cooling setpoints with appropriate dead-bands.
            b. System shall cycle compressor(s) as required to meet space temperature.

c. Upon a drop-in space temperature below the heating setpoint, unit shall operate reversing valve and stage compressors in heating mode to maintain space temperature setpoint.

3. Control points:
   A. All control points provided by manufacturer. Points indicated with (HMI) shall be accessible to the Owner via BACnet communications protocol for monitoring and control.
   B. Provide the following control points for a water source heat pump system using the following performance criteria:
      i. Unit start/stop (HMI)
      ii. Unit schedule override (at sensor and HMI)
      iii. Compressor stage 1
      iv. Compressor stage 2
      v. Reversing valve
      vi. Space temperature (HMI)
      vii. Space temperature setpoint adjust (HMI)
      viii. Discharge air temperature (HMI)



SINGLE STAGE WATER SOURCE HEAT PUMP

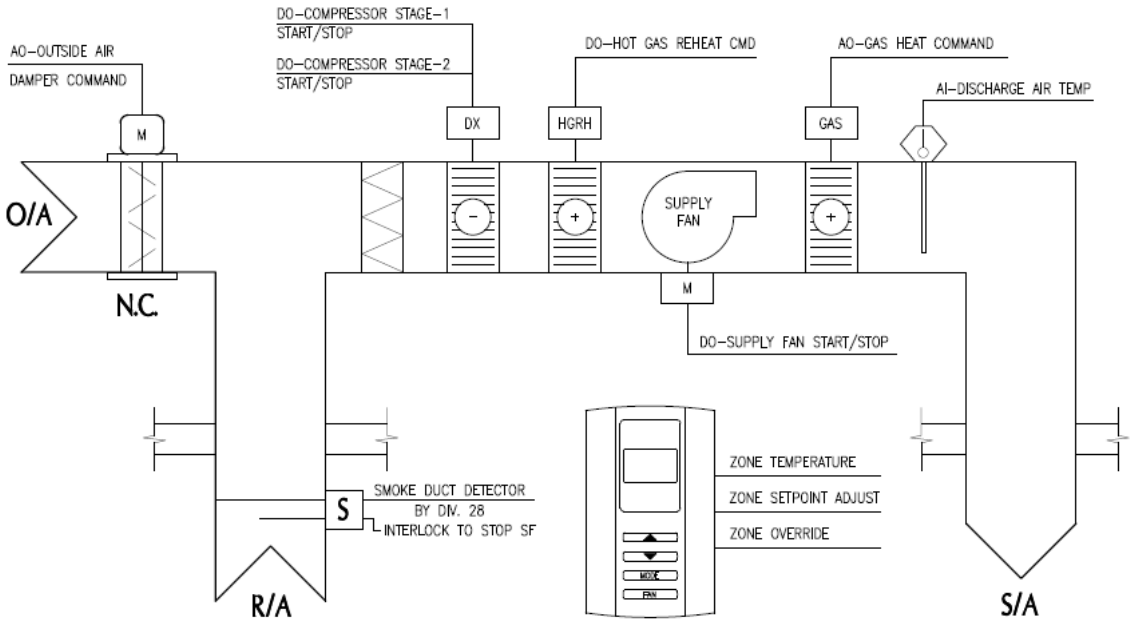
NOT TO SCALE

Packaged Direct Expansion

1. Description:
    A. This guideline applies to a stand-alone, air-cooled, packaged direct expansion system with one or more stages of direct expansion cooling, heat pump or natural gas heating and hot gas reheat. These systems apply mostly to retrofit applications where it is not possible to provide hydronic units to serve single studios. Systems will be vertical self-contained indoor units, or rooftop mounted pending approval by Owner.
    B. Controls provided by equipment manufacturer with BACnet communications protocol to interface with Owner's WANHMI. Design team will coordinate with equipment manufacturer to verify that controls provided are able to meet these guidelines, and to develop detailed sequences and interface requirements for integration to Owner's WANHMI.
2. Guideline sequence:
    A. Enable packaged direct expansion system using one or more of the following:
        i. Occupancy schedule
        ii. Unoccupied setback/setup
        iii. Local override at zone thermostat
        iv. Remote override at WANHMI
        v. Fan control:
            a. Fan shall run continuously during occupied hours.
            b. For units with variable speed fan, fan speed will vary to maintain space temperature and relative humidity.
        vi. Temperature control:
            a. Program unit controls with adjustable discrete occupied and unoccupied heating and cooling setpoints with appropriate dead-bands.
            b. Cycle compressor(s) to meet space temperature.
            c. For units with variable speed compressors, modulate compressors to maintain space temperature and relative humidity.
            d. Modulate gas heat (or enable heat pump reversing valve) to maintain space temperature setpoint upon a drop-in space temperature below the heating setpoint.

vii. Ventilation control:
    a. Module decoupled OA damper to maintain CO_2 levels within limits established by the design team.
    b. Close outside air damper during unoccupied hours.
viii. Controls shall allow outside air damper to be commanded from the HMI.
ix. Dehumidification control:
    a. Enable hot gas reheat to maintain relative humidity below set-point during occupied hours.
    b. Disable hot gas reheat when unit is in cooling or heating mode.
x. Economizer:
    a. Provide on-board economizer controls.

3. Control points:
    A. All control points provided by manufacturer. Points indicated with (HMI) shall be accessible to the Owner via BACnet communications protocol for monitoring and control.
    B. Provide the following control points for a package direct expansion system using the following performance criteria
        i. Unit start/stop (HMI)
        ii. Unit schedule override (at sensor)
        iii. Outside air damper command (HMI)
        iv. Compressor stage 1 (or modulation)
        v. Compressor stage 2
        vi. Hot gas reheat
        vii. Modulating gas heat/heat pump reversing valve/electric heat
        viii. Space temperature (HMI)
        ix. Space temperature setpoint adjust (HMI)
        x. Space relative humidity (HMI)
        xi. Space CO_2 (HMI)



DUAL STAGE PACKAGED UNIT WITH HOT-GAS REHEAT AND MODULATING GAS HEAT

NOT TO SCALE

Other Control Sequence Guidelines

1. Kitchen exhaust fans
    A. Control HVAC system for the kitchen and dining area by the Building Automation System, in accordance with one the guidelines outlined above.
    B. Manually control kitchen exhaust fans and makeup air units by switches to be provided as part of the design.
    C. Provide a hard-wire interlock so the kitchen exhaust fans cannot be enabled unless the makeup air units are also enabled. This eliminates the possibility of running exhaust fans without makeup air units and drawing the space into negative pressure.
2. Group restroom and dressing room exhaust fans
    A. Control exhaust fans for group restrooms by the Building Automation System and placed on the same operational schedule as the air handlers serving the area
3. Telecommunication rooms (SuperNodes/MDF/IDF)
    A. Control single-duct terminal unit fed from AHU to maintain space cooling temperature setpoint per VAV sequence guideline. Close VAV box damper fully if supply air temperature increases above 65°F.
    B. Building Automation System shall not control direct-expansion unit provided for cooling of IT equipment. Monitor space temperature and issue alarm if it increases by 2°F above setpoint

Section 232113 / 232116 – Hydronic Piping and Specialties

1. Piping general requirements
    A. Avoid routing of piping within MDF and IDF communication equipment rooms. Provide shielding to protect equipment from potential water damage.
    B. Do not route piping through electrical and elevator machine rooms.
    C. Identify above grade piping systems with pipe markers to indicate the type of material being conveyed.
    D. Identify valves with stamped brass tags, keyed to a valve list.
    E. Piping installed on the roof is not permitted, unless specifically serving roof-mounted air handlers.

F. Install pipe penetrations into buildings through chases with isolation valves inside building.
G. Provide isolation valves at all piping branch-offs of piping.
H. Design piping to allow for expansion and contraction without overstressing the pipe. Design growth strategy pipelines, including, anchors, one-dimensional slides, and expansion joints.
I. Provide seal sleeves for pipes passing through floors, walls and roofs. Provide watertight and rated sleeves to match the fire and smoke rating of the assembly.
J. Victaulic pipeline connections are allowed for use in hydronic system installed in dedicated mechanical rooms and exterior to the building.
K. Do not use polypropylene piping or fittings in hydronic water systems within the building. Use of polypropylene piping for underground or crawl space applications may be allowed pending approval by Owner.

2. Hot and chilled water piping
   A. Design to a maximum friction loss of 4-feet per 100-feet of pipe for mains and branches, using a minimum velocity of 2 ft/sec.
   B. Run outs to individual coils are not allowed to exceed 8 ft/sec velocity.
   C. Avoid joints below floor slabs and route piping in accessible locations.
   D. Provide a minimum schedule 40 black steel piping with wrought steel fittings, wrought-cast or forged-steel flanges, flange fittings, and welded and flanged joints for sizes 2.5-inches and above. Welded or flanged steel pipe is required.
   E. Provide hard drawn Type L copper with wrought copper fittings for sizes less than 2-inches. Soldered joints for copper pipe are required.
   F. Grooved mechanical joints and mechanical pressed joints are only permitted in dedicated mechanical room.
   G. Provide unions or flanged joints at each piece of equipment, valve, or device in the system to allow future removal.
   H. Pressure test systems at 200% of the design operating pressure, but not less than 125 psi. Verify that test pressure will not exceed any component pressure rating.
   I. Underground hydronic piping shall pre-insulated Schedule 40 steel pipe with expansion compensation and thrust blocks to prevent excessive pipe movement and stress.
   J. Provide manual air vents at all high points. Provide drains at all low points.

K. Protect piping against freezing by either recirculation sequences or electric heat tracing. Provide built-in ground fault protection on heat trace controllers.

L. Provide full-size valves and blind flanges at chilled water and hot water supply and return lines to allow for connection of temporary chillers and boilers. Coordinate location of temporary connections for ease of use and no risk of freezing. Provide valves to allow bypass of permanent equipment as required for connection of temporary equipment.

M. For insulated hydronic pipelines located in crawl spaces, treat fittings joints, and/or connections with corrosion resistant paint prior to installing the insulation.

N. Piping made in USA is required.

3. Valves

   A. Each pump, heating or cooling water coil, chiller, and boiler require valves to balance, drain, isolate, purge air, and measure pressure.

   B. Pumps require check valves on the pump discharge.

   C. Provide full-port, ball valves for pipeline sizes 2-inches and less. Provide butterfly valves for pipeline sizes 2.5-inches and larger.

   D. Ball valves shall have blow-out proof, stainless steel ball and stem.

   E. Provide gear operators for butterfly valves 4 inches and larger. Install gear operators facing down.

   F. Provide stainless steel stems on all exterior isolation valves.

   G. Provide chain operators for valves over 13-feet above finished floor. Extend chains to 7-feet above finished floor. Chain operators are only intended for mechanical rooms.

   H. Consider using high performance butterfly valves for critical applications.

4. Air separation and expansion

   A. Each closed pumping system requires an automatic air separator and expansion device piped with an isolation valve to vent drain at high points in the system, an ASME-rated diaphragm type compression tank, and in-line centrifugal type separator with strainer.

5. Piping specialties

   A. Circuit setter: Provide circuit setter stations for each air handler coil, chiller, boiler and pump.

B. Strainers: Provide a cleanable strainer on the suction side of each pump with full size ball valve and piped to a floor drain for blow down. Provide unions in drain piping to facilitate removal.

C. Flexible connections: Use flexible connectors where piping connects to rotating or vibrating equipment and where below-grade piping is subject to movement due to expansion and contraction of the soil.

Section 232123 – Hydronic Pumps

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

Section 232300 - Refrigerant Piping

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

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

Section 232500 – Water Treatment

1. Chemical water treatment is provided by the Owner's water treatment company, with the installation and first year of service included as part of the project.
2. Flush, clean, and treat closed hydronic systems. Provide bypass pot feeder with replaceable filter and differential pressure gauge for closed hydronic systems.
3. For work involving or connecting to existing systems, clean and flush the entire hydronic system, blow down all the strainers, and provide chemical treatment of entire system.
4. Provide an automatic chemical treatment system for open water systems by the Owner's water treatment company.

Section 233113 - Metal Ducts

1. Construct supply and return air ducts of galvanized metal.
2. Provide flexible duct to connect a main or branch duct to an air device. Limit flexible duct length to 6 feet. Make connections from vertical face of the rectangular duct.
3. Seal all supply and return duct joints and seams with mastic. Pressure test systems with an operating static pressure of more than 1-inch and achieve a leakage rate of less than 5%. Systems with an operating static pressure of less than 1-inch are not required to be pressure tested.

4. Provide seal sleeves for ducts passing through floors, walls and roofs. Water tight and rated sleeves are required to match the fire and smoke rating of the assembly.
5. Where exposed to view, round spiral duct is preferred over rectangular ductwork.
6. Use code-approved duct materials for special applications such as laboratories, kitchens, and shop areas in accordance with SMACNA standards.
7. Exposed supply ductwork on roofs is not acceptable. Consider stainless steel exhaust duct for special (laboratory) applications.
8. Where plenum return systems are used, provide return boots with sound attenuation.
9. Comply with sustainability requirements for all sealants, mastics, and adhesives in ductwork and systems.

Section 233300 – Metal Duct Accessories

1. Dampers
    A. Provide dampers in the mains, branches, returns, exhaust, and outdoor air intakes for balancing of each duct system.
    B. Provide opposed-blade dampers, except that single blade type may be used in branches to individual air devices. Clear denote the open and closed positions and the normal operating position of each damper.
    C. Include provisions for ensuring that dampers are visible, accessible, and easy to operate after installation is complete.
    D. Where balancing dampers are located above hard ceilings, provide cable-operated (Young's regulators) dampers to allow for adjustment without accessing the ceiling space.
    E. Provide fire dampers and fire-smoke dampers at locations required by Authority having Jurisdiction. Provide properly labeled and numbered access panels.
2. Intake and exhaust air
    A. Protect outside air intakes and exhausts with rainproof louvers, hoods, or other approved systems, and bird screens.
    B. Design intakes and exhausts to protect against accidental freeze-up of adjacent interior equipment or piping.
    C. Design intakes and exhausts to protect against short circuiting of air streams.
    D. Size intakes to minimize air velocity to eliminate the possibility of water intrusion.

E. Design outside air intake and exhaust openings as high as practical to prevent introduction of foreign materials into the building.
F. Provide lighting-protection systems on exterior equipment, flues, and exhaust stacks.

Section 233813 – Commercial Kitchen Hoods

1. Interlock kitchen exhaust fans and associated make-up air fans to run automatically when the kitchen hoods are enabled. Use code required control provisions during a fire suppression discharge event.
2. The top of the fire suppression system control equipment shall be mounted a minimum of 4" below the ceiling.
3. Provide fire suppression equipment for kitchen as required by applicable code and AHJ. Provide a Kidde WHDR wet chemical fire suppression system and accessories are preferred.

Section 233423 – HVAC Power Ventilators

1. Kiln exhaust systems:
    A. Refer to *Chapter 5, Section 115115 - Kiln*.
2. Kiln room exhaust systems:
    A. Provide a dedicated, general space, exhaust fan for kiln rooms that transfers air to the building exterior. Size exhaust fan for a minimum six air changes per hour.
    B. Control kiln room exhaust fan with a wall-mounted temperature sensor (local-control only). Provide on, off, and automatic selector switch on local thermostat.
3. Provide transfer air path from an adjacent space into the kiln room.
4. Provide carbon monoxide sensors in the kiln room.

Section 233425 – Dust Extraction Systems

1. Provide dust collection systems in spaces as directed by program need such as wood shops, construction labs, etc. Consult with Owner for application.
2. Locate dust collectors on the exterior of the building, as close as possible for the area of use. Provide dedicated dust collector for each space.
3. Dust collectors shall be once-through type. Recirculating dust collectors can only be used with authorization from the Owner.
4. Provide exhaust ductwork to equipment with connection points and a minimum of one floor cleanup connection. Design ductwork to a pressure rating 150% greater than the maximum pressure developed by the dust extraction equipment.
5. Provide sound attenuation.
6. Provide local control via wall switch.
7. Coordinate fire alarm and fire sprinkler requirements.
8. Basis-of-design manufacturers is Donaldson Torit Cyclone.

Section 234100 – Air Filters

1. Provide disposable filter system during the construction period. If HVAC equipment will operate during construction, provide disposable filtration media at all return and exhaust grilles within the construction area, minimum MERV 8.
2. During construction and prior to TAB and system commissioning, furnish and install filter, holding metal frames and disposable filter media with a rating of MERV 8 for the metal frames at all equipment associated with construction.
3. Prior to TAB and system commissioning, remove disposable filter media and provide one set of permanent filters at all equipment as described below. Provide a second set of identical filters to be used for first filter replacement.
    A. For dedicated outside air units and/or units with dedicated outside air coil(s), provide four-inch filter racks with MERV 13 filters at the outside air intakes.
    B. For units without a dedicated outside air coil, provide four-inch filter racks with MERV 8 filters in the mixed air section prior to the coils.
4. Select filters based on maximum 400 fpm face velocity or recommended velocity of the manufacturer, whichever is lowest.

Section 235200 – Hydronic Boilers

1. Provide hydronic boilers with the following performance criteria:
    A. Low-NOx, less than 30 ppm
    B. Full-modulation 7:1 turndown (100% - 14%)
    C. Use life cycle cost analysis and energy performance criteria for guidance on selection of the hydronic boiler type.
    D. Condensing: 96% efficient when low-load/low-temperature operation is anticipated (such as dehumidification loads). Condensing boilers shall have either stainless steel firetubes or cast aluminum heat exchangers.
    E. Non-condensing: 88% efficient for heating loads. Select vertical copper-finned tube boilers (where floor area is limited), or horizontal cast-iron boilers.
    F. Integral pumps for primary-secondary variable flow pumping configuration.
    G. Integral controls with remote signal from BAS for enable/disable and temperature reset.
    H. Integral boiler controls will be designed to operate in lead-lag fashion, with automatic enabling of lag boiler upon failure of lead boiler.

Section 236410 – Chilled Water Systems

1. Provide chilled water systems with the following performance criteria:
    A. If building load is 500 tons or greater: centrifugal water-cooled chillers
    B. If load is between 300 and 500 tons: Scroll or screw type, water-cooled chillers.
    C. If load is less than 300 tons: Scroll or screw air-cooled chillers
2. Provide a life cycle cost analysis as a justification for the chiller technology utilized.
3. Design team shall adjust the number and/or capacity of chillers to ensure that:
    A. Failure of a single chiller will always leave the facility with at least 60% of total cooling capacity;
    B. Central plant can effectively unload to meet cooling requirements under partial occupancy conditions down to 15% of the capacity of a single chiller.
4. Chiller selections and design schedules shall include required performance (capacity and efficiency) at full-load, 75% load, 50% load, and 25% of capacity.

5. Factory test centrifugal chillers in accordance to AHRI procedures with zero tolerance for full-load capacity and efficiency.
6. Test chillers at 100%, 75%, 50%, 25% of capacity with constant 85°F entering condenser water temperature. Deviations from specified performance shall not exceed standard AHRI values.
7. Thermal Storage Systems: All chiller plant designs shall include provisions for future installation of a "packaged" thermal energy storage system. The basis-of-design shall include: 40-foot x 40-foot exterior yard, valved flanges, and power connections for a 130-ton chiller and pump.
8. Chillers shall operate in a variable flow pumping configuration, in either a primary-secondary, or primary-only configuration.
9. For primary-secondary systems, each chiller shall have a dedicated (primary) chilled water pump is controlled by the chiller. With the use of dedicated pumps, no automatic isolation valves at the chillers are necessary.
10. Chiller controls shall include a BACnet interface that will allow for the following remote signals from the building automation system:
    A. Enable/disable (hardwired)
    B. Demand limit
    C. Supply chilled water temperature reset
    D. Monitoring chiller parameters (refer to controls standards)

Section 236420 – Cooling Towers / Fluid Coolers

1. Provide all stainless-steel cooling towers unless there is a written request for deviation by design team and approval by Owner. Coordinate all specification requirements with manufacturer's warranty requirements.
2. Motors rated for inverter duty are required.
3. Locate motors outside the air stream. Provide TEFC or Marine Duty motors when recommended by design team and accepted by Owner. Provide premium efficiency and inverter duty rated shaft ground rings.
4. Provide flow control valves where multiple hot water basins are used. Provide cold-water basins complete with depressed outlet sump having debris screen, overflow connection,

equalization connection, electrical basin immersion heater, and automatic electronic controlled make-up water valve.

5. Provide insulated and heat traced make-up water piping with aluminum jacketing. Consider installing the cooling tower makeup water connection on the suction side of the condenser water pump suction to avoid routing domestic water outside of the building.
6. Provide equalization pipeline between tower basins for multiple tower installations. Provide equalization pipeline at least one size larger than the size of the pipeline returning to the condenser water pump.
7. Each cooling tower fan shall have a protective discharge guard of non-corrosive materials. Provide ladder, handrails, and platform around the elevated areas of the cooling tower that require maintenance access.
8. Provide one VFD per fan.
9. Carefully coordinated cooling tower location for consideration of aesthetics, acoustics, performance, and maintenance. If installed above the roof, towers must have elevation for drainage under the unit. Provide drift eliminators and sound attenuation features.
10. Provide schedule 40 black steel and epoxy coating for cooling tower piping. Polypropylene piping is acceptable with written request by design team and approval by Owner.
11. The tower will include a condenser water bypass. Design team will provide a recommendation if basin heat is necessary.
12. Provide vibration sensor and oil level switch with connection to building automation system.
13. Provide water meters on tower make-up and blow down with connections to building automation system.
14. Tower piping shall have two access points with butterfly valves for tying into temporary cooling tower.
15. Closed-loop fluid coolers shall be provided with redundant spray pumps set up in lead-lag fashion with automatic start of lag pump upon failure of lead pump.

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

1. Design casings specifically for weatherproof operation and provide with weatherproof roof mounting curbs flashed into roof membrane and enclose all ducts and conduit penetrations associated with the unit.
2. Provide casings with two-inch thick minimum, double-wall and insulated to prevent condensation, with thermally-broken structure. Manufacturer shall provide data to demonstrate that no part of the unit will condense when exposed to outdoor ambient conditions.
3. Provide draw-through airflow configuration.
4. Use multiple, variable speed plug or plenum fans where feasible.
    A. Provide individual means of disconnect and motor overload protection for each fan.
    B. Fan arrays shall include back draft dampers.
    C. No blank-off plates allowed.
5. Provide field installed variable speed drives.
6. Provide interior lights and glass inspection ports on the fan section and coil section.
7. Provide hinged doors with lockable handles.
8. Provide TEFC motors with inverter duty shaft ground rings.
9. Provide stainless steel and ASHRAE compliant drain pans.
10. Provide interlaced, cooling coils made of copper tubes and aluminum fins. A maximum face velocity of 400 FPM is required.
11. Provide modulating compressor technology for single compressor or leading compressor applications.
12. Provide hot gas reheat or similar proven technology to control relative humidity in the occupied space.
13. Gas-fired furnaces are the preferred heating source. Furnace shall have modulating control to 30% of full rated capacity.
14. Electric resistance heat is not permitted.
15. Provide non-fused disconnects for roof-mounted and ground-mounted mechanical equipment remote from the units.
16. Solid state integral controls compatible with the Tridium BACnet system are required.
17. Interface for remote control from Owner's building automation system are required.

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

1. Air handlers shall be factory assembly and tested for leakage at the factory. Modular, field-assembled air handlers shall be avoided but shall be considered if required by space constraints. Modular field-assembled units 5000 cfm and higher will be field-tested for leakage by manufacturer's representative.
2. Provide draw-through airflow configuration.
3. Use multiple, variable speed plug or plenum fans where feasible.
    A. Provide individual means of disconnect and motor overload protection for each fan.
    B. Fan arrays shall include back draft dampers.
    C. No blank-off plates allowed.
4. Mount fan motors within the air handler casing on vibration isolators. Provide slide-out blower assembly where feasible and extended lubrication lines to the exterior of the casing.
5. Provide field installed variable speed drives.
6. Provide interior lights and glass inspection ports on the fan section and coil section.
7. Provide hinged doors with lockable handles.
8. Provide TEFC motors with inverter duty shaft ground rings.
9. Provide stainless steel and ASHRAE compliant drain pans.
10. Provide 6-rows cooling coils made of copper tubes, aluminum fins, and stainless-steel frame. A maximum face velocity of 400 FPM is required.
11. Where air handling units are installed exposed to the weather, provide casings specifically designed for exterior installation. Where installed on roofs, provide a weatherproof roof mounting curb flashed into roof membrane and enclosing all ducts and conduit penetrations associated with the unit.
12. Provide double-wall and insulated air handling unit casing to prevent condensation, with thermally-broken frame. Manufacturer shall provide data to demonstrate that no part of the unit will condense when exposed to outdoor ambient conditions.
13. Provide outside air intakes sized and shielded to prevent water intrusion.
14. Provide all chilled water coils with a condensate overflow sensor that will cause the Building Automation System to close the chilled water valve and shut down the unit upon detection of high condensate level.

Section 238146 – Water-to-Air Heat Pumps

1. Provide a dedicated vertical water source heat pump. Use of console or above ceiling units requires specific approval by Owner.
2. Provide decoupled outside air units for ventilation air.
3. Install units in dedicated mechanical rooms meeting all the requirements for access and maintenance outlined.
4. Cabinet casing insulation shall meet requirements for fire resistance (NFPA 90), mold-growth (UL-181), and ASTM standards for resistance to fungal and bacterial growth.
5. Two stages of heating and cooling are required.
6. Provide ECM motors for variable speed control
7. Provide two position, automatic isolation valves.
8. Fully insulated refrigerant and water piping are required.
9. Provide insulated stainless-steel drain pan with solid state overflow protection
10. Provide solid state integral controls that can interface with Owner's Triduum BACnet Building Automation System.
11. Provide a field mounted flexible piping and valve package.

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DIVISION 26 – ELECTRICAL

The following full specifications sections for Division 26 are included in Appendix A. Editable files are available from the Owner. Design teams shall edit each specification to the requirements necessary for the project and include each in the project manual in accordance with required contractual deliverables for each phase. Additional items associated with Division 26 are listed below. In Appendix A:

Section 260100 – Commissioning of Electrical Systems

General Requirements

1. Install panels in dedicated electrical rooms only unless otherwise noted.
    A. Provide recessed panelboards the kitchen.
    B. Panelboards in mechanical rooms are allowed if the panelboard only serves loads within the mechanical room.
    C. Provide a panelboard dedicated to MDF (telecom) equipment loads. Locate this panel in the MDF room. Feed the AC system serving the room from this panel. Provide connections for a portable emergency generator hook-up.
    D. Do not install panels in corridors or custodial rooms.
2. Provide a minimum of 10% branch breaker space and 20% capacity on all branch circuit panelboards
3. Provide a maximum of 42-poles per panelboard section.
4. Provide a minimum of two 20-amp receptacle circuits per standard size studio. Do not share circuits between studios and adjacent corridors or other rooms.
5. Renovation work:
    A. Prior to commencing work in existing buildings, contractor shall test all existing systems affected by the work. Submit a report of any defects in the system to the Owner. Consider all systems in good working condition at the start of the project if a report is not available.

   B. Provide updated typed circuit directory for all panelboards affected by work. Trace and verify all existing circuits to remain served by each panelboard affected by the work.
   C. Coordinate down times of power and other services with the Owner at least two weeks in advance.
6. Protection against noise and vibration: Refer to *Chapter 5, High Performance Design* for additional information.
7. Refer to *Appendix C, Acceptable Manufacturers List* for list of acceptable manufacturers for electrical equipment.

Section 260519 – Low-Voltage Electrical Power Conductors and Cables

1. Provide conductor material as follows:
   A. Copper
2. Provide THHN-THWN or XHHW-2 insulation.
   A. Cables in feeders and branch circuits exposed to sunlight or above roof-tops shall have type XHHW-2 insulation.
3. Provide solid conductors for sizes #10 AWG and smaller.
4. Provide stranded conductors for size #8 AWG and larger.
5. Power Cables (AC, MC, etc.) are not permitted excepted as noted below:
   A. Provide MC cables for runs 72-inches and less in length from junction boxes to light fixtures (i.e. fixture whips) in unfinished spaces or where concealed above an accessible lay-in ceiling.
6. Minimum conductor size for interior work is #12 AWG.
7. Minimum conductor size for exterior underground work is #10 AWG.
8. Provide purple colored jacket for MEP equipment utilizing CAT-5/5e/6/6a cabling. Refer to Communications Cable Plant Specifications 271300 for additional cabling requirements.
9. Install all low-voltage wiring within a conduit at all elementary and middle school stages and all high school theaters or auditoria.

Section 260526 – Grounding and Bonding for Electrical Systems

1. Provide grounding and bonding of telecommunications rooms in compliance with the latest TIA 607 standard.
    A. Provide telecommunications grounding busbars in each telecommunications room and telecommunications bonding backbone conductors per the TIA 607 standard.
    B. Provide bonding of racks, trays, etc. with telecommunications rooms per the TIA 607 standard.

Section 260533 – Raceway and Boxes

1. Conceal raceways within walls or above finished ceilings in finished spaces in all new construction.
    A. Exceptions:
        i. Surface raceway products above counters in labs if part of the design.
        ii. In finished, dry spaces with exposed structure ceilings such as gymnasium, exposed EMT is allowed above the bottom cord of joists within the space. Paint EMT to match adjacent surfaces.
        iii. Existing masonry walls in renovation projects
2. Conceal raceways in renovation projects to the greatest extent possible in finished spaces in renovation projects. If exposed raceway is the only option, provide a paintable surface metal raceway such as Wiremold products.
3. Do not route raceways horizontally on roofs or elsewhere exposed to sunlight in lengths greater than five feet.
4. Limit the use of flexible raceways to lengths of 72-inches and less and the following applications:
    A. Connections to equipment subject to vibration such as motors, transformers, elevators, etc.
    B. Connections to light fixtures.
5. Floor boxes and poke-thru boxes shall have heavy-duty metallic covers.
6. Install Sleeves where low-voltage conductors pass through walls.

7. Provide manufactured sleeves for low-voltage cabling that pass through rated walls specifically for this application with an intumescent material that allows the sleeve to remain open for cable modifications.
8. Provide plenum-rated insulated bushings on the ends of all conduit stub-ups and sleeves used for low voltage cabling.

Section 260536 – Cable Trays

1. Provide wire-mesh basket cable trays with electroplated zinc finishes for low voltage telecommunications cabling.

Section 260553 – Identification for Electrical Systems

1. Provide labels constructed of phenolic plastic or similar material and engraved with lettering 3/8-inch high minimum. Provide white lettering on a red background for items related to an emergency or stand-by power source. Provide black lettering on a white background for all other items.
2. Provide a label for each panelboard. Labels shall include the following information:
    A. Panelboard name
    B. Fed from
    C. Voltage, phase, wire configuration
    D. Color of each phase, neutral and grounding conductors in the panel.
    E. Available fault current
    F. Date
3. Provide arc flash hazard labels per NFPA 72E for switchboards and panelboards.
4. Coordination and arc-flash studies shall be conducted by the equipment manufacturer or approved equal.
5. Discuss requirements for power studies for renovation projects with the Owner.
6. Provide a label for each transformer.
7. Provide a label for each disconnect.

8. Provide typed circuit directories for each panelboard and relay panel. Directories shall use the Owner's final room numbers which may not match the room numbers on the construction documents.
9. Provide underground-line warning tape containing a detectable metallic core directly above all buried electrical and telecommunications lines and 4- to 6-inches below finished grade.
10. Label junction box covers with panelboard and circuit number information. Label junction boxes exposed in finished spaces on the inside of the junction box cover. Use permanent marker or machine printed labels.
11. Label conduits at panelboards and where conduits penetrate walls with panelboard and circuit number information. Use permanent marker or machine printed labels.
12. Provide labels on equipment indicating warranty expiration dates.
13. Provide machine printed labels on the cover plate of each wiring device identifying panelboard and circuit number.

Section 260923 – Lighting Controls

1. Provide lighting controls to meet current emergency codes, sustainability goals, and requirements of this document. Refer to *Chapter 3 – Energy, Water, and Sustainability* for additional information.
2. Provide local occupancy/vacancy sensor control for studios and smaller spaces.
    A. Sensors shall provide for 100% coverage of space served and utilize the appropriate technologies to minimize false off situations.
    B. Stand alone controls for each space are preferred over networked systems. The Owner has no need for monitoring, remote control, nor interfacing of lighting controls.
    C. Lighting controls shall not be used in combination for non-lighting systems such as electrical outlets.
3. Provide relay-based lighting control panels for corridors, and large spaces such as gymnasiums and commons.
    A. A master relay panel shall contain an astronomical time clock and allow for scheduling of on and off times as well as nightly off sweeps.

   B. Network all relay panels in a building together.
      i. Networked relay panels serving an individual studio or pair of studios are not required.
      ii. Relay panels do not require an interface with the Building Automation System but must have BACnet interface capability to tie into the Building Automation System in the future.
4. Provide daylight harvesting as required by code.
5. Provide dimming down to 10% minimum in all studios, conference rooms and other educational spaces. For all other regularly occupied spaces, including kitchens, provide at least three lighting levels using task lighting, multi-mode lighting or dimming.
6. Provide separate control for a 'Projector Zone' in each space equipped with a projector.
7. Provide wireless controls for all exterior lighting.
   A. Provide reduced light levels during unoccupied hours and as required by code.
   B. Motion sensors on all exterior light fixtures shall allow light levels to raise if motion is detected during unoccupied hours.
8. Refer to *Chapter 5, Safety and Security* for additional lighting requirements.
9. Refer to *Chapter 5, Section 260519,* for additional low voltage cabling requirements.

Section 262000 – Electrical Distribution Equipment

1. Switchboards: Copper or aluminum bussing allowed
2. Panelboards: Copper bussing only
3. Provide sub-metering of different load types as required by the project sustainability goals and energy codes. At a minimum for new projects provide separate metering of the following:
   A. Total Electrical Energy
   B. HVAC Systems
   C. Interior Lighting
   D. Exterior Lighting
   E. Receptacles
4. Meters shall be monitored by the Building Automation System. Refer to *Chapter 5, Section 230926 – Building Automation Systems* for additional information.

5. Solar ready:
    A. Electrical interconnection: Design shall include provisions for a solar interconnection to the electrical service with minimal cost and distribution. Interconnection must comply with the National Electrical Code and local utility requirements. Calculate the potential size of the array in kilowatts and submit a record of the calculations to the Owner.
    B. Solar-ready zone: Design shall also include a designated area on the building roof for the solar array. Size the array to approximately half of the open roof area as calculated per the local Solar Ready ordinance.
    C. Structural capacity: The structural design of the roof areas designated for a future solar array shall account for the load of the solar array.
    D. The design must meet the requirements for Solar Ready as defined by local ordinance.
6. Electric vehicle (EV) ready:
    A. Design shall include designated space for future type 2 electric vehicle charging stations. Coordinate quantity and locations with the Owner. Coordinate extent of scope with Owner. At a minimum provide conduit with pull string to the designated EV station locations. Include loads for EV stations in building load calculations and size transformers and panelboards to accommodate EV station loads.
    B. Refer to *Chapter 5, Site Design Requirements – EV Charging Stations* for more information.
7. Surge suppression devices (SPD): Provide SPD's on switchboards and panelboards and integral to the equipment.
8. Provide non-fused disconnects for roof-mounted and ground-mounted mechanical equipment remote from the units. Group and gang disconnects within sight of units served and within 50-feet of the units served. Label disconnects with name of unit served.
9. Do not include phase-loss and undervoltage protection in switchgear, switchboards, or panelboards. Provide motor protection at the starter/VFD.

Section 262726 – Wiring Devices

1. Provide wiring devices rated for 20-amps minimum.
2. Provide type 302 stainless steel faceplates in the kitchen. Provide unbreakable plastic or nylon construction faceplates in other areas.
3. Provide isolated ground receptacles for MDF and IDF rooms. Provide orange cover plates.
4. Provide all 120V, 20 amp receptacles as tamper-resistant.
5. Review needs with Owner for a 208V/single-phase, 30-amp circuit for copy machines at facilities with larger volume.

Section 262923 – Variable Frequency Devices/Motor Controllers (VFD)

1. Refer to *Chapter 5, Section 230500 – Common Work Results* for HVAC for requirements.

Section 263200 – Generators

1. Generators are optional unless noted otherwise below. Backup power for light fixtures shall be provided by fixture-mounted batteries and not by generators or central inverters unless specifically requested by the Owner's PM.
2. Generator manufacturers shall have a service center that is able to make an emergency call response within 24 hours and is located within 50 miles of site.
3. Provide on-site generator as the emergency power source for legally required standby loads as determined by the project design team or as directed by the Owner.
    A. Sites containing a telecommunications Super-Node shall be equipped with a generator.
4. Natural Gas or Diesel generators are acceptable. Natural gas is preferred if acceptable to the Authority Having Jurisdiction.
    A. Diesel
        i. In-skid tank sized for 48 hours of operation at 100% load.
5. If a generator is not provided, provide a connection for a mobile generator to power main telecom rooms (MDF). Provide a manual transfer switch and distribution to allow ease of connection and transfer of power source.

Section 264100 – Lightning Protection

1. Provide lightning protection systems for all supernode automation facilities (data centers).
2. Provide risk analysis and value engineering to determine the need for lightning protection systems at other facilities.

Section 265000 – Lighting

1. All light fixtures shall utilize LED's as the source of illumination.
2. Comply with City of Austin Outdoor Light Ordinance and LEED v4 SSc Light Pollution Reduction for exterior lighting for backlight/uplight/glare.
3. Light fixtures shall contain long-life LED's with L70 rating of 60,000 hours minimum.
4. Light fixtures shall contain a lens or other shielding means to eliminate direct view of the bare LED's.
5. Provide 5-year warranty on all light fixtures.
6. Design light levels per IESNA.
7. Provide recessed 2x4 LED, low-profile, volumetric distribution, center basket design, with curved ribbed diffuser for fixtures at studios.
8. Color temperature: 3500K for interior lighting; 5000K for exterior lighting or as required by Authority Having Jurisdiction.
9. Coordinate with Owner to determine needs and locations for color tuning fixtures on a project-specific basis.
10. Provide light fixtures with a minimum color rendering index (CRI) of 80 for all interior lighting.
    A. Exception: Special use, color effect lighting.
11. Provide light fixtures with a minimum CRI of 70 for all exterior lighting.
12. Provide light poles with the following characteristics:
    A. Round, tapered
    B. Steel or aluminum
13. Exterior lighting shall cut-off at the property line.
14. Provide fixture-mounted batteries for emergency power egress fixtures.

Section 265561 – Theatrical Lighting

1. All Theatrical lighting fixtures shall be ETC fixtures or equivalent. LEDs are desired for all projects. (Please consult with someone from Tech Theatre)
    A. ETC Cyclorama lights, ETC Source 4 Pars, and Chauvet 6”-10” Fresnels shall be LED.
    B. ETC Source 4 Ellipsoidals may be tungsten lamps if value engineering is required for respective project.
    C. ETC ColorSource Spot LED Zooms are acceptable fixtures for middle and high school theaters.
    D. ETC SourceSpot LED Jr. Zooms are acceptable fixtures for elementary and middle school cafetoriums.
    E. DMX shall transfer information to any color changing/macro effects LEDs. Raceway 5-pin DMX or RJ45 Ethernet shall run with electrical or wireless 5-pin DMX transmitter/receivers. Furnish for each electric batten and light board. Consider using remote plug-in stations with 5-pin DMX or RJ45 Ethernet cable.
    F. Provide power for each of the LEDs (stage-pin, twistlock, Edison). Power for LEDs varies from basic theatrical fixtures. LEDs require different type of dimmer, ETC R20 or CC20, compared to ETC D20 dimmer (20 amp) if the location is being built with a dimmer rack. Most LED and moving light fixtures (including those made by ETC) require an unregulated power source.
    G. Provide light plots at all campuses as follows:
        i. At minimum, Elementary School light plots must include:
            a. 9-top ETC LED Pars
            b. 5-ETC LED Cyc fixtures
            c. 12-ETC ColorSource Spot Jr. Zooms (LED)
        ii. At minimum, Middle School light plots must include:
            a. 9-top ETC LED Pars
            b. 5-ETC LED Cyc fixtures
            c. 18-ETC LED ellipsoidals (warm and cool face)
            d. 15- LED Chauvet
        ~~iii.~~ At minimum, High Schools with prosceniums widths between 30 feet and 35 feet must include basic:
            a. 9-15-top ETC LED Pars, including face light fixtures

b. 7-ETC Cyc LED fixtures
c. 30-ETC LED ellipsoidals
d. 21-LED Chauvet

iv. At minimum, High Schools with proscenium widths 50 feet or wider must include a UIL 15 area light plot with:
a. 15-top ETC LED Pars,
b. 7-ETC Cyc LED fixtures
c. 30-ETC LED ellipsoidals
d. 21-LED Chauvet

v. Optional (Beyond UIL Standards and as requested by Owner):
a. 15-21 LED Chauvet

vi. Refer to *Appendix C, HS UIL Plot Plan* and *Appendix C, MS UIL Plot Plan* for lighting plot plans.

H. Installation shall meet applicable standards, codes and the following University Interscholastic League (UIL) resources:
i. https://www.uiltexas.org/files/academics/theatre/26th_AMENDED_Handbook_BOOK_2020_2021.pdf
ii. https://www.uiltexas.org/theatre/resources/recommended-facilities-for-hosting-one-act-play-contests

2. Dimmer racks, if required, shall be at least an ETC Sensor CEM3 Dimmer rack or equivalent.
3. All Theatrical entertainment control boards should be solely ETC light boards.
A. If dimmers are required for non-LED purposes, adjust the specification to meet standards and be upgradable for future purposes.
B. Provide ETC Echo at all Elementary Schools.
i. The system should allow for a minimum of 80 channels.
ii. Provide a touch screen control panel.
iii. Design space with accessible outputs, giving the ability to add a console if needed.
C. Provide either ETC Echo or Paradigm at all Middle Schools based on individual program needs.
i. The system should allow for a minimum of 80 channels and have at least one touch screen control.

D. Provide ETC Paradigm at all High Schools.
    i. The system should allow for at least one mounted touch screen and one portable touch screen control.
    ii. Provide portable network distribution to allow for portable control.
    iii. Provide network bases with multiple network ports where DMX is required.

4. General Lighting: Provide general / work lighting to illuminate stage areas without the use of specialized theatrical lighting.
5. Electrical Requirements: Design should clearly state electrical requirements for theatrical lighting and related systems, including:
    A. Voltage/phases
    B. Amps or kilowatts (coincident demand, not sum of loads)
    C. Power conditioning
    D. Uninterruptible power supplies (UPS)
    E. Grounding
6. HVAC Requirements: Design should clearly state HVAC requirements for theatrical lighting and related systems, including:
    A. Maximum coincidence cooling load/rejected heat in Btu/Hr (not the sum of the installed capacity).
7. Coordinate design with Owner representatives, including but not limited to Owner's Project Manager and Performing Arts technical staff.
8. Provide electronic copies of all system programming in close-out documentation.

DIVISION 27 – COMMUNICATIONS

The following full specifications sections for Division 27 are included in Appendix A. Editable files are available from the Owner. Design teams shall edit each specification to the requirements necessary for the project and include each in the project manual in accordance with required contractual deliverables for each phase. Additional items associated with Division 27 are listed below. In Appendix A:

Section 271300 – Structured Cabling Infrastructure
Section 272100 – Data Communications Network System
Section 274116 – Integrated Audio-Video Systems and Equipment for Studios
Section 275313 – Clock Systems
Section 275319 – Public Address Standards

Section 274116 Audio Video Systems

1. Designer shall contact the Owner to determine the requirements of A/V Systems for each space.
2. Provide all required cabling, raceways, boxes, etc. for a complete working installation.
    A. Equipment furnished by the Owner for each learning space may include:
        i. Projector (or TV)
        ii. Mounting brackets
        iii. Speakers
3. Refer to *Appendix C, OFCI/CFCI Matrix* for furnishing and installation responsibilities for Audio Video Systems and equipment.
4. Include A/V systems for spaces other than learning spaces in the building contract. Provide an A/V system for each of the following spaces:
    A. Gymnasiums
    B. Commons
    C. Other spaces as directed by the Owner

Section 275313 Clock System

1. Renovation projects
    A. Provide secondary clocks compatible with the existing synchronous clock system. Replace entire system if directed by Owner. Coordinate scope of work with Owner. Set a coordination meeting with NSS to verify exact scope of work prior to design activities.
    B. Refer to *Appendix A – Full Specifications* for Owner's current specification.
2. New construction projects
    A. Provide a complete synchronous clock system consisting of IP clocks. Integrate the system with the class/bell schedule. Coordinate scope of work with the Owner.

Section 275319 Public Address Standards

1. Renovation projects
    A. Coordinate scope of work with Owner.
    B. If expanding upon an existing system, provide system components compatible with the existing intercom system.
2. New construction projects
    A. Provide a complete paging and scheduling system as directed by the Owner.
3. Refer to *Appendix A – Full Specifications* for Owner's current specification.

DIVISION 28 – SAFETY AND SECURITY SYSTEMS

The following full specifications sections for Division 28 are included in Appendix A. Editable files are available from the Owner. Design teams shall edit each specification to the requirements necessary for the project and include each in the project manual in accordance with required contractual deliverables for each phase. Additional items associated with Division 28 are listed below. In Appendix A:

Section 280510 – Conductors & Cables
Section 280530 – Pathways for Security Systems
Section 280555 – Identification for Security Systems
Section 282810 – Supplemental Submittal Requirements
Section 280840 – Acceptance Testing of Security Systems
Section 281300 – Access Control
Section 281600 - Intrusion Detection
Section 282300 - Video Surveillance
Section 283100 - Fire Alarm System New Construction
Section 283101 - Fire Alarm System Additions & Renovations

Section 281300 Access Control

1. Refer to *Appendix A, Section 281300 – Access Control*. Ensure the following requirements are addressed.
2. Provide an access control system compatible with the district-wide system.
3. The Access Control System shall control power via a line-voltage relay to power assist door and gate operators. System shall allow power to a door operator when the door is unlocked only. System shall allow power to a gate based on a time schedule or access credential reader as directed by the Owner.
4. Access control systems may include lockdown switches at receptionist desk(s) and other locations designated by the Owner. Lockdown switches shall activate barrier systems restricting movement of building occupants during emergency situations.
5. Refer to *Chapter 5, Safety and Security* for additional information.

Section 281600 Intrusion Detection

1. Refer to *Appendix A, Section 281600 – Intrusion Detection.*. Ensure the following requirements are addressed.
2. Provide intrusion detection systems in locations as directed by the Owner.
3. Intrusion detection systems shall include duress/panic switches at reception desk(s) and other locations designated by the Owner.
4. Refer to *Chapter 5, Safety and Security* for additional information.

Section 282300 Video Surveillance

1. Refer to *Appendix A, Section 282300 – Video Surveillance*. Ensure the following requirements are addressed.
2. Provide video surveillance systems as directed by the Owner.
3. Refer to *Chapter 5, Safety and Security* for additional information.

Section 283100/283101 Fire Alarm / Emergency Communications System

1. Refer to *Appendix A, Section 283100* for new construction and *Appendix A, Section 283101* for additions and renovations. Ensure the following requirements are addressed.
2. Systems shall be addressable. Provide addressable alarm initiation devices.
3. All systems shall include voice evacuation.
4. Provide re-recorded messages in English and Spanish for:
    A. Fire
    B. Severe Weather
    C. Intruder Alert
5. Utilize system speakers for general paging.
6. Provide a remote dialer for the system.
7. Provide a local operators console in the administration suite. Coordinate exact location with Owner.
8. In addition to smoke detection required by code, provide smoke detection in corridors, custodial closets, storage rooms, utility rooms, and other unoccupied areas.
9. The Owner prefers the use of Silent Knight addressable duct detectors over area smoke detectors as the required means of smoke detection through ventilation systems.
10. Provide manual pull stations at location required by the Owner.
11. Contractor shall submit proposed fire alarm plan to the Owner.

DIVISION 31 – EARTHWORK

Section 311000 – Site Clearing

1. Provide design and submittals for tree protection materials in cut and fill conditions. Materials include:
    A. Arborist certification requirements;
    B. Construction phasing plan;
    C. Perforated sub-drain pipe;
    D. Clean drainage aggregate;
    E. Recycled wood mulch; and
    F. Filter fabric.
2. Protect all existing trees including heritage trees, per the City of Austin, during construction.
    A. New School Sites: Obtain the services of a certified Arborist during project design to prepare an existing Tree Inventory
    B. Existing school sites: Obtain an existing tree inventory and health conditions assessment study from the project Arborist.
    C. Arborist report to include evaluation of existing trees on site and provide to the Owner's urban forester or arborist for review and comment.
    D. Arborist to prepare a tree protection plan to include fencing, grading limitations, and specified penalties for violation during the construction duration. Outline penalty requirements in the Construction Documents.
    E. Establish structural root plate area and critical root zone (CRZ) for trees in construction areas.
    F. Provide root bridging details for walks or other site improvements within tree's structural root plate.
    G. Do not allow scraping of soil materials below existing trees with heavy machinery or track-type equipment (like a Bobcat). Specify use of equipment with turf tires if access is required in these areas.
    H. Existing "living mulch" like ground covering plants or other native vegetation below existing trees to remain shall be undisturbed. Add organic mulch, aerate, and replant with additional green mulch plantings where possible.

I. Use Arborist-approved methods for excavating around tree roots to install utilities, pavements, and irrigation including careful soil removal around roots with an air spade or air knife to not damage or cut critical roots.

J. De-compact soils within critical root zone by drilling 2-inch diameter holes at 6-feet centers and fill with mix of bio-char and slow release fertilizer materials as recommended by Arborist.

K. Provide protection fencing in locations as determined by arborist and coordinate before contractor mobilization.

3. Lightly mulch critical root zone areas and plant with low native groundcover per *Appendix C, Recommended Plant List*.
4. Chimney Swifts and Cliff Swallow birds
    A. Under the Migratory Bird Treaty Act, it is illegal to disturb or kill the birds, their eggs or their young during demolition or remodeling of existing school buildings and stadiums. Chimney Swifts and Cliff Swallow birds are migratory and typically arrive in the Austin area in March and are usually gone by November 1st.
    B. Contact https://travisaudubon.org/ for more information.
    C. Building structures and chimney-type spaces are not protected if the birds are not present on site. Structural maintenance and demolition are allowed without a permit during the time the birds are not in the area (November through February)
    D. Structural integrity of the chimneys is as important to the birds as it is to the public. The State Audubon Society recommends "structural repair" before "structure removal" is contemplated.
    E. If structural maintenance or demolition of a building is required when birds are on-site, the Owner/Contractor can apply for, and obtain a Depredation Permit.
    F. If preservation of a chimney for use by Chimney Swifts is going to be problematic, the Owner/Contractor may block the top opening of the chimney during the time the birds are not present, or prior to their return in March. Obstructing the protected birds is not a violation; however, once the birds are present, they are protected by state and federal statutes.
5. Design team will include a Phase I Environmental Site Assessment to identify/locate other threatened habitats, environmental conditions, and historic land uses. Other threatened species include the Cliff Swallow and Gold Creek Warbler. Environmental conditions include karst topography, potential environmental contamination, or historic mining activity.

1. Satisfactory Soils (structural fill areas): Soil Classification Groups GW, GP, GM, SW, SP, and SM according to ASTM D 2487 or Groups A-1, A-2-4, A-2-5, and A-3 according to AASHTO M 145, or a combination of these groups; free of rock or gravel larger than 3 inches (75 mm) in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
2. Drainage Course: Clean aggregate as defined in Division 33 Sub-Drainage. Provide aggregate layer that supports slabs-on-grade, but also minimizes upward capillary flow of water.
3. Soil Excavations: Excavated soil materials shall be kept onsite for use in landscaping, berms, etc.
    A. Work with the existing natural grade where possible. Avoid scraping off existing topsoil and replacing it with "sandy loam", a subsoil with temporary organic matter.
    B. Blackland clay is a very fertile soil to place in lawn and landscape planting areas, even though it may be difficult to spread and level.
    C. Caliche-type soils (west of I-35) can remain on sites and are suitable for plantings of trees and plants that are adapted to those soils. Refer to *Chapter 5, Division 32 – Exterior Improvements* for plant materials that are adaptable to these soils.
    D. Ensure any fill soils imported to the site within planting areas complies with Austin Environmental Criteria Manual (ECM) soil specifications. Soils referenced as “red death” and “chocolate loam” are not permitted.
    E. Minimize site grading and allow for the natural sheet drainage flows pre-site development to move storm water run-off to existing trees, plants and native meadow areas to maintain plant health.
    F. Site grading plans will be reviewed by Owner’s staff and Urban Forester prior to construction.
4. Topsoil: Stockpile loamy soils with organic materials found on-site within the “A” horizon on-site and retained for re-use in all planting and lawn areas. Removing of any topsoil off-site requires approval the Owner.
    A. Scrape and remove existing turf grasses and duff layer prior to stockpiling of topsoil. Do not intermix turf or vegetation into stockpiled topsoil materials

Section 313116 – Termite Control

1. The administration of pre-construction-termite control should be evaluated on a case by case basis with three options to consider:
    A. Option 1: No application of termite control measures. Preferred method for projects with small quantities of wood.
    B. Option 2: Termite Control Physical Barrier Method. Install non-chemical physical barriers compliant with Owner's IPM Plan that prevent subterranean termites from entering a building to be considered for projects with large quantities of wood. Options Include:
        i. Termite/Vapor Barrier Wrap, a multi layered plastic extrusion installed under slab compliant with ASTM E1745 Class C, ASTM F1249, ASTM 01709
        ii. Stainless steel mesh, mesh size between 0.44 and 0.66 mm/ <0.02 or 0.05 cm, installed on top of plumbing penetrations during early phase construction
        iii. Aggregate particle barriers, installed around exposed perimeter at prescribed width and depth according to manufacturer direction
            - Sand barrier
            - Basaltic/ granite barrier
            - For all aggregate types, use grain particle size 8 (2.36 mm), 10 (2.07 mm), 12 (1.77 mm), based on ASTM sieve size grit sand.
    C. Option 3: Chemical Termiticide. ApplyEPA approved termiticide to pretreat the site such as Termidor SC or Premise Pro.
        i. Contractor must be a commercial applicator and submit the following:
            - Current applicator's license for termite treatment and pest management by Texas Department of Agriculture (TDA).
2. Termite Treatment: to be reviewed and coordinated with the Owner's Integrated Pest Management (IPM) Foreman to verify compliance with Owner's IPM Plan.

DIVISION 32 – EXTERIOR IMPROVEMENTS

Section 321216 – Asphalt Paving

1. Provide bituminous asphalt mix designs per City of Austin and geotechnical engineer.
    A. Surface course
    B. Base course
    C. Permeable pavements will be considered for use by the Owner, if required for storm water management.
2. Specify water-based high wear pavement marking paints.
3. Provide concrete wheel stops with pavement anchors.

Section 321313 – Concrete Paving

1. Provide non-reactive concrete mixes.
    A. Permeable concrete and sub drainage systems to be considered for use if required for storm water management.
2. Provide and design concrete pavement design and subgrade preparation per geotechnical report recommendations.
3. Provide reinforced concrete within all drive aprons, heavy loading areas, and pavements or walks within drives and loading zones
4. Specify concrete sealant and joint filler at all expansion joints
5. Design and construction of construction and expansion joints per recommendations of American Concrete Institute (ACI)
6. Provide concrete curb and gutters to direct storm water and for pedestrian safety.
7. Provide 0-inch height curbs at learner loading areas. Incorporate native stone boulders into the concrete to separate drive zones form learner plaza spaces for pedestrian protection from errant vehicles. Installed boulder height to be a minimum of 18-inches above the plaza elevation to provide seating area.
8. Provide design for concrete walks:
    A. Design typical walks at 5-inch minimum thickness unreinforced.
    B. Design walks in areas subject to vehicular traffic with reinforced concrete.

9. Elementary Outdoor Play Area: Provide a minimum concrete play area at 50-feet by 72-feet, or 80-feet by 80-feet if used as an emergency access turn around.
10. Pre-K and Kindergarten: Provide a minimum concrete play area of 24-feet by 24-feet.
11. Secondary Outdoor Play Area: Provide a minimum concrete play area at 80-feet by 100-feet.
12. Provide drives at 24-feet minimum width.
13. Provide concrete wheel stops with pavement anchors.
14. Specify water-based high wear pavement marking paints.

Section 321316 – Decorative Concrete Paving

1. Provide non-reactive concrete mix approved for use in specified decorative concrete pavements.
2. Provide concrete reinforcement.
3. Specify type of integral color pigment and solar reflectivity index (SRI).
4. Specify curing and sealing materials
5. Specify Exposed aggregate finishes
6. Specify concrete joint sealant and filler materials.
7. Specify joint type for project:
    A. Sawed construction joint;
    B. Sawed joint with “V” joint;
    C. Specify reinforcing for expansion joints with diamond dowels or slip dowels.

Section 321400 – Unit Paving

1. Specify solid concrete pavers with at least 10,000 psi compressive strength as needed for design intent.
2. Specify polymeric joint sand to keep sand from washing out of joints.
3. Specify aggregate setting bed system and thickness per recommendations of the geotechnical engineer.
4. Provide heavy-duty vinyl "L"-shaped paver edge restraint with 3-inch vertical height and 4-inch horizontal leg, sim.to "Oly-Ola Edging" system or equal.
5. Concrete edge restraints (6-inch wide by 6" minimum depth) can be used as an alternate to vinyl edging. Provide continuous steel reinforcing in edge curb.
6. Specify permeable pavers in non-heavy traffic areas, if needed, as part of the storm water treatment plan for the project.
    A. Pavers must be accessible and sub-base designed to withstand required loading.
    B. Specify clean course aggregate for joint fill.

Section 321816 – Playground Cushioned Surfacing

1. Provide synthetic turf with unitary pad over sub-drain system.
    A. Provide turf selections that meet the following safety requirements:
        i. PFA free
        ii. Lead free
        iii. UV resistant
        iv. Nonflammable
        v. Anti-static infill
        vi. Organic fill with cooling properties
    B. Specify Slit film fibers with nylon or polyethylene thatch zone.
    C. Provide shorter, heavier weight nylon turf for high wear zones (under swings and slide chutes.)
    D. Face weight at 80 oz./S.Y. minimum.
    E. Specify clean infill sand to provide ballast for turf system.
    F. Provide recycled plastic lumber nailer board. Size: 2”x4”. Fasten with stainless steel concrete fasteners. Material equal to *www.blackrhinoproducts.com*
    G. Provide concrete curb for playground perimeter to contain turf or cushioned material surface and for fastening the nailer board.
    H. Specify unitary cushioned pad, 2-inch minimum thickness. Accommodate specified fall heights for play equipment per IPEMA.
    I. Crumb rubber infill utilizing recycled or shredded tires is not acceptable.
2. Unitary or Poured in Place Mat Systems
    A. Owner approval must be provided to allow use of Unitary or Poured in Place Mat Systems.
    B. Specified systems must meet ADA guidelines and fall heights.
    C. Specified systems must meet ASTM F1951 Standard Specification for Determination of Accessibility of Surface Systems Under and Around Playground Equipment.
    D. Allowable products must be ASTM F1292-13 compliant.
3. Optional use of engineered wood fiber mulch for cushioned surface over specified sub-drain system
    A. Accommodate specified fall heights for play equipment per IPEMA.
    B. Concrete curb for cushioned material containment.

   C. Sub-drainage system below engineered wood fiber mulch.

4. Sub-drainage System
   A. Provide 4-inch to 6-inch minimum depth of clean drainage aggregate below play surfacing.
   B. Provide geotextile soil separation fabric below aggregate and on top of compacted subgrade.
   C. Provide perforated HDPE pipe to daylight into storm outside of play area (no sock or filter fabric around pipes)

Section 322100 – Running Track Trench Drain

1. Submittals required for contractor experience in track and field construction. Provide experience references for at least five certified tracks per National Federation of State High Schools (NFHS).
2. Contractor to have certification as a certified Field Builder by American Sports Builder's Association (ASBA).
3. Provide slotted track channel system around interior of track to collect water from track surface.
   A. System consists of a polymer concrete with level channel and at least 8-outlet sumps per 400-meter track.
   B. Provide PVC grate system with vandal proof connectors.
   C. Provide 6-inch HDPE or PVC pipe connections from catch basin to collector pipe.
   D. Provide PVC clean-outs at ends of collector pipe runs to facilitate pipe maintenance.
4. Provide slotted linear or curved drain channel system with radiused sections to negotiate specified interior track radius.
   A. Provide polymer concrete, level channel system that is compatible with the track straight channel drains.
5. Specify integral catch basin with removable trash basket for ease of maintenance.

Section 322200 – Resilient Track Surfacing

1. Refer to the following related sections:
    A. *Chapter 5, Section 116803 - Athletic Equipment*. Coordinate surfacing with embedded track equipment.
    B. *Chapter 5, Section 321216 - Asphalt Paving*. Coordinate for tight tolerances on surface planarity and non-reactive mix design.
2. Provide structurally sprayed black mat system with the following:
    A. SBR rubber and polyurethane shock mat (1/2-inch (13-mm) thick) minimum thickness.
    B. Structural spray applied to rubber mat in two coats at 90-degree angles to each other.
    C. Coordinate track striping plan with Owner. Striping will be compliant with NFHS guidelines. Owner to review and approve striping plan to confirm track events, colors, exchange zones, etc.
    D. Provide submittal for track striping and marking paint that is compatible with track surface.

Section 322020 – Tennis Court Surfacing

1. Refer to the following related sections:
    A. *Chapter 5, Section 116803 - Athletic Equipment*. Coordinate surfacing with tennis net system and net tie down supports.
    B. *Chapter 5, Section 321216 - Asphalt Paving*. Coordinate with asphalt installer for tight tolerances on surface planarity and non-reactive mix design.
2. Provide acrylic sand leveling coat as required to eliminate any “bird baths” greater than those identified with flooding the court and covering a nickels thickness.
3. Provide acrylic color tennis court surfacing system.
4. Striping and court dimensions per United States Tennis Association (USTA).

Section 322040 – Synthetic Turf Base Construction

1. Submittals required for contractor experience in track and field construction and references for at least five certified tracks constructed in the last 5-years. Tracks to be certifiable by National Federation of State High Schools (NFHS).
2. Contractor to have current certification as a certified Track and Field Builder by American Sports Builder's Association (ASBA).
3. Refer to the following related sections:
    A. *Chapter 5, Section 312000 - Earth Moving:* Coordinate for treated sub-base soils and compaction.
    B. Include geotechnical recommendations for the subgrade design and preparation.
4. Provide clean drainage aggregate over a non-woven geotextile fabric over compacted subgrade. Fabric will minimize aggregate contamination.
5. Provide collector drain pipe (HDPE dual wall N-12 corrugated).
6. Provide composite panel drain pipe (1x12-inch perforated pipe).
7. Provide PVC clean-outs at ends of pipe at high points for maintenance.
8. Provide utility communication boxes (aluminum with cover system)
    A. Cover design to accommodate synthetic turf with rubber infill restraint system or accommodate synthetic track surfacing system.

Section 322060 – Synthetic Turf Surfacing

1. Submittals required for Contractor experience in Track and Field construction and references for at least five certified tracks per National Federation of State High Schools (NFHS).
2. Contractor to have current certification as a certified Field Builder by American Sports Builder's Association (ASBA).
3. Require 8-year field warranty for failures in turf materials, drainage, and subgrade.
    A. Required third party warrantee for correction of all equipment, synthetic turf and field sub-base failures.
    B. Include field safety testing requirements for Gmax, with test results less than 150 Gmax, or per current standards.

C. Include testing for HIC at 1.4M drop with results less than 1,000 HIC or per current standards.

4. Provide specifications for football and soccer turf type. Turf will be a 2-inch to 2.25-inch height, dual fiber (50% three-dimensional monofilament and 50% slit film) or slit film fiber with infill material per manufacturer's recommendations.
5. Provide specifications for baseball and softball turf type. Turf will be 1.5 to 1.75-inch height dual fiber turf with thatch zone to produce a consistent ball bounce. The shorter turf should be installed in the "skinned" infield and warning track areas.
6. Provide and specify sewn turf seams with glued hash or field markings.
7. Provide shock pad system for player safety. Verify need for pads for baseball and softball fields with Owner.
8. Provide shock pad system for elementary school playgrounds used for physical activities.
9. Specify infill materials per independent testing recommendations and to infill at a minimum of 70% of the fiber height to reduce premature fiber wear. Infill materials include:
    A. Sand and crumb rubber mix (consistent material diameter size of 0.02 to 0.06mm). Crumb rubber infill utilizing recycled or shredded tires is not acceptable.
    B. Sand and ground natural materials (i.e. commercially available blend of cork/coconut fibers, char-treated wood or other approved infill material).
    C. Manufacturer may recommend other materials for approval by Owner.
10. Specify turf grooming and maintenance equipment to include a tow-behind groomer, sweeper, debris collector, and magnet system as recommended for the selected infill material.
11. Contractor and material manufacturers shall certify installed materials meet current environmental and health standards, including artificial turf with Owner-approved crumb rubber.

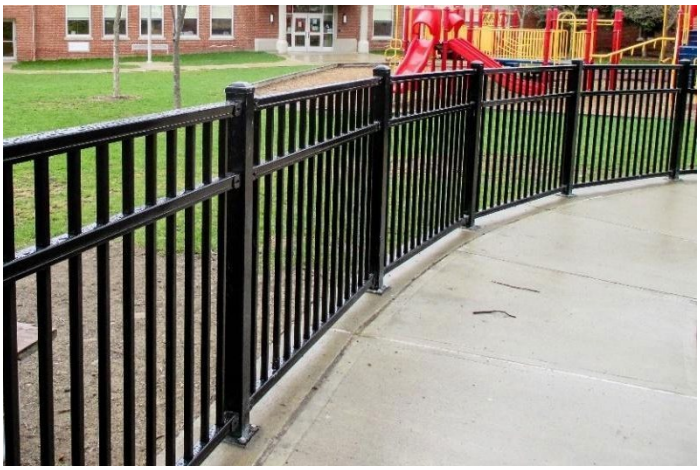
Section 323113 – Chain Link Fences and Gates

1. Standard finish for all chain link fencing materials, gates and backstop systems is hot dipped zinc galvanized steel with PVC Class 2b coating. Specify “Black” color.
2. Specify fence fabric with coating system.
3. Provide design for fence framing with manufacturer’s recommended post and rail fittings.
    A. Use PVC coated Schedule 40 steel pipe with fittings.
4. Provide gates with lockable hasps, self-latching heavy-duty hinges
5. Provide backstops for baseball and softball. Netting backstops are an acceptable alternative to chain link.
    A. Provide delegated design by fencing manufacturer for structural live and dead loads.

Section 323119 – Decorative Metal Fences and Gates

1. Provide tubular picket fence system including:
    A. Provide steel fencing system with light industrial polyester powder coat system; or
    B. Provide aluminum fencing system with powder coat system.
    C. Specify flexible panel system to accommodate site slopes.
    D. Provide 25-year manufacturer’s warrantee for materials and labor for replacement.

2. Option: Provide welded wire panels or metal pickets with manufacturer's power coat protection system.
    A. Specify flexible panel system to accommodate site slopes.
    B. Provide 25-year manufacturer's warrantee for materials and labor for replacement
3. Provide gates with heavy-duty hinges, and lockable latches.
4. Specify gate hardware (stainless steel) including the following:
    A. Self-closing hinges;
    B. Lockable latches;
    C. Panic hardware required at courtyards or locations where building has rated egress exit doors per code;
    D. Cane bolts for double service gates for securing gates in both the open and closed positions.
    E. Provide design for trash enclosure gates including: cane bolts with stainless steel receivers in the pavement to accept the bolt to secure the gates in both the open and closed positions.



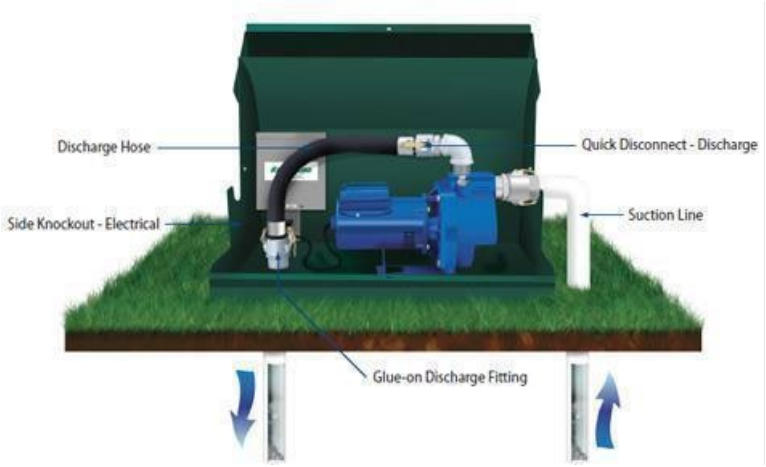
Section 323223 – Segmental Retaining Walls

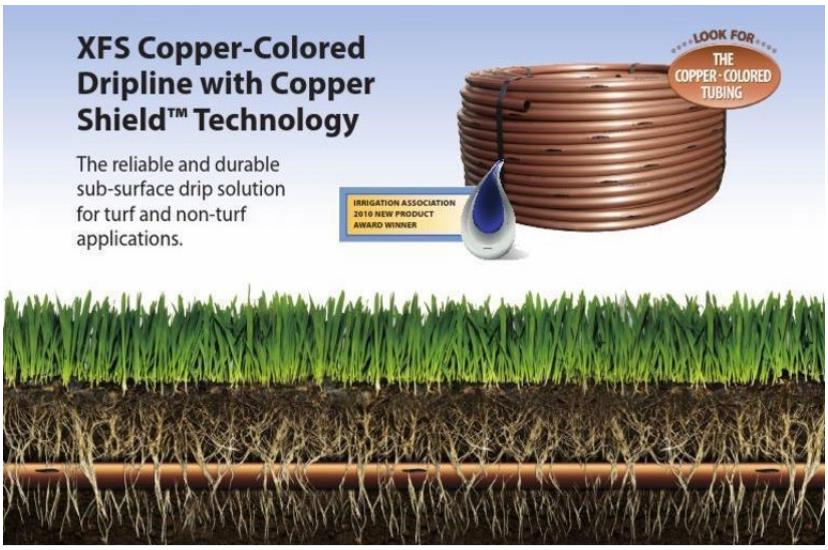
1. Provide delegated design for concrete segmental retaining wall system to address soil conditions, wall drainage system, backfill aggregate,
2. Specify geogrid soil reinforcements in backfill.
3. Specify cap adhesive.
4. Provide drainage aggregate fill.
5. Specify geotextile filter fabric.
6. Provide sleeves in the reinforced backfill or proprietary fence post sleeve system to secure the guard railing or fence system at top of walls.
7. Require delegated design submittal by professional engineer.

Section 328400 – Planting Irrigation

1. Provide design for the irrigation system for bidding. Final irrigation design submittal will be completed by a Certified Irrigation Designer (CID).
2. Provide monthly maintenance for a one-year maintenance period for all new irrigation systems.
3. Avoid use of temporary irrigation, except for sports field locations. Temporary irrigation can cost as much as permanent irrigation that is installed and then abandoned once plant materials are established. Confirm irrigation limits/goals with Owner for each project.
4. Irrigation system to be used for plant establishment. Consider turning off the irrigation system when the plants are established.
5. Alternate Water Sources: Specify non-potable "purple" pipe, fittings, equipment, and valve box covers with the potential for reclaimed water to be used as a water source.
6. Provide irrigation mainline piping for reclaimed water (purple) including the following options for material type:
    A. PVC Schedule 40 with Schedule 40 pipe fittings, or
    B. HDPE-butt fused pipe.
7. Provide lateral piping for reclaimed water (purple) including the following:
    A. Class 200 SDR 21 with glued joints; and
    B. Schedule 40 pipe fittings.
8. Specify encasement for piping (Class 200 PVC) below pavements as required per the irrigation design.
9. Provide manual valves as required for system shut down and maintenance.
10. Provide remote control valves for reclaimed "dirty" water conditions.
11. Provide master control valves for reclaimed "dirty" water conditions.
12. Provide flow sensing valves at each master valve, wired to the controller to detect line breaks, leak detection, and blown heads or valves.
13. Specify gear-driven rotors for sports fields.
14. Specify spray sprinklers for smaller lawn areas or planting beds
    A. Provide sustainable rotary spray sprinklers (4-inch pop-up height).
15. Specify 12-inch height pop-up, low-flow, flood bubblers in shrub beds.
16. Provide drip irrigation equipment with pop-up flow indicators and flush valves in a valve box at the end of each drip system tubing.
17. Provide quick coupling valve for system winterization.

18. Provide quick coupling valves for incidental watering.
19. Provide irrigation control system. Determine if site-control or cloud-based central control system with Owner.
20. Determine which type of irrigation control is to be used based on the following:
    A. Two-wire system (>20 stations)
    B. Multi-wire system (<20 stations)
    C. Provide rain sensor for all systems for irrigation shut down during rain events.
    D. Provide remote hand-held controller.
21. Provide two-wire decoders and wire connectors.
22. Provide grounding system for controller and two-wire decoders.
23. Provide valve boxes for irrigation equipment with "purple" colored box covers to denote reclaimed water being used.
24. Specify backflow preventer.
    A. Provide city required double-check backflow preventer, above grade in a lockable protective enclosure mounted on a 5-inch thick concrete service slab.
25. Specify booster pump as required based on pressure requirements and system design.
    A. Determined pump size by Certified Irrigation Designer (CID) or Landscape Architect based on the irrigation system design.
    B. Provide booster pump as required with inadequate water pressure to serve the irrigation equipment or to serve sports field rotors with higher operating pressures.
    C. Provide booster pumps for separate reclaimed or harvested water in cisterns. Provide a minimum of 30 PSI to operate low-flow drip tubing.
26. Provide system design to accommodate recycled grey water or condensate water for irrigation of non-edible landscapes.
27. Provide cistern system to capture storm water from condensate or building roof areas.
    A. Provide PVC Pipe with glued fittings for collection and distribution piping.
    B. Provide drip tubing for below-grade irrigation for plantings of trees, shrubs, ornamental grasses, and perennials.
    C. The collected and harvested roof and condensate water is NOT to be used for watering gardens with edible vegetables or plants unless approved by the Owner.





Section 329010 – Natural Turf Athletic Field

1. Refer to *Chapter 5, Section 329200 – Lawns and Grasses*.
2. Refer to *Chapter 5, Section 328400 – Planting Irrigation*.
3. Provide permeable sand and course peat moss soil mix.
4. Require conformance surveys to confirm that field was graded with laser-guided equipment.
5. Require a minimum field grade of 1.0 percent minimum to 1.5 percent maximum for positive drainage of natural turf fields.

Section 329200 – Lawns and Grasses

1. Provide no-till drill seeding method for native grasses and turf.
    A. Drought tolerant tall-turf type Fescue seed blend.
    B. Provide seed mixes with varieties that perform at an excellent level in NTEP turf trials in the Austin area.
2. Provide no-till drill seeding of native meadow areas.
3. Provide sprigging and mechanical anchoring of Bermuda grass (Sports Fields only).
4. Provide solid turf sod as follows:
    A. Provide drought tolerant, adaptable tall-turf type Fescue sod blend as tested and grown by local NTEP turf trials.
5. Provide sod in lieu of hydroseed in pond areas.
6. Specify hydro-mulching with a wood fiber slurry and fertilizer over new drill-seeded areas to help maintain moisture control and minimize soil erosion.
7. Specify organic soil amendments to be blended with existing topsoil.
8. Specify fertilizer rates and amounts as recommended by agronomist based on crop type. Require agronomic soils testing for existing soils to determine type and rate of fertilizer application.
9. Provide planting soil mix appropriate for specified plant materials.
10. Comply with Owner's Integrated Pest Management Plan
11. No Herbicides are allowed for use on Owner's property. (Refer to Owner and COA IPM for least toxic pest management practices and products).

Section 329300 – Plants

1. Overview and Summary of Work
    A. The proposed design should make all efforts to preserve Regulated, Protected, and Heritage trees on site. Refer to *Environmental Criteria Manual Section 3 (Tree and Natural Area Protection)* for more information on tree regulation.
        i. Refer to *Chapter 5, Section 31100 – Site Clearing.*
        ii. Plant native groundcover or install organic mulch within the critical root zone (CRZ) areas within the drip line of existing trees to minimize mowing and foot traffic. (Refer *to Appendix C, Recommended Plant List).*
        iii. If necessary, install hand dug "pocket plantings" in the outside half of the CRZ using hand tools or air spade to avoid damage to existing tree roots.
    B. Provide plantings of trees, shrubs, grasses, perennials, groundcover, mulches, turf, and landscape accessories.
    C. Schedule a post-install walk with Owner to review all trees and plantings on site.
    D. Warranty:
        i. Contractor to include a one-year warranty and one year of maintenance for all newly planted trees. Confirm this is not excluded when reviewing bids.
            a. Trees must meet minimum standards outlined in the American Standard for Nursery Stock (ANSI Z60.1).
        ii. Contractor to include a 1-year warranty for all non-tree planting materials.
    E. Maintenance Period:
        i. Trees: Contractor to include a one-year maintenance period for all trees from date of Substantial Completion.
            a. Include face-to-face hand-off meeting between Contractor and Owner maintenance staff.
            b. Include walk-throughs with Owner in conjunction with tree maintenance.
        ii. Contractor to include a one-year maintenance period for all new plantings from date of Substantial Completion.
            a. Include face-to-face hand-off meeting between Contractor and Owner maintenance staff.
            b. Include fall cutback of grasses and woody perennials in maintenance plan.

c. Provide As-built plans for all plantings and irrigation systems.

F. Transplanting Trees: Contractor to include a 5-year maintenance and inspection plan. Maintenance plan to include requirements as outlined in the Environmental Criteria Manual Section 3.5.2 - B. Alternative Compliance - 5. Transplants.

G. Landscape Plans must be prepared by and sealed by a Registered Landscape Architect in the state of Texas.

2. Reference Documents
   A. The Owner's LANDSCAPING GUIDELINES revised January 7, 1991, found in the agreement between the Owner and the City of Austin is to be used as the minimum for all site design.
   B. All landscape designs shall consider" Firewise Landscaping in Texas" document as assembled by Texas A&M.
3. General Planting requirements:
   A. Use non-invasive drought tolerant and native materials.
   B. Design for year-round seasonal interest and color.
   C. Provide adequate space for mature plant growth.
   D. The Owner encourages the of use of low-maintenance landscape design techniques. The Owner also encourages the use of non-invasive drought tolerant, low-water use and/or native plants.
   E. Use plants identified by Texas Parks and Wildlife Department's Wildscape Program EcoRegion 4 (Blackland Prairies) or EcoRegion 7 (Edward's Plateau).
   F. Provide plants as recommended by Lady Bird Johnson Wildflower Center as recommended for Central Texas.
   G. Refer to the City of Austin Grow Green Database for trees, shrubs, succulents, and wildflowers and region-appropriate "child-friendly" plants as listed in the Texas Nursery Landscape Association database.
   H. Consider plant selections that enhance outdoor learning spaces and other learning environments. Refer to *Chapter 5, Site Design Requirements – Outdoor Learning Spaces*. For example, a native or non-invasive adapted plant selection may highlight the use of a plant by Native Americans as a dye, the use of plant by certain species of wildlife, the use of plant by environmental professionals for water filtration, etc. (see above reference to region-appropriate "child-friendly" plants listed in the Texas Nursery Landscape Association database).

I. Work toward specifying species diversity on the overall site, and avoid selection situations, where a single species of trees/shrubs creates a mono-culture.

J. Oak Trees: Schools in areas of known "Oak Wilt" Do not prune any oak tree branches of any size or remove oak trees without authorization from the Owner's Urban Forester, or Project Arborist. Live oak and Red oak trees should not be planted in areas with a high presence of Oak Wilt. Refer to *Texas A&M Forest Service Oak Wilt Map* for more information on Oak Wilt in Texas.

4. Trees

A. Allow for a 3- year establishment period.

B. Provide native hardwood mulch to the dripline (edge of canopy) for all trees planted on site.

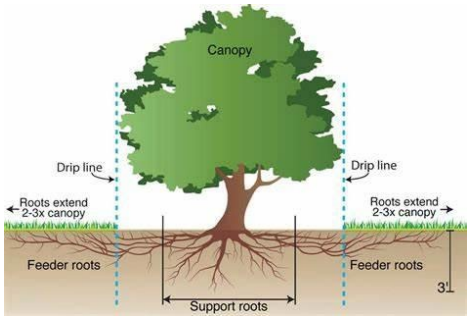
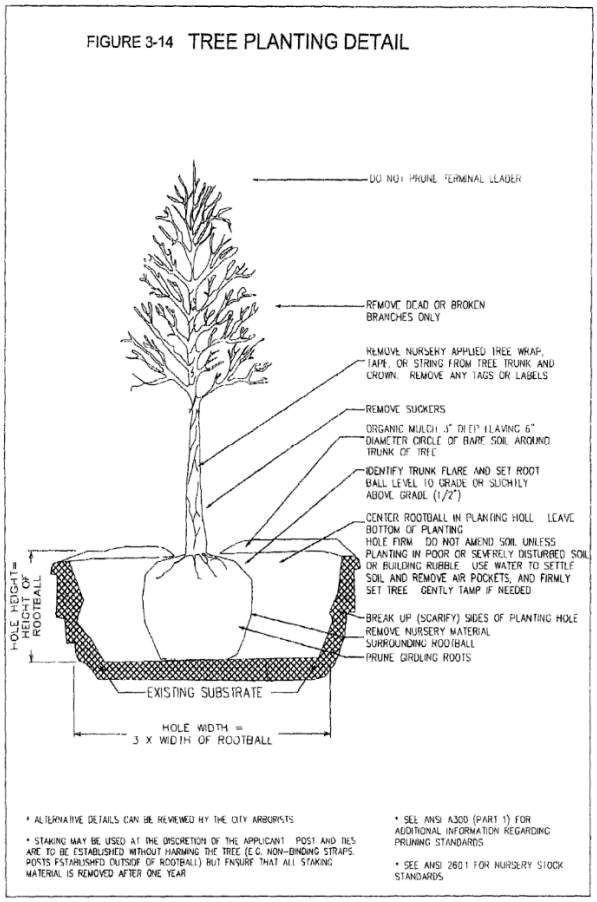


Image Source: California ReLeaf

C. Recommend a minimum of 3" – 4" caliper tree size for installation.

D. Trees should be planted as outlined in Environmental Criteria Manual Appendix V Figure 3-14. Provide tree staking with steel posts and tie trees with fabric tree ties. Plastic and steel tree ties are not permitted.



E. Provide 3-inches of organic hardwood mulch to the tree's dripline.

F. Provide groundcover or now-mow cover under and around groves of existing trees.

G. Refer to the City of Austin's Land Development Code Chapter 25-8 Subchapter B. Tree and Natural Area Protection; Endangered Species and the Environmental Criteria Manual Section 3 - Tree and Natural Area Preservation for detailed information about the City of Austin's local tree ordinance.

H. No berms or swales in critical root zones.

I. Provide trees in parking lot along perimeter, minimize trees in isolated islands.

J. Provide the following minimum tree spacing:

    i. Large Shade Trees: 25'-40' spacing on center depending on tree's mature size and spread. Plant a minimum of 20' from buildings and 10' from walkways to prevent future root and canopy conflicts.

    ii. Understory Trees: 10' spacing on center. Plant a minimum of 10' from buildings and 5' from walkways to prevent future root conflicts

iii. Owner's Urban Forester can adjust spacing as needed depending on the intent of planting

5. Shrubs
    A. Provide spacing at 36" on center minimum.
6. Groundcovers
    A. Provide low-maintenance groundcovers as a turf alternative planted at 12-inches on center maximum.
    B. Provide groundcovers below existing trees that do not require trimming or mowing.
    C. Do not install irrigation within existing tree root zone areas.
7. Perennials/Grasses
    A. Meadows and native grasslands shall be sited at a distance greater than 25 feet from any building.
    B. Permanent water and irrigation shall not be installed.
    C. Provide a visible barrier for wildflower meadow establishment. Area perimeter shall be clearly defined by a physical edge such as rope, timbers, split rail fence, or natural features. No metal edging shall be used.
    D. Provide signage and visible markers to designate wildflower meadows as "no-mow" areas.
8. Perennial grasses are the preferred native plant materials for biofiltration plantings.
9. Refer to *Appendix C, Recommended Plant List*.
10. Undesired Plants
    A. Avoid tender perennials or shrubs.
    B. Use sparingly perennials which require early spring cut back.
    C. Avoid aggressive re-seeding grasses.
    D. Avoid Bermuda Grass (except sports fields – use hybrid only).
    E. Avoid trailing Lantana (new gold, white, purple) and other aggressive vines.
    F. Avoid or use extremely sparingly grasses and vines because of their potential maintenance burden. If vines are used, they should be planted on a trellis structure to avoid spreading to adjacent spaces.
11. Use standard planting details.
12. Arborist to review construction phasing plan and details for tree protection.
13. Provide planting soil mix:
    A. Follow Austin Environmental Criteria Manual (ECM) Soil Specifications.

14. Provide weed barrier fabric. Refer to Owner and COA IPM:
    A. Use natural weed barriers like a deeper mulch layer (+3-inches).
    B. Use fabric weed barriers below aggregate mulch.
15. Specify tree staking and guys as follows:
    A. Steel and plastic guys are not permitted. Use fabric ties to reduce damage to trees

Section 329400 – Planting Accessories

1. Decomposed granite (DG) surfacing
    A. Specify natural stabilizer product within DG for erosion control.
    B. Use stabilized DG mulch surfacing sparingly and not within areas adjacent to building entries or areas subject to overland flow of rain water and erosion.
2. Seating boulders:
    A. Provide with cut, smooth top and bottoms with naturally split side edges.
    B. Material: limestone or granite.
3. Native boulders
    A. Provide as naturally found in nature as landscape accents.
    B. Use boulders to protect walks and pedestrian areas traffic control devices set into concrete walks or plaza areas adjacent to drives (refer to *Chapter 5, Safety and Security*).
    C. Specify durable limestone or granite material boulders.
4. Bed edging
    A. Provide heavy-duty vinyl “L-shaped” edging with flexible or rigid characteristics.
    B. No steel or aluminum metal edging per Owner for safety reasons.
    C. Provide shoveled or machine cut edge into compacted soil with 8-inch thickened mulch edge. Note: This is not a long-term edging solution and may require additional maintenance.
    D. Use heavy duty 12-inch minimum length galvanized steel anchors to secure vinyl edging firmly into undisturbed soils.

5. Native Stone Walls to be delegated designed to withstand loading and exiting soils:
    A. Provide retaining walls with soil reinforcement.
    B. Provide guard rails as required by building code.
    C. Provide native stone edging for raised planting beds with 4 to 6-inch linear stone edge or concrete curb system to prevent Bermuda grass encroachment in planting areas.
    D. Refer to images of native stone and stabilized decomposed granite below.

DIVISION 33 – UTILITIES

Section 334100 – Storm Utility Drainage Piping

1. Provide pipe materials and installation that will comply with applicable local jurisdiction(s).
2. Provide concrete reinforced pipe (RCP).
3. Provide dual wall HDPE pipe with corrugated exterior and smooth wall interior (Type N-12).
4. Storm Inlet Structures and Grate Systems:
    A. Provide concrete curb inlets.
    B. Provide area inlets in paving or lawn areas as required. Grate and frames will comply with pavement loading requirements.
    C. Yard Areas Inlets. Inlets to be flush with finish grade to allow mowing and for trip safety. Provide pedestrian rated slot grates in walkways or plazas to comply with ADA accessibility.
    D. Trench Drains
        i. Provide sloping invert systems with separate manholes.
        ii. Provide track and sports- trench drain systems with neutral flow lines and integral catch basins;
5. Manholes shall be flush with adjacent pavements and finish grade.
6. Clean-outs for storm and sanitary sewers:
    A. Provide flush with adjacent pavements and finish grade.
    B. Provide a concrete collar around cleanouts in lawn and landscape areas.
7. Storm water treatment devices need to comply with local code.

Section 334600 – Sub-Drainage

1. Provide dual wall HDPE (Type N-12) solid or perforated drainage pipe with soil tight fittings.
2. Provide composite panel drain system with fittings for synthetic turf sports fields.
3. Provide clean-outs (PVC) with cast iron access manhole cover and frame system set into concrete base to minimize movement.
4. Provide clean drainage aggregate in bottom to accommodate drainage.
5. Provide non-woven filter fabric soil separation between subgrades and clean drainage aggregate to promote efficient drainage and filters silt.

[END OF CHAPTER]

CHAPTER 6

FURNITURE STANDARDS

AUSTIN
Independent School District

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ABOUT THIS DOCUMENT

This document was developed through a collaborative process between Austin ISD representatives (the Owner), facilities consultants, and design professionals for the purpose of establishing an approved set of criteria for new furniture specifications for Austin ISD facilities and campuses. It is intended to simplify and standardize all future furniture purchases by the Owner. The guiding principles that follow this introduction provide a reference point and context for the selections. This document also aligns with the existing Guiding Principles identified during the Facility Master Planning Process and featured in the Educational Specifications.

Realizing that many of the furniture selections can work in multiple applications and across the district, the criteria document is organized by unit type and function (e.g. seating, worksurfaces, storage, etc.) Items are grouped by product "families" and associated accessories are included in each section. Reference the *Sizing Guide* included in the criteria introduction to confirm appropriate furniture dimensions for each individual use and user size.

The furniture items included in the criteria can work universally throughout each campus. The selections outlined incorporate a focus on multi-purpose applications and identify items specific to the different age groups and body sizes in K-12 environments.

While each specification sheet references product warranty information, complete and current warranty details require confirmation by the manufacturer prior to purchase.

AUSTIN ISD GUIDING FURNITURE PRINCIPLES

FURNITURE VISION STATEMENT

Provide a *FLEXIBLE* and adaptable furniture solution to *OPTIMIZE* learning by promoting individualization and *CHOICE* for learners of all needs and capabilities. Solutions should translate school culture and be FUN, ENGAGING, and INSPIRING for all school users and community.

GOALS

1. Meet needs of all learning styles and capabilities
2. Equity between all campuses and programs
3. Welcoming and comfortable
4. Promote health and wellness
5. Support creativity
6. Sufficient and creative storage solutions
7. Trust and choice for learners
8. Access to technology and power

IMPERATIVES

- Promote safety
- Ease of maintenance and cleaning
- Functional while intuitive
- Correct sizing of furniture for all learners and faculty sizes
- Furniture that has dual or multiple functions
- Easy to move
- Inclusivity of technology component where applicable

*These visions and goals are a result of furniture-specific workshops. Utilize them in conjunction with goals outlined in the Project Development Manual (PDM).

LEARNER ENGAGEMENT

Furniture in innovative learning environments, like those specified in the Austin ISD Educational Specifications, plays an active role in the learning experience, enabling differentiation and increasing learner engagement. Furniture must provide learners the freedom and flexibility to engage in ways that work best for them, including task-function alignment, personal comfort, proper ergonomics, and choice. Research shows how furniture contributes to a learner's success and engagement in the learning environment. Part of the process of creating this document involved multiple workshops focusing on research and the role furniture plays in learner engagement, health, and well-being. The following section discusses this research, which informs the performance requirements of furniture selections.

Academic Engagement

Recent data from over 3000 high school learners shows that satisfaction with one's school building design positively correlates with academic engagement[1]. This satisfaction was measured in multiple ways, linking to both architectural and furniture design decisions. One of the strongest relationships was learner perception of his or her school's values, as indicated by the space design. Specifically, "the more the learners perceived that the school valued creativity, critical thinking, collaboration, or the 21st century learning skills, the higher their academic engagement was likely to be (p. 333)." This finding is of special note for Austin ISD as creativity, critical thinking, and collaboration are three of the identified "Power Skills" that learners should develop. Furniture selections should promote this perception by:

1. Having the potential to be arranged into collaborative groups
2. Providing opportunities for critical thinking (both independently and in small groups)
3. Signaling creativity by being multi-modal

Design teams should intentionally select materials which allow for hands-on activities (e.g. durable, easily-cleaned) and learning on display (e.g. writable surfaces).

[1] Scott-Weber, L., Konyndyk, R., French, R. (2019). Developing Instruments: Student Academic Engagement Levels and Satisfaction with School Design. *European Scientific Journal*, 15(1), pp. 325-347, Retrieved February 6, 2019, from https://eujournal.org/index.php/esj/article/view/11679/11119

Also linking to learner engagement in the data is the ability for learners to easily access one another, move around throughout the learning space, and access technology. Furniture selections (quantity, type, and layout) should support this access and movement.

Empowerment and Comfort

One of the most powerful benefits of increased variety and choice in the learning environment is enabling the empowerment of learners to personalize their level of physical and psychological comfort. In a recent study of 153 primary school classrooms, the individualization of space accounts for approximately 5% of the variation in learner progress throughout the year[2]. Individualization of space was represented by flexibility and ownership in this study. Furniture needs to allow for arrangement of learning spaces into different "learning zones" that support different types of activities. Storage should be accommodated within the furniture, with flexible and accessible characteristics to support these different learning zones. Regarding ownership, the study found that furniture should be child-centered and provide specific pieces that are "comfortable, interesting and ergonomic to the pupils' ages and sizes (p. 30)". Opportunities within the learning neighborhoods for learners to personalize are important.

Many furniture manufacturers are beginning to incorporate empowerment and comfort through their products. While this is most commonly seen by offering a variety of heights (e.g. counter-height tables), materials (e.g. soft versus hard), and types of seating (e.g. informal/lounge pieces), some products offer variety. Consider furniture pieces, such as tables, that have unique shapes to accommodate different learner personalities when sitting as a group. Prioritize furniture pieces that can perform multiple functions or be utilized in different ways. All spaces should ultimately allow all learners and educators to move and shift throughout a lesson, day, or year to accommodate their comfort level.

[2] Barrett, P., Zhang, Y., Davies, F., Barrett, L. (2015). *Clever Classrooms: Summary report of the HEAD Project (Holistic Evidence and Design)*. University of Salford: Manchester. Retrieved February 6, 2019, from https://www.salford.ac.uk/cleverclassrooms/1503-Salford-Uni-Report-DIGITAL.pdf

Visual Complexity

Color and visual complexity have a curvilinear relationship with learner academic progress. Too much color or complexity (e.g. clutter) has a negative impact. Thus, selection of storage pieces, affordances for learner display, and color choices should be intentional and aim for intermediate levels of visual complexity and color stimulation.

Movement

Furniture today should embrace learners' needs for independent movement and proper ergonomic positioning. The Physical Activity Design Guidelines for School Architecture prioritizes the use of dynamic seating versus fixed seating[3]. "'Dynamic furniture' is designed to foster children's natural physical movements and includes pieces such as ergonomic roll-swivel chairs with seat surfaces that move in three dimensions, adjusting to subconscious body position changes and encouraging the body to change positions. Such seating is shown to have a rhythmic and postural effect, activating the proprioceptive system and improving circulation, raising body temperature and improving learning outcomes." (p. 12)

Dr. Dieter Breithecker is a German Health and Kinetics Scientist, the head of the Federal Institute on the Development of Posture and Exercise in Germany, and an international expert on ergonomics for children. He is one of the coauthors of the aforementioned *Physical Activity Design Guidelines* and discussed his research as part of the AISD Furniture Standards Process. Many seating options included in this document focus on accommodating such movement. Furniture selections should allow for small scale movements such as leaning, rocking, turning, or swaying to encourage concentration and cognitive development.

[3] Brittin J., Sorensen D., Trowbridge M., Lee KK., Breithecker D., Frerichs L., et al. (2015). Physical Activity Design Guidelines for School Architecture. *PLoS ONE* 10(7): e0132597. doi:10.1371/journal.pone.0132597. Retrieved February 6, 2019, from https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0132597

DEFINITIONS

Formal Seating/Furniture is furniture that meets a typical chair and worksurface scenario. Formal seating means that a learner is sitting in a learner chair along with a type of learner worksurface. Although a learner is sitting at a chair and worksurface, it does not imply that the learner owns this chair or worksurface. All seating and worksurfaces in the studio are meant for sharing between all learners. All formal seating scenarios can apply to overall studio learner counts.

Informal Seating/Furniture is furniture that is beyond a typical learner chair and learner worksurface scenario. This furniture has alternate seating options for learners in order to promote choice and engagement within the studio and other spaces. Informal seating or furniture can include, but is not limited to, a learner stool, a movement stool, a lounge piece, and high-top seating. All learning environments must include these types of furniture in their layouts. Informal seating will apply to overall studio learner counts.

Furniture vs. Equipment: Chapter 6 in this document outlines furniture design and performance requirements. Refer to *Chapter 4 – Facility Design Standards* for equipment requirements.

Millwork & Casework: Built-in millwork and casework is outlined in this chapter to show the relationship of furniture to built-in storage; however, it is not covered under the furniture budget of the project. All built-in millwork and casework designs are the responsibility of the design team and are required in the deliverables for the project. Refer to *Chapter 4 – Facility Design Standards* for linear feet of casework required in each space. For performance requirements regarding casework, refer to *Chapter 5, Division 12 – Furnishings.* Movable casework is an accepted solution to support sustainability and future use of learning spaces.

Closed Line Manufacturer: A closed line manufacturer is one that requires purchasing from a specific contract furniture dealer. Certain manufacturers have pre-determined agreements with contract furniture dealers to control who sells their product. If a product from a closed line manufacturer is selected, the design teams must work with the respective contract furniture dealer for any pricing and procurement. If the respective contract furniture dealer is not known, ask the manufacturer representative.

ORDERING INFORMATION

Lead Times

Identify product lead times and confirm durations during the specification process to ensure timely delivery and installation. Material selections can affect lead times, and design teams should minimize durations whenever possible. Design teams should allow approximately 16 weeks for lead times. If lead times less than 6 weeks are required, propose products from quick ship programs. Many manufacturers offer quick ship options; however, not all products listed in this document fall within a quick ship program and will have limited finish options.

Product Warranties

Each specification sheet identifies established warranties for that product by the manufacturer. Finish materials specified may have different warranty considerations. If needed, clarify warranty details with the manufacturer or vendor representatives.

Procurement & Pricing

Vendors will work with the Owner through Contract & Procurement to execute master agreements or utilize cooperative contracts with set pricing discounts and fees. Each project and furniture order will require working with vendors and dealers to identify appropriate pricing based on set pricing. Each project will generate and issue task orders to provide services for specific projects on an as needed basis. Actual amounts will be determined based on specific project plans once they are finalized.

The Owner will provide project management responsibilities that may include delivery and installation that require negotiations with parties at time of order. The Owner, through the Construction Management Department, will manage project plan specs, delivery and installation pricing for individual products based on pricing provided.

Vendors are furniture dealers from whom the Owner will purchase the furniture. Vendors will also handle all installation and warranty claims for the products they provide. Manufacturer

representatives work directly for the manufacturer and require coordination through the respective vendors.

Ordering

Unless otherwise specified by the Owner due to extenuating circumstances, all furniture ordering will be managed by the Owner. In instances where design and construction teams are asked to order furniture, all furniture specifications must be approved by the Owner, through the Construction Management Department, prior to placing any orders.

EXAMPLE FURNITURE LAYOUTS

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Pre-Kindergarten/Kindergarten 6-20

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**Refer to the* Educational Specifications *for example imagery of AISD campuses and spaces for furnishings for all space types.*

LEARNING NEIGHBORHOODS

Elementary

This example layout is intended for use as a tool by the design teams to meet all guidelines and expectations set forth by the Owner for furniture. Coordinate with Owner to determine appropriate furniture counts on a campus by campus basis. Below are minimum requirements for successful furniture procurement at all elementary school projects.

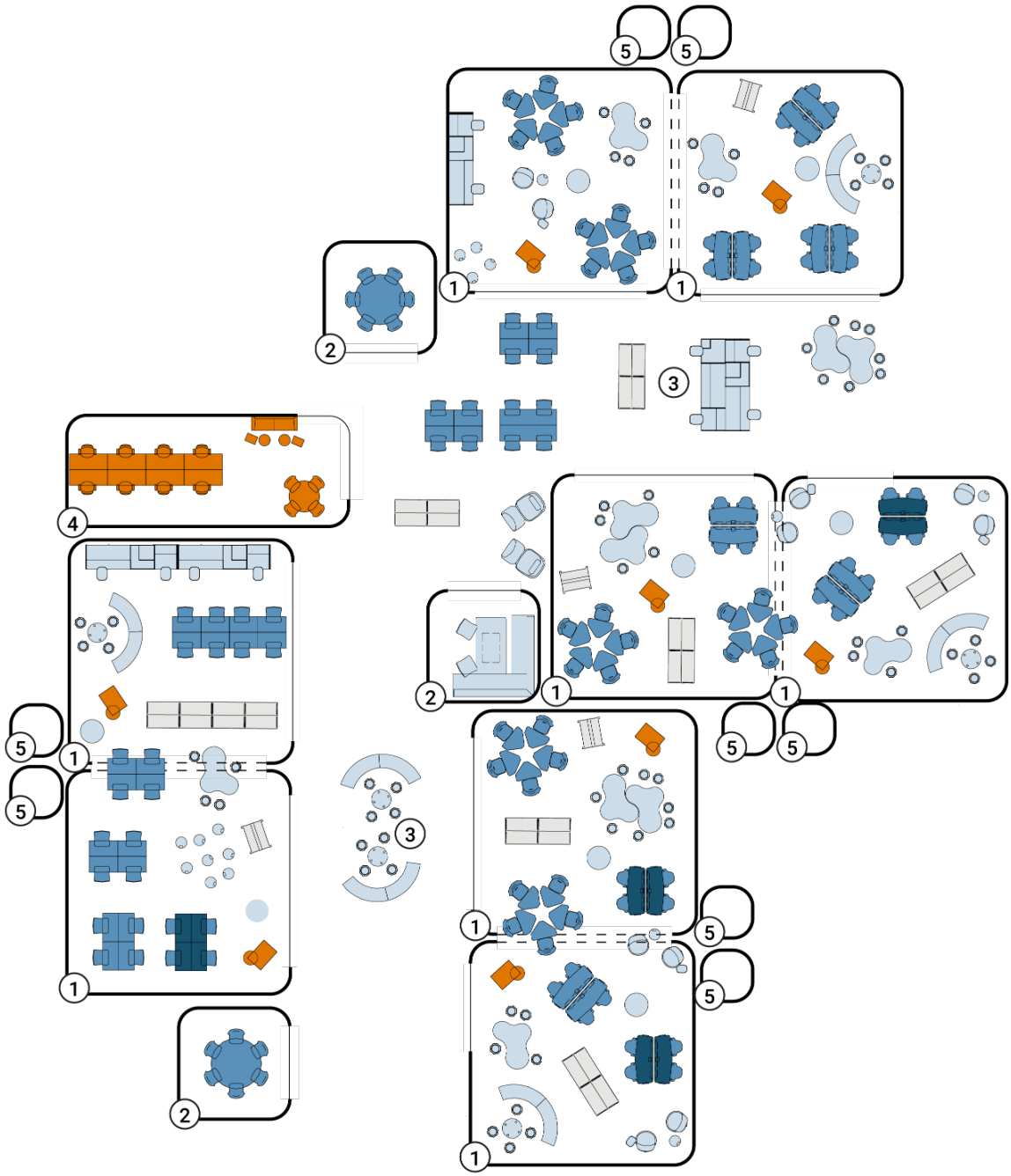
1. Sizing
    A. Size furniture to meet the needs of all learner sizes and needs as stated in the Furniture Vision & Goals. Refer to *Chapter 6, Performance Requirements – Sizing Guide*.
2. Studios
    A. Elementary spaces should utilize a ratio of 60% informal furniture to 40% formal furniture. Informal furniture is defined as a type of seating that offers a variance from the typical learner chair and learner worksurface (i.e. poufs, wiggle stools, lounge chairs, tiered seating, floor space etc.). Refer to *Chapter 6, Performance Requirements – Learner Furniture* for further clarification.
    B. Provide a variety of seating types and configurations at each studio to allow learners a choice on how and where they learn. Not every learner needs to receive their own desk or formal chair. Informal furniture will contribute towards total learner counts in each room. Informal seating can include floor space.
        i. Coordinate formal seating specified with allowable space in Learning Studios.
    C. All informal seating that is counted towards overall learner counts must be paired with a worksurface (formal or informal) that is sized to support a learner device and one additional learning item (e.g. textbook or writing material) simultaneously.
    D. Provide a mobile lectern, task stool, and mobile storage for every educator.
3. Standing Height Options
    A. Each elementary learning space should also utilize a small percentage of standing height furniture options. It is at the discretion of the design team and Owner for how

much standing height furniture is appropriate for the space. Provide a minimum of 4 seats per studio at 4th and 5th grade levels only.

4. Mobile storage
    A. Utilize in conjunction with built-in casework or millwork to meet campus needs. Units should support a full studio, based on quantities outlined in the PDM.
    B. Ensure studio square footage appropriately supports access to mobile storage units without impeding use of operable partitions or blocking visual transparency.
    C. For 1st Grade, provide a minimum quantity of 2 bookcases, no higher than 36 inches and a minimum of 12 inches deep. From 2nd Grade and above, provide a minimum quantity of 2 bookcases, no higher than 48 inches and a minimum of 12 inches deep.
    D. For 1st Grade, provide a minimum quantity of 2 open cubbies, no higher than 36 inches and a minimum of 18 inches deep for a backpack, blanket, and lunchbox. For 2nd Grade and above, provide a minimum quantity of 2 open cubbies, no higher than 48 inches and a minimum of 18 inches deep for a backpack, blanket, and lunchbox.
    E. For 1st Grade, provide a minimum quantity of 2 units of bin storage at a minimum of 36 inches wide, 14 inches deep, and 36 inches tall for center-based learning. For 2nd Grade and above, provide a minimum quantity of 2 units of bin storage at a minimum of 36 inches wide, 14 inches deep, and 48 inches tall.
    F. Refer to *Chapter 4, Facility Design Guidelines, Elementary School - Casework* for learner personal storage requirements. Provide a maximum of one additional mobile storage unit if mobile cubby storage is the campus's preferred option.
        i. If studio square footage is not sufficient to meet mobile storage requirements outlined above, provide wall-mounted hooks or other storage solutions for learner personal storage.
    G. Provide a small, mobile storage unit to support educator personal storage in learning studios.
5. Open Collaboration
    A. Offer ultimate flexibility with the design of the furniture to allow sharing furniture between studios and open collaboration areas. A ratio of 60% informal and 40% formal furniture is required.
    B. Provide a variety of seating and appropriately-sized worksurface types to meet the varied needs of learners.

C. Provide furniture for 25-30 learners' needs per every 1200 square feet of open collaboration space programmed. Provide a variety of informal and formal furniture seating. Refer to example layouts for suggested quantities and seating types.
D. Provide a minimum of 2 mobile markerboards in open collaboration areas.
E. Coordinate informal seating that supports movement with planned floor finishes to ensure appropriate levels of movement and learner safety are balanced.

6. Professional Learning Centers (PLC)
   A. Provide a minimum of 4 individual work stations for heads-down concentration and individualized work for professionals. Work stations are not owned by one individual but are shared by staff. Consider requisite layouts when selecting workstation size.
   B. Provide informal furniture for a casual work area. Ensure that a work surface is provided with all soft seating elements.
   C. Provide furniture to support individual educator wellbeing and mindfulness, either in Professional Learning Center or associated Meeting Room. Coordinate specific furniture needs with campus.
   D. Coordinate PLC Meeting Room furniture with campus to ensure it supports the desired functions for that campus's staff.
   E. Provide a minimum of 4 PLC lockers in Learning Neighborhood PLCs.
7. Small Group Room
   A. Provide a variety of seating types to meet the varied needs of learners, staff, and community users. Provide 50% formal and 50% informal furniture.
   B. Provide furniture for a minimum of 6-8 people and maximum of 10 people.
8. Peace Centers
   A. Refer to *Chapter 6, Furniture Standards, Example Furniture Layouts – Student Mental Health and Wellness* for furniture requirements for Peace Centers.
9. Ancillary
   A. All studios should receive 1 rug at minimum, that is 8 feet wide and 12 feet long.
   B. All studios should receive 1 mobile whiteboard at minimum.



ELEMENTARY LEARNING NEIGHBORHOOD LAYOUT

INFORMAL FURNITURE	1 LEARNING STUDIO
FORMAL FURNITURE	2 SMALL GROUP ROOM
STANDING HEIGHT FURNITURE	3 OPEN COLLBORATION
EDUCATOR FURNITURE	4 PROFESSIONAL LEARNING CENTER
MOBILE STORAGE	5 LEARNER TOILET
CASEWORK*	

*Casework is drawn for reference only. For casework requirements, refer to *Chapter 4 - Facility Design Standards*

Pre-Kindergarten/Kindergarten

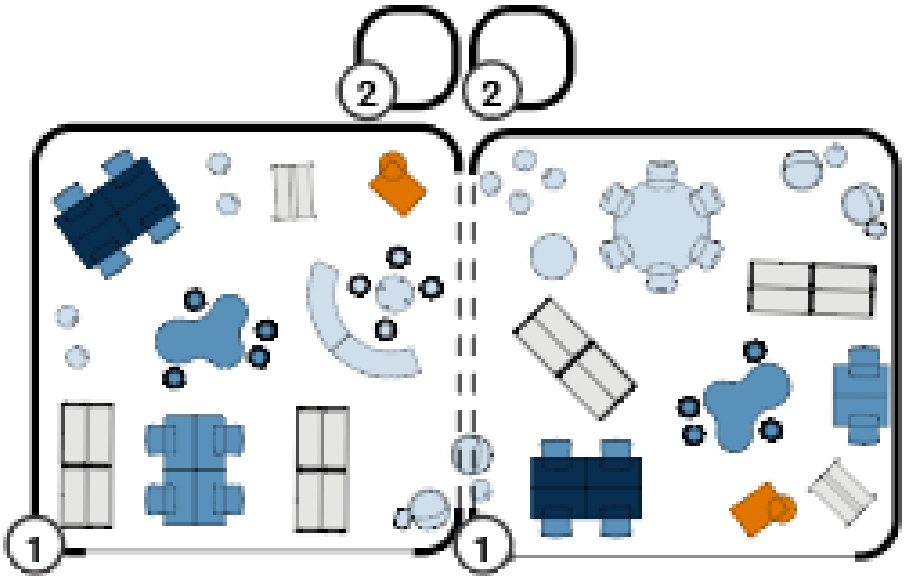
This example layout is intended for use as a tool by the design teams to meet all guidelines and expectations set forth by the Owner for furniture. Coordinate with Owner to determine appropriate furniture counts on a campus by campus basis. Below are minimum requirements for successful furniture procurement at all Pre-kindergarten/Kindergarten projects.

1. Studio
    A. Pre-Kindergarten/Kindergarten studio spaces should utilize a ratio of 60% informal to 40% formal furniture.
    B. Provide groups of furniture of various sizes that allow for flexibility in learner-led activities as well as group work.
    C. Provide a variety of seating types and configurations at each studio to allow learners a choice on how and where they learn. Not every learner needs to receive their own desk or formal chair. Informal furniture will contribute towards total learner counts in each room.
    D. Provide a minimum of 25% height variation in products, to include low tables, floor cushions, etc.
    E. All informal seating that is counted towards overall learner counts must be paired with a worksurface (formal or informal) that is sized to support a learner device and one additional learning item (e.g. textbook or writing material) simultaneously.
    F. Provide a mobile lectern, task stool, and mobile storage for every educator.
2. Mobile Storage
    A. Utilize in conjunction with built-in casework or millwork to meet campus needs.
    B. Ensure studio square footage appropriately supports access to mobile storage units without impeding use of operable partitions or blocking visual transparency.
    C. Provide a minimum quantity of 2 bookcases, no higher than 36 inches and a minimum of 12 inches deep.
    D. Provide a minimum quantity of 2 open cubbies, no higher than 36 inches and a minimum of 18 inches deep for a backpack, blanket, and lunchbox. Units should support a full studio, based on quantities outlined in the PDM.
    E. Provide a minimum quantity of 2 units of bin storage at a minimum of 36 inches wide, 14 inches deep, and 36 inches tall for center-based learning.

F. Refer to *Chapter 4, Facility Design Guidelines, Elementary School - Casework* for learner personal storage requirements. Provide a maximum of one additional mobile storage unit if mobile cubby storage is the campus's preferred option.
    i. If studio square footage is not sufficient to meet mobile storage requirements outlined above, provide wall-mounted hooks or other storage solutions for learner personal storage.

G. Provide a small, mobile storage unit to support educator personal storage in learning studios.

3. Ancillary
    A. All studios should receive 1 rug at minimum, that is 8 feet wide and 12 feet long.
    B. All studios should receive 1 mobile whiteboard at minimum.
4. Associated Open Collaboration, Small Group Rooms, and Professional Learning Centers require furniture aligned with the previous example layout for Elementary.
5. Peace Centers
    A. Refer to *Chapter 6, Furniture Standards, Example Furniture Layouts – Student Mental Health and Wellness* for furniture requirements for Peace Centers.



EARLY EDUCATION STUDIO LAYOUT

- INFORMAL FURNITURE
- FORMAL FURNITURE
- STANDING HEIGHT FURNITURE
- EDUCATOR FURNITURE
- MOBILE STORAGE
- CASEWORK*

1. LEARNING STUDIO
2. LEARNER TOILET

*Casework is drawn for reference only. For casework requirements, refer to *Chapter 4 - Facility Design Standards*

Middle Schools and High Schools

This example layout is intended for use as a tool by the design teams to meet all guidelines and expectations set forth by the Owner for furniture. Coordinate with Owner to determine appropriate furniture counts on a campus by campus basis. Below are minimum requirements for successful furniture procurement at all middle schools and high schools.

1. Studios
    A. Middle School and High School studio spaces should utilize a ratio of 80% formal furniture to 20% informal furniture.
    B. Provide groups of furniture of various sizes to allow for flexibility in learner-led activities as well as groupwork.
    C. Provide a variety of seating types and configurations at each studio to allow learners a choice on how and where they learn. Not every learner needs to receive their own desk or formal chair. Informal furniture will count towards total learner counts per room.
        i. Coordinate formal seating specified with allowable space in Learning Studios.
    D. Provide worksurfaces that are sized to support a learner device and one additional learning item (e.g. textbook or writing material) simultaneously for all learners in provided learner count.
    E. Provide a mobile lectern, task stool, and mobile storage for every educator.
    F. Integrate learner personal storage into worksurfaces and seating solutions provided to ensure studio floor space is not utilized for backpack storage.
        i. If the requirements outlined above cannot be met, provide wall-mounted hooks or other storage solutions for learner personal storage.
2. Standing Height Options
    A. Provide a minimum of 25% standing height furniture options which is inclusive of the total 80% formal furniture. Examples of possible locations and a general guide for quantity is indicated in dark blue on the following layout. Additional standing height furniture options above the 25% requirement are acceptable and are at the discretion of the design team and Owner.

3. Mobile storage
    A. Ensure studio square footage appropriately supports access to mobile storage units without impeding use of operable partitions or blocking visual transparency.
    B. Provide a maximum of 24 linear feet of mobile storage in all Middle School and High School studios.
    C. Provide a variety of storage units with a maximum height of 48 inches tall to support passive supervision.
4. Open Collaboration
    A. Provide a variety of seating and appropriately-sized worksurface types to meet the varied needs of learners. Provide 20% formal furniture and 80% informal furniture.
    B. Provide furniture for 25-30 learners' needs per every 1200 square feet of open collaboration space programmed. Provide a variety of informal and formal furniture seating. Refer to example layouts for suggested quantities and seating types.
    C. Coordinate informal seating that supports movement with planned floor finishes to ensure appropriate levels of movement and learner safety are balanced.
5. Professional Learning Centers
    A. Provide individual workstations for heads-down concentration and individualized work for professionals. Workstations may be owned by one individual or be shared by staff. Consider requisite layouts when selecting workstation size.
    B. Provide informal furniture for a casual work area. Ensure that a work surface is provided with all soft seating elements
    C. Provide furniture to support individual educator wellbeing and mindfulness, either in Professional Learning Center or associated Meeting Room. Coordinate specific furniture needs with campus.
    D. Coordinate PLC Meeting Room furniture with campus to ensure it supports the desired functions for that campus's staff.
    E. Provide a PLC locker for each educator in a given learning neighborhood.
6. Learning Commons
    A. Spaces should offer ultimate flexibility. Furniture in these spaces also need to allow for privacy and learning for various group sizes.
7. Science Laboratories
    A. Furniture for science laboratories shall include mobile science tables along with stools for seating. Any stools specified must be able to accommodate removable back support.

B. Refer to *Chapter 6, Furniture Standards, Example Furniture Layouts – Student Mental Health and Wellness* for furniture requirements for Peace Centers in Science Labs.

C. Coordinate all furniture with casework. Casework is not provided as part of the furniture scope. For casework requirements, refer to *Chapter 4 – Facility Design Standards*.

D. Coordinate design of demonstration station with Owner to balance flexibility and functionality for educator-led demonstrations.

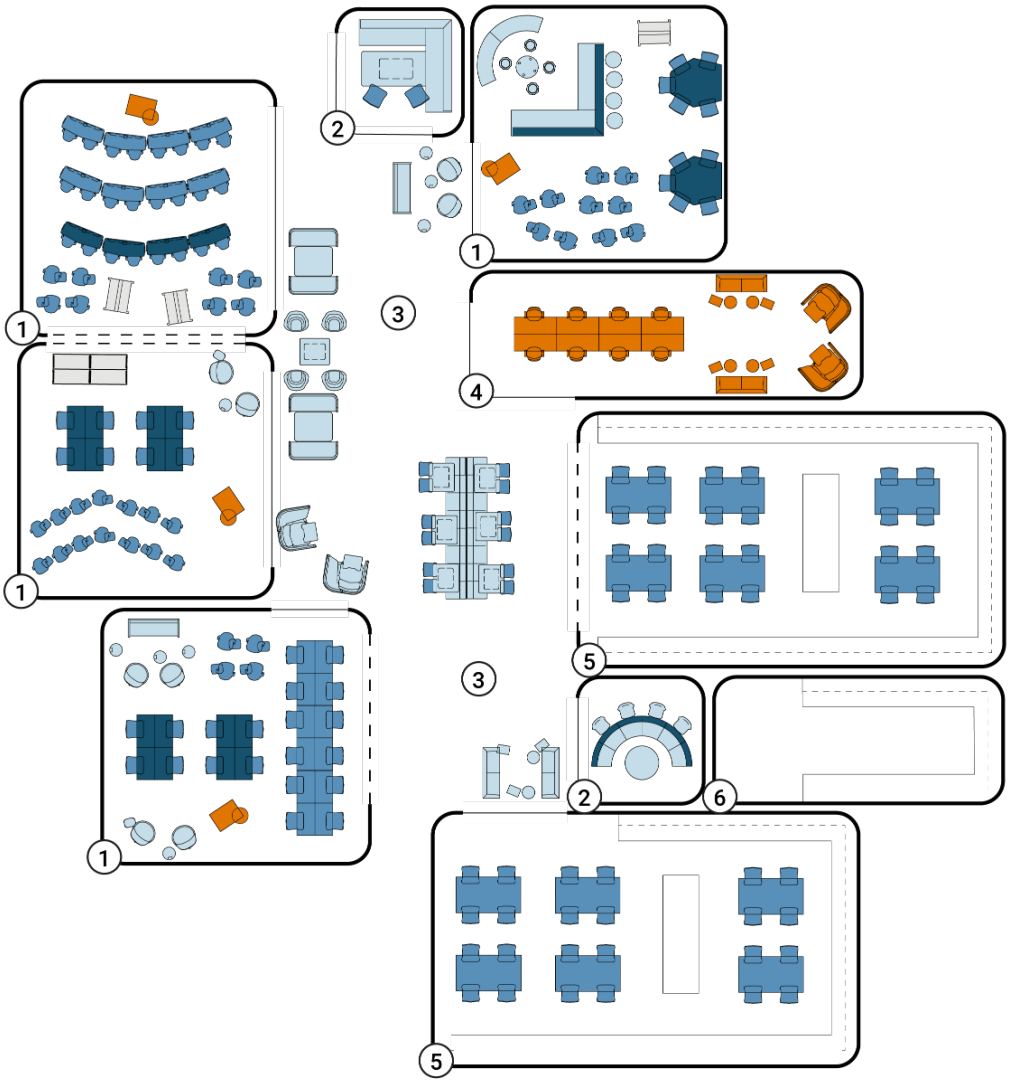
8. Small Group Room

A. Provide a variety of seating types to meet the varied needs of learners, staff, and community users. Provide 50% formal and 50% informal furniture overall for small group rooms.

B. Provide furniture for a minimum of 6-8 people and maximum of 10 people.

9. Peace Centers

A. Refer to *Chapter 6, Furniture Standards, Example Furniture Layouts – Student Mental Health and Wellness* for furniture requirements for Peace Centers.



MIDDLE/HIGH LEARNING NEIGHBORHOOD LAYOUT

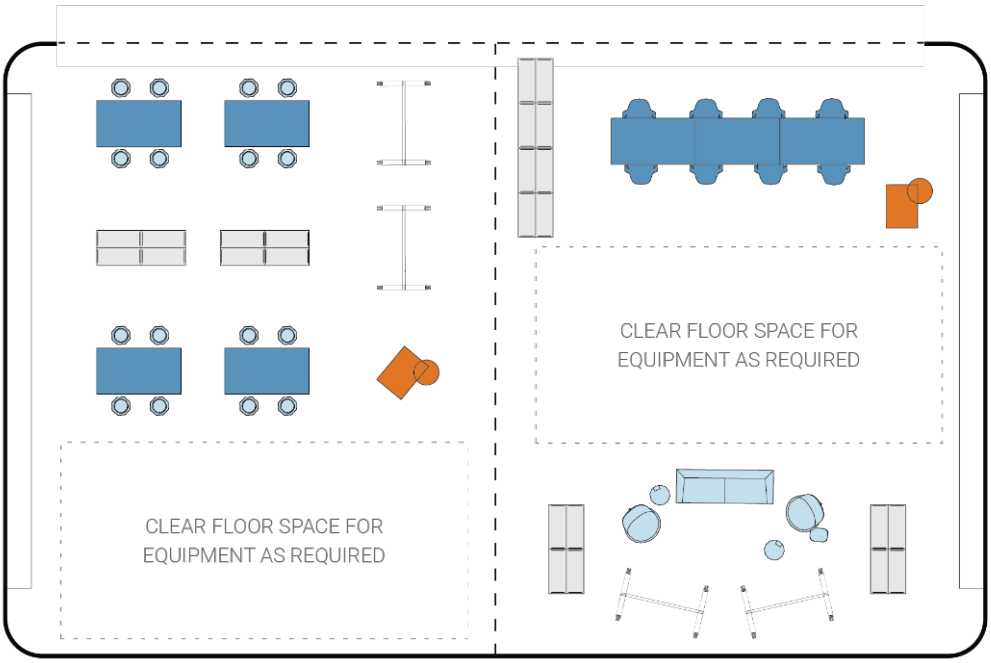
INFORMAL FURNITURE	1 LEARNING STUDIO
FORMAL FURNITURE	2 SMALL GROUP ROOM
STANDING HEIGHT FURNITURE	3 OPEN COLLBORATION
EDUCATOR FURNITURE	4 PROFESSIONAL LEARNING CENTER
MOBILE STORAGE	5 SCIENCE LABOROATORY
CASEWORK*	6 SCIENCE PREP

*Casework is drawn for reference only. For casework requirements, refer to *Chapter 4 - Facility Design Standards*

Maker Space

Maker spaces should primarily utilize formal furniture and storage options that best accommodate project-based learning activities. All furniture selections must allow for an easily reconfigurable learning space to support a variety of learning modalities and group sizes.

1. Provide a minimum of 2 mobile markerboards to enhance collaborative learning.
2. Provide metal storage on casters to allow for easily reconfigurable spaces.
3. All furniture in these spaces are to meet high durability requirements to withstand any material that is used in the spaces such as paint, tools, glue, etc.
4. Any stools specified must be able to accommodate removable back support.



MAKER SPACE LAYOUT

- INFORMAL FURNITURE
- FORMAL FURNITURE*
  *see Maker Space Tables
- MOBILE MARKERBOARDS
- EDUCATOR FURNITURE
- MOBILE STORAGE
- CASEWORK*
  *Casework is drawn for reference only. For casework requirements, refer to *Chapter 4 - Facility Design Standards*

SPECIAL EDUCATION

Special Education spaces should primarily utilize the informal and formal concepts established in the studio spaces from elementary schools to high schools. All furniture selections must allow for an easily reconfigurable learning space to support a variety of learning modalities. Coordinate with Owner to determine appropriate furniture counts on a campus by campus basis.

1. Elementary school studios require a minimum of 30% of the room designated as space for use by learners when out of their wheelchairs, including areas with mats and lounge furniture with motion capabilities.
2. A minimum requirement of 50%-75% of the furniture is required for sensory learning. Sensory learning items can include but are not limited to texture, dimension and color.
3. Studios at middle schools and high schools require 30% of the furniture to have a variety of worksurface heights. Refer to *Chapter 6, Sizing Guide* for specific worksurface height requirements.
4. Learner furniture in special education studios should emulate typical studio spaces with similar ratios of formal and informal learner furniture.
5. Mobile storage
    A. Ensure studio square footage appropriately supports access to mobile storage units without impeding use of operable partitions or blocking visual transparency.
    B. Provide closed storage to limit visual distractions in special education spaces.
    C. Refer to *Chapter 6, Example Furniture Layouts – Learning Neighborhoods* for mobile storage requirements by grade level. Coordinate with the campus to determine acceptability of open cubby or open bookshelf units.
    D. For SPED Flex studios in middle schools and high schools, a maximum of 12 linear feet of mobile storage may be provided in addition to the grade level storage requirement.
6. Provide a mobile educator lectern, task stool, and mobile storage for every educator that is to use the space.
7. All additional furniture for special education spaces is specified directly by the Owner.
8. Provide furniture with additional weight and lockable casters to help avoid getting thrown while supporting flexibility and adaptability for learning.

9. At campuses with Deaf and Hard of Hearing (DHH) programs, provide two rugs for studios supporting this program at elementary campuses and one rug at studios for secondary campuses. Refer to *Chapter 6, Example Furniture Layouts – Learning Neighborhoods* for rug size requirements. For secondary campuses, match to rug size requirements for 5th grade learners.

Sensory Motor Lab

1. Refer to *Educational Specifications, Part 4 – Additional Learning Spaces* for example images of this space type.
2. Campuses are empowered to define the character and equipment of their respective Sensory Motor Labs to best serve learners in each individual campus. Coordinate the desired use and FFE needs for these spaces with the Campus Architectural Team and the Owner to identify vendors and desired furnishings and equipment.
3. Provide a combination of equipment for gross motor development or "crash and bump" activities and sensory stimulation activities.
    A. "Crash and Bump" sensory spaces have furnishings and equipment that allow learners to move about safely, including but not limited to mats, foam play equipment, and sensory swings.
    B. Sensory stimulation spaces have furnishings and equipment that stimulate learners senses, commonly including light and sound-based multimedia equipment and busy boards.

LIBRARY MEDIA CENTER

1. All furniture must allow for an easily reconfigurable learning environment to support a variety of learning modalities and group sizes.
2. Coordinate with Owner to determine appropriate furniture counts on a campus by campus basis.
3. Furniture Requirements
    A. Library Media Centers should utilize a combination of 50% informal and 50% formal furniture and storage that best accommodates campus needs.
        i. Provide stackable seating to meet formal seating requirements.
        ii. Consider opportunities for lounge pieces and reading nooks in the selection of informal furniture.
        iii. Provide lockable casters on any large or heavy informal furniture pieces.
    B. Provide seating and appropriately-sized worksurfaces for a complete studio of learners to be in the Library Media Center at one time. Provide furniture solutions that can accommodate a formal, educator-led activity.
    C. Provide multiple seating heights or height-adjustable furniture pieces to support a range of users and activities.
    D. Provide a variety of worksurface sizes and types to support a range of users and activities.
    E. Provide a minimum of 12 linear feet of mobile markerboards.
    F. Coordinate with Owner to ensure furniture supports staff or community meeting activities in the Library Media Center, if staff and community meetings are not supported elsewhere on campus.
    G. Coordinate with Owner to determine appropriate furniture counts on a campus by campus basis.
4. Book Requirements
    A. Elementary Media Resource spaces have a minimum requirement of 13,000 books, calculated at 15 books per lineal foot. For elementary schools of 850 learners or more, the minimum requirement of books is 14,000.
    B. Middle School Media Resource spaces have a minimum requirement of 15,000 books, calculated at 15 books per lineal foot. For middle schools of 1500 learners or more, the minimum requirement of books is 16,000.

C. High School Media Resource spaces have a minimum requirement of 18,000 books, calculated at 15 books per lineal foot. For high schools of 2600 learners or more, the minimum requirement of books is 19,000.

5. Shelving
    A. Maximum width of shelving units is 3 feet, and maximum height is 6 feet at the perimeter. Flexible shelving is required.
    B. Casters are required at interior shelving units. Maximum size is 3 feet 6 inches wide and 48 inches tall for visual clarity and flexibility. Double-sided interior shelving units are required.
    C. All shelving units require adjustable shelves.
    D. All shelving in these spaces are required to meet high durability requirements and withstand heavy use. Materials such as wood, metal, and acrylic are approved by the Owner.
    E. Coordinate shelving layout with power to ensure no receptacles are blocked by perimeter shelves.
6. Circulation Desk
    A. Provide a minimum of 9 feet of linear workspace. A minimum 3 feet of the overall length must meet ADA requirements. Provide a furniture solution that can be easily reconfigurable.
    B. Provide book carts with a depressible shelf for returned books.
    C. All materials on circulation desk are required to meet high durability requirements and withstand heavy use. Provide countertops that are solid surface or similar with grommets. Plastic laminate is not allowed on countertops. The following size chart outlines appropriate counter heights:
        i. Elementary school: 30 to 33 inches above finish floor maximum
        ii. Middle and High school: 39 to 42 inches above finish floor maximum
    D. Provide space for a minimum of 2 checkout computers.
7. Book Carts
    A. Provide a minimum of 4 carts for elementary schools, of which 2 must have sloped shelves and 2 must have flat shelves.
    B. Provide a minimum of 5 carts for middle schools, of which 3 must have sloped shelves and 2 must have flat shelves. Evaluate the need for studio carts with built-in compartments for use in the Media Center with the Owner.

C. Provide a minimum of 6 carts for high schools, of which 4 must have sloped shelves and 2 must have flat shelves.

D. Ensure a designated location and appropriate square footage for storage of book carts is incorporated into furniture design and planning for the Library Media Center.

8. Office/Workroom

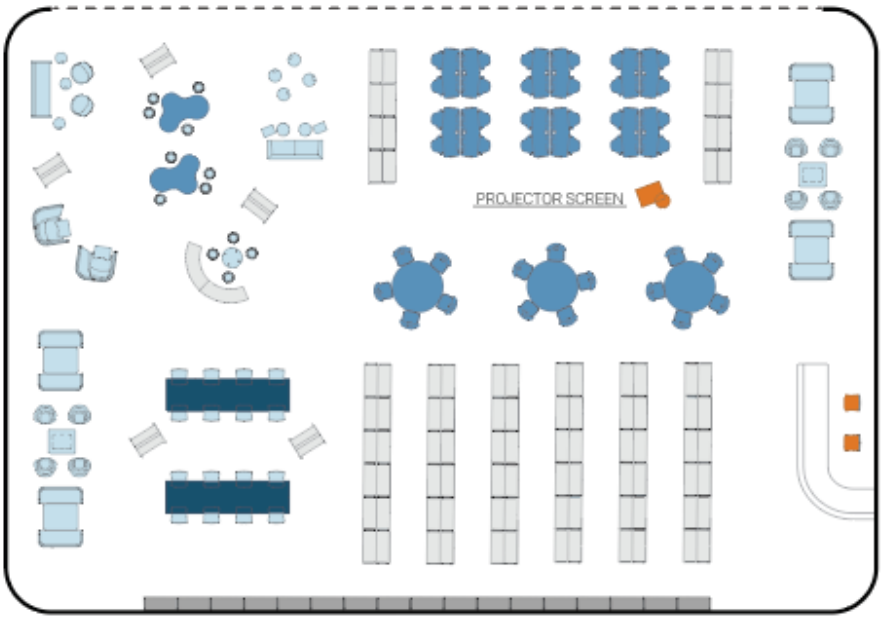
A. Provide office spaces that support at minimum 2 users and maintain visibility to adjacent spaces.

B. Provide layout space for large-format documents and materials. If possible, provide layout space at both standing and seating heights.

C. Provide 6 to 8 linear feet of bookcase storage in the Workroom.

9. A/V Storage

A. Provide lockable carts for transporting A/V equipment. Coordinate specific needs with Owner.



MEDIA RESOURCES LAYOUT

- INFORMAL FURNITURE
- FORMAL FURNITURE
- STANDING HEIGHT FURNITURE
- EDUCATOR FURNITURE
- FIXED LIBRARY SHELVING
- MOBILE LIBRARY SHELVING
- CASEWORK*

*Casework is drawn for reference only. For casework requirements, refer to *Chapter 4 - Facility Design Standards*

CAREER AND TECHNICAL EDUCATION

1. CTE Studios
    A. Provide a minimum of 24 linear feet of mobile storage with a maximum height of 48 inches tall to support passive supervision in all CTE Studios.
    B. Provide a variety of storage units (cubbies, totes, etc.) as appropriate to support existing and planned CTE programming.
    C. Coordinate needs for open, closed, and lockable storage with planned CTE programming and Owner's CTE Department.
2. CTE Labs
    A. Coordinate with Owner's CTE Department to determine appropriate storage and furnishings for Low, Medium, and High Intensity CTE Labs based on campus programming.

VISUAL ARTS

Notes in this section refer to all Visual Arts studios, at all academic levels.

1. Refer to *Chapter 6, Performance Requirements – Learner Furniture* for requirements for worksurfaces in Visual Art studios.
2. Refer to *Chapter 4 – Facility Design Standards* for equipment.
3. Any stools specified must be able to accommodate removable back support.

PERFORMING ARTS

Notes in this section refer to the following programs: Music Studio (elementary schools only), Music (middle schools and high schools only), Theater Arts (middle schools and high schools only), and Dance (middle schools and high schools only).

1. Refer to *Chapter 6, Example Furniture Layouts - Administration* for requirements regarding all faculty offices
2. Refer to *Chapter 4 – Facility Design Standards* for equipment.

ATHLETICS AND WELLNESS

1. Refer to *Chapter 6, Example Furniture Layouts - Administration* for requirements regarding all faculty offices.
2. Refer to *Chapter 4 – Facility Design Standards* for athletic equipment requirements.
3. Provide a lectern and task stool for educator use in all gymnasiums.
4. Provide 4 linear feet of mobile markerboard in each gymnasium,

ADMINISTRATION

1. Provide a minimum of 4 PLC lockers in the Flex PLC for all campuses. Confirm final count of lockers to be provided with Owner.

Offices

Provide administration spaces with furniture to establish an environment of collaboration and communication for educators and administrative staff. Identified below is a tiered system to facilitate appropriate desk and storage needs, and to support the functions and responsibilities of administrative educators. Adjustable height surfaces are highly recommended. All storage requirements must be keyed alike per Owner's requirements. Tiers are identified as follows:

Tier 1: Principal, Vice Principal, Book Keeper
Tier 2: Counselor, Secretary
Tier 3: Kitchen Staff, Custodial Staff, Ancillary Campus Staff

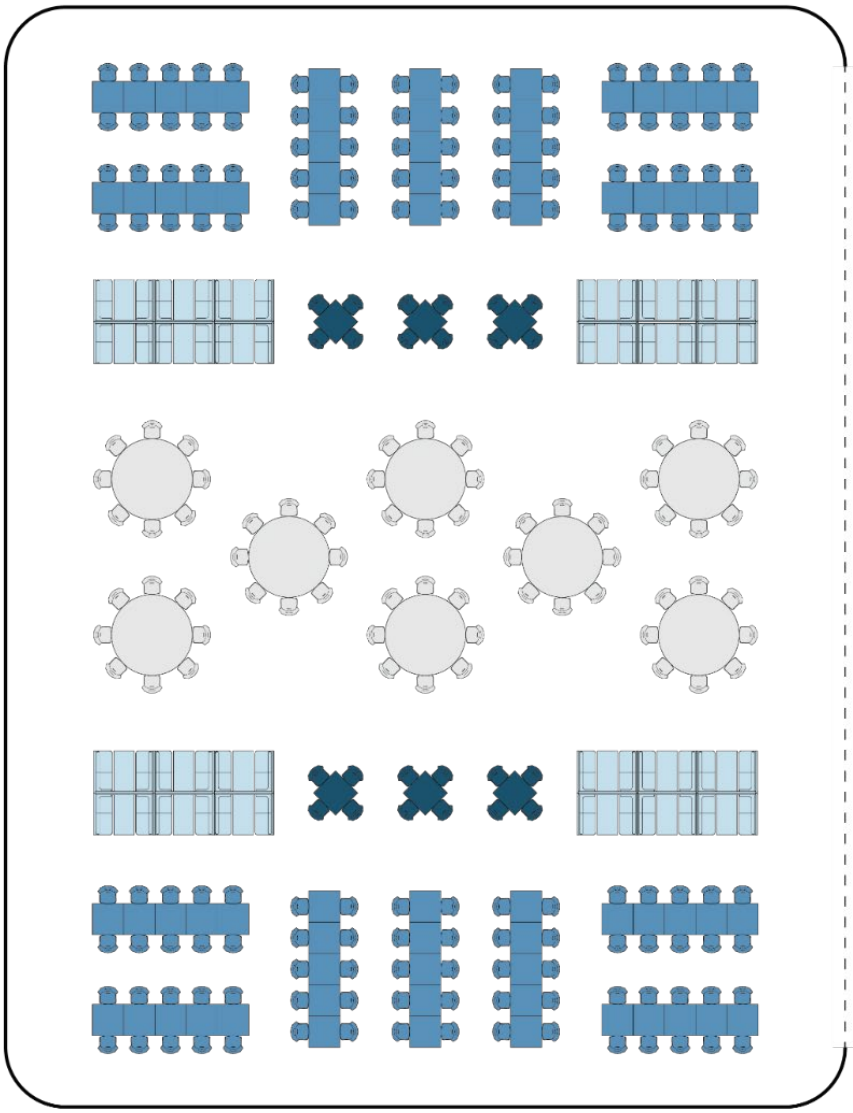
Review all aspects of this space with the Owner prior to procurement to ensure all necessary durability and cleanability requirements are met, including all electrical needs.

Mother's Room

1. Provide at one lounge seating for one adult and an informal worksurface (preferred solutions include laptop table or occasional table). Refer to *Chapter 6, Performance Requirements* for additional requirements regarding furniture in Mother's Room.

DINING COMMONS

1. Provide a variety of seating types so learners have seating choices. Types of furniture should allow for learner collaboration and provide a sense of community. Providing various group seating sizes is preferred. Refer to example layout (shown below) for suggested seating capacity ratios.
    A. Provide a minimum of 30% booth seating at all campuses.
    B. Provide 10% high-top seating at Middle School and High School; a maximum of 10% high top seating may be provided at Elementary Schools, but is not required. A higher ratio is allowed at the discretion of the design team and Owner.
    C. Flexible furniture in this space is required, and 25% of all furniture in this space must have capabilities to relocate to adjacent storage spaces.
    D. As a minimum requirement, provide 50% of group seating for 4-6 learners and 50% of group seating for 6+ learners.
    E. Provide stackable chairs with associated carts to support a variety of uses.
2. This space is also utilized by the community, so sizing should meet learner and adult requirements.
3. Review all aspects of this space with the Owner prior to procurement to ensure all necessary durability and cleanability requirements are met.



DINING COMMONS LAYOUT

- BOOTHS
- CAFE SEATING
- HIGH TOP SEATING
- FOLDABLE TABLE SEATING

STUDENT MENTAL HEALTH AND WELLNESS

Wellness Room

1. Refer to *Chapter 6, Furniture Standards – Sizing Guide* for sizing requirements.
2. Worksurfaces
    A. Provide worksurface solutions to support individual and group stations-based learning activities. Confirm quantity with campus Counseling and Mental Wellness Staff.
    B. Consider writeable surfaces to support flexible activities.
    C. Provide lockable casters for convenient reconfiguration.
    D. Consider height-adjustable worksurfaces at elementary schools to support the full range of users.
3. Seating
    A. Provide 50% formal seating, 25% stationary informal seating, and 25% informal seating that supports learner micromovements. Confirm space capacity with campus Counseling and Mental Wellness Staff.
4. No mobile storage is allowed within Wellness Rooms. All manipulatives are to be stored in the Student Mental Wellness and Counseling suite.

Peace Centers

1. Peace Centers are intended to support learner choice and self-regulation within the Learning Studio and Science Lab spaces. Refer to the *Educational Specifications, Part 5 – Space Programs* for square footage allocation for Peace Centers within learning studios.
    A. Peace Centers can be a furniture or built solution within the square footage allocated in the Education Specifications.
    B. Campuses are empowered to define the character and furnishings of their respective Peace Centers to best serve learners in each individual campus. Discuss and coordinate with the Owner and campuses to best meet requirements outlined below.

2. Furniture Requirements
    A. Provide informal seating for one to two learners maximum. Consider solutions that provide tactile stimulation or provide a sense of shelter.
    B. Acceptable informal seating options include but are not limited to:
        i. Single Learner Lounges (including bean bags)
        ii. Work Lounges
    C. Provide storage for sensory manipulatives. Coordinate with Owner to determine specific storage needs.
    D. Consider the use of mobile storage provided with the Learning Studio to balance supervision and visual or physical privacy between the Peace Center and the Studio.
        i. Consider utilizing pegboard and magnetic backs on mobile furniture to support additional sensory activities for Peace Centers.
3. Science Labs
    A. Provide one additional informal seating product beyond the studio learner count to support Peace Center functionality in Science Labs. Specify waterproof, stain resistant upholstery for long term maintenance and durability.
    B. Coordinate manipulative storage needs to with storage provided for Science Labs.

COMMUNITY

Community Room

1. Provide a minimum of 30 high-capacity, adult-sized stacking chairs with the associated dolly.
2. Provide a minimum of 6 multipurpose mobile flip-top tables with lockable casters to support flexible use of the space.
3. Provide worksurface and seating options for 6-8 young learners within the Community Room.

Community Partners' Suite

1. Parent Support Specialist Office
    A. Provide Tier 2 Administrator Office furnishings.
2. Community Professional Learning Center (PLC)
    A. Provide a collaborative, formal or informal worksurface and corresponding seating to support up to four community partners at a time.
    B. Provide a minimum of 4 PLC for all campuses. Confirm final count of lockers to be provided with Owner.
3. Group Room(s)
    A. Provide a variety of seating types to meet the varied needs of learners, staff, and parent/community users. Provide 50% formal and 50% informal furniture overall for group rooms.
    B. Provide furniture for a minimum of 6-8 people and maximum of 10 people.

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SIZING GUIDE

In addition to accommodating movement of many scales, size furniture to comfortably accommodate the appropriate age groups. Refer to the table below for recommended worksurface and seat heights. Verify sizing with the Owner to ensure the appropriate sizes are provided. Multiple sizes per space are allowed for grade levels that have a large range of learner sizes and heights; however, it is the intent to minimize sizing types for ease of maintenance.

	Small		Medium			Large
Chair Seat Height (Measured to top of seat)	12 inches	13 inches	14 inches	15 inches	16 inches	18 inches
Worksurface Height (Measured to top of surface)	22 inches	-	24 inches	25 inches	27 inches	29-30 inches

Pre-K	•	-	-	-	-	-
K	•	•	•	-	-	-
1	•	•	•	•	-	-
2	-	-	•	•	•	-
3	-	-	-	•	•	-
4	-	-	-	•	•	•
5-12	-	-	-	-	-	•

STANDARD TABLE HEIGHT GUIDELINES:

1. Worksurface Height: 29-30 inches
2. ADA Height: 34 inches maximum. Provide 5% minimum of all seating per room to meet ADA requirements.
3. Counter Height: 36 inches (for counter height stool)
4. Standing Height: 40-42 inches (for bar height stool)
    a. To achieve standing height in Elementary applications, consider the use of height adjustability.

FLOOR-LEVEL TABLE HEIGHT GUIDELINES:

To determine the appropriate worksurface height for floor-level tables, measure height from the top of the provided floor seat (or finished floor if floor seats are not being utilized) and add the required height indicated below to determine the worksurface height:

1. Pre-K – 2: 10 inches
2. 3 – 5: 12 inches

MATERIAL REQUIREMENTS & FINISH SELECTION

During the design process, all materials specified must comply with commercial ANSI, BIFMA, and ASTM standards with an emphasis on durability and ease of maintenance.

Sustainability

Design teams are required to incorporate materials and products with attributes that deliver positive environmental and health performance. Refer to *Chapter 3 – Energy, Water and Sustainability,* the current ANSI/BIFMA Standard Method M7.1 Testing for VOC Emissions for Office Furniture and Seating, and the current ANSI/BIFMA e3 Furniture Sustainability Standard for specific sustainability requirements.

Product Fabrication

Metal Legs: 1 inch diameter, .06 inch thick wall, steel tubing with 1/2 inch threaded inserts welded inside the tubes for mounting the legs to worksurfaces.

Plastic Chairs: Provide plastic and poly chairs made from static-free, high impact polypropylene. Provide seats made from a single formed poly mold with colorfastness ensured by complete color impregnation throughout the molded seat.

Surface Top Materials: 1 to 1-1/4 inch wood composite board (MDF or plywood) (45 lb./cu ft. M3 Grade) core faced with 0.030 inch high pressure decorative laminate (NEMA LD 3), 0.028 inch

phenolic backer (bottom surface), and 3mm polyurethane edge banding. All wood composite products shall be manufactured with no added formaldehyde (NAF) or meet criteria for ultra-low emitting formaldehyde (ULEF). Any worksurface larger than 60 inches wide requires a reinforcing channel to minimize deflection.

Worksurface Grommets: ABS plastic, flush-mounted into the top of the worksurface. The manufacturer is required to cut holes and place grommets in the factory prior to delivery to the site.

Writeable Surfaces: Porcelain markerboard surfaces are preferred; however, back-painted glass substrates and single-process-molded, thermoformed compressed resin are also allowed. Ensure all specified writable surfaces wipe clean with no ghosting. Provide magnetic backers on all substrate options if available. The design team is required to verify substrate requirements for each project. High-pressure laminate with melamine writeable surfaces are allowed with a mockup and prior approval from the Owner. Black or dark colored edge banding is required on any table with a writable surface.

Casters & Glides: Provide 3 inch diameter, twin-wheel, lockable, swiveling casters. Nylon casters attached to legs with steel attachments are required. Glides shall have telescoping height adjustment capabilities. It is the responsibility of the design team to specify the correct glides and casters for hard or soft floor surfaces. Specify universal glides or casters if available.

Ganging Mechanisms: Provide high-strength nylon mechanisms requiring no tools to join tables. Ganging mechanisms are required to self-store under the table while not in use. Pre-drilled tops are required for placement of ganging pegs.

Lounge Seating Foam: Provide 2.6 pounds per cubic foot density, 80 pound compression, with a 2 inch thick seat and back. Provide 3/4 inch thick foam covers at all exposed sides. Specify foam as manufactured with no added halogenated flame retardants, labeled as TB-117-2013 – Requirements, Test Procedure and Apparatus for Testing the Smolder Resistance of Materials Used in Upholstered Furniture.

Furniture Standards

American National Standards Institute (ANSI)

The American National Standards Institute is an organization dedicated to developing performance standards to ensure the highest quality for many sectors of American business. These guidelines strengthen the position of the United States in the global marketplace and assure the health and safety of its consumers.

Business and Institutional Furniture Manufacturer's Association (BIFMA)

The Business and Institutional Furniture Manufacturer's Association is a non-profit organization that creates furniture standards to promote safe working environments. Accredited by ANSI, BIFMA continually lobbies for legislation to continually make furniture safer for workers and consumers.

ANSI/BIFMA Testing

Furniture is put through a series of tests to determine that it will meet the combined standards of both ANSI and BIFMA. These tests determine the safety, functionality, and sustainability of the furniture. Comply with ANSI/BIFMA Standard Method M7.1 Testing for VOC Emissions for Office Furniture and Seating and ANSI/BIGMA e-3 – Furniture Sustainability Standard, Section 7.6.1 and 7.6.2, using either the concentration modeling approach or the emissions factor approach..

ASTM International Textile Standards

The organization formerly known as the American Standards of Testing and Materials, is an international standards-writing organization that develops technical standards for materials and products. ASTM's Textile Standards provide testing methods for the physical, mechanical, and chemical properties of textiles and fabrics.

Upholstery Fabric Standards

Wyzenbeek Test

The Wyzenbeek Test rates the abrasion resistance of fabrics. Abrasion resistance is "the ability to resist surface wear caused by flat rubbing contact with another fabric." The result is measured in "Double Rubs." High-performance fabrics are required for upholstery and must meet or exceed

100,000 Double Rubs. Abrasion test results exceeding ACT Performance Guidelines are not an indicator of product lifespan. Multiple factors affect fabric durability and appearance retention

Standard 100 by Oeko-Tex

A product label for textile products from all processing stages that have been tested for harmful substances.

GREENGUARD Gold Certification

The GREENGUARD Gold Certification standard includes health-based criteria for chemicals and requires low total VOC emissions levels to help ensure that products are acceptable for use in environments like schools and healthcare facilities. Products must also comply with the California Department of Health (CDPH) "Standard Method for the Testing and Evaluation of Volatile Organic Emissions from Indoor Sources Using Environmental Chambers, Version 1.2 (2017).

Maintenance

Solution-dyed fibers are preferred. All upholstery fabrics must have a stain resistant finish and moisture resistant backing, while also meeting the ANSI/BIFMA e3 Furniture Sustainability Standard, Standard 100 by Oeko-Tex and/or GREENGUARD Gold criteria. (refer to *Protective Fabric Coatings* section below) Cleanable fabrics are required and must accept *Brighton Professional Virustat, Multi-Use Cleaner #64, and Eagle Brush Dual Spot and Stain Remover*. Provide manufacturer's cleaning and maintenance requirements to the Owner for all finishes specified.

Standard and COM Fabric

Prioritize materials that are "standard" or "graded in" for any product to minimize cost and lead times. All "Customer's Own Material" (COM) fabric requests must be approved by CMD before a final furniture package is released. If a COM fabric is utilized, it must meet all testing standards and not exceed $75 per yard. COM fabrics require time from the furniture manufacturers for testing and require time allotments in the procurement schedule.

Woven Upholstery

Crypton fabrics are preferred for all woven upholstery fabrics. Crypton is a finish inherently applied to the fibers of the fabric, prior to fabrication, and in lieu of a topical, surface-applied finish. Crypton offers moisture, stain, and antimicrobial resistance, and meets GREENGUARD Gold certification requirements. Other topical protective coatings such as Nanotex, Durablock, and Nanoguard are

allowed but do not offer antimicrobial properties. If puncture-proof fabrics are required, specify Alta Nightclub. If a fabric does not come standard with these finishes, an upcharge will occur if specified. All woven upholstery shall meet Wyzenbeek Test requirements, as well as ANSI/BIFMA e3 Furniture Sustainability Standard, Standard 100 by Oeko-Tex and/or GREENGUARD Gold criteria.

Non-Woven Upholstery

All non-woven upholstery fabrics must withstand ink stains, anti-crocking, and reverse-crocking per ASTM International Textile Standards. Polyurethane is lighter in weight and has a softer feel. Use polyurethane fabrics on lounge furniture due to its ability to breathe and remain cooler when utilized. Vinyl has a stiffer feel and may not upholster as neatly as polyurethanes on curved furniture shapes. Verify with furniture manufacturers for approval prior to specifying vinyl on any lounge furniture. Vinyl, non-woven fabrics do have a higher abrasion resistance and resist fading compared to polyurethanes. Any furniture exposed to high levels of UV light shall utilize vinyl, non-woven fabrics or solution-dyed, woven fabrics. Both vinyl and polyurethanes act as a moisture barriers and additional topical finishes are not required. All non-woven upholstery shall meet ANSI/BIFMA e3 Furniture Sustainability Standard, Standard 100 by Oeko-Tex and/or GREENGUARD Gold criteria.

Outdoor Finish Standards

Steel

Provide Fe37 steel with a layer of phosphatic, micro-crystalline that helps create a high anticorrosive performance. A second stage of varnishing by cataphoresis, (the most technologically-advanced method of protecting the metal for the outdoor elements) is required. Provide products with a final finish using a polyester powder coat. Painted steel that is not powder coated is not allowed.

Aluminum

A chemical element that does not exist in a pure state in nature, it is a malleable metal with strong resistance to corrosion and oxidation. Aluminum components shall be powder coated, level 4, UV finish.

Synthetic Wicker

Synthetic wicker is comprised of a fiber thread or metal wire surrounded by the thermoplastic polymers. Additives further improve the performance levels of this material, ensuring resistance to weather, UV light and heat. Synthetic wicker is offered in a variety of colors.

Polypropylene

Polypropylene is a lightweight and flexible plastic. It is unlikely to shatter and will take significant flexing and damage prior to breaking. It does not mold or deteriorate from bacteria and is non-staining and non-toxic. It is possible to structurally reinforce polypropylene with glass fiber for additional load bearing properties, improving rigidity, surface appearance, durability, and it will not discolor under intense sunlight.

Outdoor Woven Upholstery

All woven upholstery shall meet ANSI/BIFMA e3 Furniture Sustainability Standard, Standard 100 by Oeko-Tex and/or GREENGUARD Gold criteria.

MarineTex Fabric

MarineTex Fabric is 100% woven, vinyl-coated polyester weighing 11 ounces per yard with a minimum width of 54 inches. Acceptable brands include Sunbrella, Bella-Dura, or Dickson. The vinyl resin surface is resilient to cracking, peeling, hardening, and fading.

Sunbrella Fabric

Sunbrella fabric is solution-dyed and woven from 100% acrylic fabrics. It is resistant to UV rays and color degradation. Colors are tested up to 1500 hours in a Fade-O-Meter. Average life span is 5-10 years. The fabric is flame-retardant, highly resistant to acids, alkalis, and solvents, and is water repellent.

Outdoor Product Requirements

During the design process, all materials specified should comply with commercial ANSI, BIFMA, and ASTM standards with an emphasis on durability and ease of maintenance. Provide drain holes for water run-off where required for all outdoor furniture. Additionally, reduce tipping and wind corruption by weighting or bolting furniture to the ground. Materials listed above are approved and all other materials require approval by the Owner prior to procurement.

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Learner Chair, Elementary Schools

Example Product:

Panto Swing, VS America

Groove Cantilever Chair, Smith System

Performance Requirements

1. Forward-flexing cantilever chair to accommodate a variety of body postures.
2. Double-walled, textured polypropylene with air-cushion effect for comfortable sitting.
3. Grip hole for easy maneuvering by all ages.
4. Chair provides the ability to sit sideways, backwards, and forward to assist with immediate visual connection to the educator.
5. Provide the ability to lean back to support natural body movements.
6. Provide various size options to accommodate all learners. Refer to *Chapter 6, Sizing Guide*.
7. Chair seat and frame are an integral design with concealed seat attachments and does not require on-site assembly.
8. Provide universal chair glides for use on both hard surface and carpet.
9. Designed to hang onto worksurface for ease of floor maintenance.

FORMAL SEATING

Learner Chair, Middle & High Schools

Example Product:

Ruckus, KI

360 Chair, Haskell

Performance Requirements

1. Casters for mobility and collaborative energy.
2. Swivel and spin capabilities to promote active learning.
3. Back of chair can function as a tablet arm when seated in multiple positions.
4. Fiberglass reinforced polypropylene seat and back.
5. 1-inch thick, 13-gauge metal frames, either nickel-chrome plated or powder-coated.
6. Stackable.
7. Optional learner storage at base of chair.
8. Designed to hang onto worksurface for ease of floor maintenance.
9. Note: this furniture type can take up floor space and should be specified with coordination to the allowable studio space.

Learner Chair with Tablet Arm

Example Product:

Hierarchy Enroll, MooreCo

Essay, National Office Furniture

Performance Requirements

1. Universal tablet arm or left-right agnostic products preferred to accommodate left and right-handed learners.
2. Casters for mobility and collaborative energy.
3. 360-degree swivel and spin capabilities to promote active learning.
4. Base of chair to serve as learner storage.
5. Provide armless chairs to support a wide range of body types.
6. One-piece polypropylene contoured shell with a flexible back.
7. Personal worksurface moves 360-degrees, and independently of the seat shell and base. Depth is adjustable for large and small users and for ingress or egress.
8. Personal worksurface includes grooved tablet stand for multimedia display. Provide rectilinear, straight-edge tablets.

FORMAL SEATING

High Capacity Stacking Chair

Example Product:

Opt 4 High Density Stacking Chair, KI

Theorem Stacking Chair, Smith System

Performance Requirements

1. Multipurpose chair for use in larger group activities.
2. Chairs are stackable (minimum of 38) for the repurposing of a space.
3. Optional fabric mesh seat and back for temperature control are part of the chair construction and covered under minimum 15-year warranty.
4. Metal sled base with protective rubber glides.
5. Flexible back for ease of comfort.
6. Lightweight chair (7.3 to 10 pounds maximum) making it easy to stack, move, and carry.
7. Armless
8. Poly back versions require integral handles for ease of movement and carrying.

High-Capacity Stacking Chair Dolly

Example Product:

Opt 4 High Density Stacking Chair Dolly, KI

Theorem Stacking Chair Dolly, Smith System

Performance Requirements

1. Furnish from the same chair manufacturer and must accommodate the “High Capacity Stacking Chair”.

FORMAL WORKSURFACES

Single Learner Table

Example Products:

Interchange Curve Table, Smith Systems

Thumbprint Table, VS America

Performance Requirements

1. Use the appropriate height tables to coordinate with learner chairs, or consider the use of height adjustable legs for actively engaged learning. Any height adjustable mechanism shall be capable without the use of additional tools or the Owner's staff.
2. Casters for mobility and collaborative energy.
3. Variety of tabletop shapes for the efficiency of space usage. Tables are capable of fitting together to form larger groups.
4. Explore learner storage components on a campus by campus basis. Avoid storage at learner tables if possible.
5. Optional markerboard worksurfaces available for active learner participation. When markerboard top is specified, black or dark colored edge banding must be used to hide marker dust.
6. Tables constructed with high pressure laminate worksurfaces, 3mm edge banding, and steel tube legs are required.

Multi-Learner Table

Example Products:

Verb Table, Steelcase

Elemental Kidney Table, Smith System

Performance Requirements

1. Consider the use of height-adjustable legs for actively engaged learning. Any height adjustable mechanism shall be capable without the use of additional tools or the Owner's staff.
2. Option for up to 42 inches fixed height for varied seating requirements.
3. Consider casters for mobility and collaborative energy.
4. Tables are capable of fitting together to form larger groupings.
5. Storage at learner tables shall be prohibited if possible.
7. Optional markerboard worksurfaces available for active learner participation. When markerboard top is specified, black or dark colored edge banding must be used to hide marker dust.
6. Optional modesty panels for privacy.
7. Tables constructed with high-pressure laminate worksurfaces, 3mm edge banding, and steel tube legs are required.

Multipurpose Mobile Flip-Top Table

Example Products:

Flip Table, VS America

Pirouette Table, KI

Flip Table, Fleetwood

Performance Requirements

1. Flip-top table for quick transition between learning modalities.
2. Mobile and stackable for repurposing the function of a space.
3. Size recommendation is to fit 2 learners per table and a minimum of 54 inch wide. The preference is a 60 inch wide table.
4. Option to include power capabilities for technology-based learning. If power is specified, cable management is also required.
5. Optional markerboard surface for hands-on learning. When markerboard top is specified, consider a standard black edge band finish to hide marker dust.
6. Tables constructed with high pressure laminate worksurfaces, 3mm edge banding, and steel tube legs are required.
7. Provide casters for space flexibility.
8. Tables shall nest together in a straight line.
9. Consider pinch points on flip top tables if alternates from basis-of-design products are considered.

Maker Space Table

Example Products:

Planner Table, Smiths Systems

Limber Makerspace Table, CEF

Performance Requirements

1. Explore height adjustable surfaces to support varied body postures and multimodal learning.
2. Provide sturdy worksurfaces for creating and constructing. Consider wet and dry uses.
3. Tables with butcher block worksurfaces are preferred for the highest durability. Stainless steel tops for ___ uses. High-pressure laminate tops are acceptable in spaces where high impact activities are not occurring such as painting, power tools, etc.
4. Consider optional, writeable surfaces to encourage collaborative problem solving.
5. Consider tables with storage for various types of tools and supplies. Varied types of storage are preferred to provide for any activity that may occur. Provide a variety of bin sizes and depths.
6. Tables shall fit minimum of 4 learners per table for collaboration.
7. Casters are required and must accommodate weight requirements of the table and an applicable warranty.

Art Table

Example Product:

EPIC Table, WB Manufacturing

Planner Table, Smiths Systems

Performance Requirements

1. Provide a worksurface top appropriate for all art materials, including paint. Butcher block is not an acceptable worksurface top.
2. Tables are equipped with non-skid adjustable glides for precise leveling and rubber leg boots, if needed.
3. If casters are preferred for flexibility of space, use Planner Table as the basis-of-design. If casters are used, they must be lockable.
4. Intended to fit minimum of 4 learners per table for collaboration.
5. Size requirement is 30 by 48 inches, and 48 by 48 inches is also acceptable.
6. Standard height is 30 inches; however, additional heights are acceptable if standing height tables are preferred. Height of table shall coordinate with learner chair specified in this room.
7. Storage provisions are not allowed as part of the table.

Science Table

Example Product:

Adjustable Wooden Leg, Diversified Woodcrafts

Performance Requirements

1. 1-inch epoxy top. Alternative table surfaces may be considered by the owner depending on activities occurring in the space.
2. Tables are equipped with non-skid adjustable glides for precise leveling and rubber leg boots, if needed.
3. Intended to fit minimum of 4 learners per table for collaboration.
    A. Size requirement is 30 by 48 inches, and 48 by 48 inches is also acceptable.
4. Legs can adjust from 30 to 36 inches high. Height of table shall coordinate with learner chair specified in this room.
5. Storage provisions are not allowed as part of the table.
6. If casters are used, they must be lockable.
7. Science tables are not appropriate for Art Studios and may not be specified for Fine Arts spaces.

INFORMAL SEATING

Single Learner Lounge

Example Products:

Domo Lounge, Arcadia

Teardrop Bean Bag, Lakeshore Learning

Kids Lounge, MooreCo

Performance Requirements

1. Comfortable seating for individualized learning.
2. Overall size of chair must correlate to user seat height requirements.
3. Facilitates an informal learning style.
4. Optional power and data capabilities.
5. Optional casters for mobility.
6. Optional left-and-right-handed tablet arms. Tablet arms shall meet a minimum of 300 lb weight limit according to BIFMA standard testing.
7. Finished in durable upholstery for learner comfort. Refer to *Chapter 6, Material Requirements*.

Modular Lounge

Example Products:

Serafina Modular Lounge, Arcadia

MyPlace, KI

Shift+ Lounge, VS America

Performance Requirements

1. Comfortable seating for social learning and connection.
2. Numerous configurations to encourage learner-driven choice.
3. Must include low, medium and standard height options.
4. Functions as community breakout seating.
5. Facilitates an informal learning style.
6. Lightweight construction making it easy for any user to push, roll, or move.
7. Optional power and data capabilities.
8. Option for use with Laptop Tables or tablet arms.
9. Offered in concealed glides, legs, or casters.
10. Finished in durable upholstery for learner comfort. Refer to *Chapter 6, Material Requirements*.

INFORMAL SEATING

Tiered Lounge

Example Product:

RISE, Allsteel

Elevate Steps, MooreCo

Performance Requirements

1. Varied seating heights for multiple teaching and learning modalities.
2. Can also function as a space divider.
3. Enables learner-driven choice in seating.
4. Power and data capabilities.
5. Provides opportunities for social connectivity.
6. Optional lounge trays to serve as worksurfaces.
7. Finished in durable upholstery for learner comfort. Refer to *Chapter 6, Material Requirements*.

Work Lounge

Example Products:

Brody, Steelcase

Heya, OFS

Hush, Arcadia

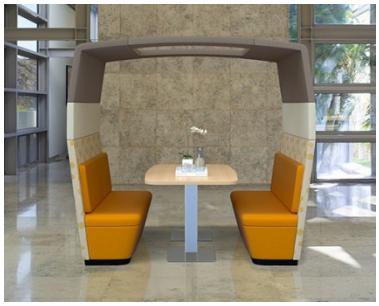
Performance Requirements

1. Comfortable and can accommodate a variety of body postures.
2. Offers acoustic separation for quiet study space.
3. Fabric-wrapped privacy screen or panel a minimum of 48 inches high.
4. Provides a quiet, heads-down space to serve all individual learners.
5. Optional power and data capabilities. Design team is responsible for coordinating floor power at all locations.
6. Optional lighting for proper visibility.
7. Optional footrest for leg support.
8. Must be heavy in weight to prevent throwing.
9. Serves as a quiet peace space for all education needs, including special education.

INFORMAL SEATING

Collaborative Lounge

Example Products:



Co-op, Arcadia

Heya, OFS

Performance Requirements

1. Comfortable and can accommodate a variety of body postures.
2. Offers acoustic separation for a quiet collaborative space. Furniture can provide a low, medium back (36 inches high) or high back (minimum 48 inches high).
3. Shall include a worksurface for small group work.
4. Optional power and data capabilities. Design team is responsible for coordinating floor power at all locations.

Specialty Lounge/Rocker

Example Products:

Sway, KI

Soft Rocker, Smith System

Performance Requirements

1. 360 degree swivel and spin capabilities to promote active, engaged learning.
2. 4 leg poly or metal base with upholstered back and seat for comfort.
3. Consider rocking mechanism to accommodate multimodal learning.
4. Comfortable to support varied body postures.
5. Provides stimulation for improved cognitive function ensuring wellness to all learners.
6. All provided specialty lounge/rockers are required to meet the Sizing Guide requirements for the intended learners.

INFORMAL SEATING

Counter-Height Stool with Back

Example Product:

Strive 4-Leg Armless Café Stool, KI

Performance Requirements

1. Lightweight for easy mobility.
2. Polypropylene seat and back with metal legs. Optional upholstered seat pad.
3. Flexible back for comfort. Shall incorporate handle or poly lip on the back to assist with mobility of chair.
4. Specify glides for appropriate flooring type. Casters are not permitted on this stool.
5. Armless design is preferred for easy ingress and egress during use and to fit various body types.

Movement Stool

Example Products:

Grow Stool, MooreCo

RokDrop, FomCore

Performance Requirements

1. Supports body movement and stimulation for improved cognitive function ensuring wellness to all learners.
2. Movement of stool requires confirmation and testing with learners in early elementary schools or studios to ensure they are safe for use.
3. Lightweight for ease of mobility. Includes a handle or top lip to assist with grabbing and carrying by any user type.
4. Offered with pneumatic height adjustability or various heights to accommodate all learners. Refer to *Chapter 6, Sizing Guide*.
5. If upholstered seat pad is preferred, it is required to specify a vinyl, non-woven upholstery.
6. Provide a non-skid base regardless of flooring surface.
7. Consider a weighted stool with non-skid base for movement for special education needs.
8. Do not specify movement stools in spaces with polished concrete flooring.

INFORMAL SEATING

Stationary Stool/Ottoman/Pouf

Example Products:

Boost, OFS

Whimsy, National Office Furniture

Performance Requirements

1. Consider weighted ottomans to accommodate all learners and special education needs.
2. Comfortable, soft seating used for quick collaboration.
3. Lightweight for ease of mobility.
4. Includes a handle, top lip, casters or is light enough to grab and carry by any user type. If casters are specified, concealed casters are required. Casters are not preferred at early education grade levels.
5. Refer to *Chapter 6, Sizing Guide* for appropriate sizing at each grade level.

Floor Seat Pads/Cushions

Example Product:

Lotus Lily Pad, FomCore

Dot Soft Seating, MooreCo

Performance Requirements

1. Comfortable, soft seating pad that learners can sit on or use as an impromptu worksurface in the sitting position on ground.
2. Vinyl non-woven fabric cover, with zipper removal for ease of cleaning.
3. Minimum size of 10 inches diameter and ½ inch thick. Larger sizes are acceptable.
4. Consider storage caddies if offered.

INFORMAL SEATING

Banquettes

Example Product:

National Fringe, OFS Coact

Performance Requirements

1. Comfortable and can accommodate a variety of body postures.
2. Offers acoustic separation for a quiet collaborative space. Furniture can provide a low, medium back (36 inches high) or high back (minimum 48 inches high).
    a. Coordinate sight line and supervision needs where high-back banquettes are provided.
3. Provide crumb clean out and specify waterproof, stain resistant upholstery for long term maintenance and durability.
5. Optional power and data capabilities. Design team is responsible for coordinating power at all locations.
6. Provide lockable casters when specified in dining areas

Multimedia Ready Table

Example Product:

Interchange Half Boat Conference Table, Smith System

Mio, National Office Furniture

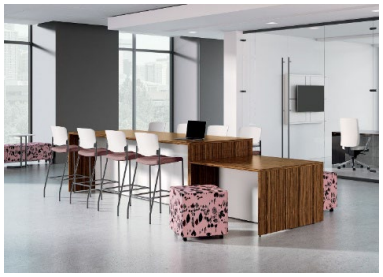
Performance Requirements

1. Power and data capabilities.
2. Minimum table size requirement is 60 inches square by 30 inches high; however, higher tables are acceptable for alternate seating options. Chairs or stools must coordinate with the specified table height.
3. High-pressure laminate top with 3mm edge banding and metal legs.
4. Consider cable management for the ease of maintenance.
5. If power is provided, locations require coordination with the manufacturer, so grommets are installed at the factory.
6. Design team is responsible for coordinating power at all necessary locations.
7. Interactive space for small group work.

Community Table

Example Products:

Dock Work Table, Kimball



Strassa, National Office Furniture

Endzone, SPEC

Performance Requirements

1. Provide various heights to support a variety of body postures and multimodal learning, and for accessibility requirements.
2. Power and data capabilities for technology-based learning. Locations require coordination with the manufacturer, so grommets are installed at the factory.
3. Design team is responsible for coordinating power at all necessary locations.
4. Minimum table size is 36 inches wide by 72 inches in length by 30 or 42 inches high. Chairs or stools require coordination with the specified table height.
5. High-pressure laminate top with 3mm edge banding and metal legs.
6. Consider cable management for the ease of maintenance.
7. Interactive space for small group work.

Café Table

Example Products:

Montara650, SteelcaseCafé Table, SmithSystem

Performance Requirements

1. Various table top heights for casual seating.
2. Community gathering tables to serve as a social hub and one-on-one interactions.
3. Minimum size is 30 inches diameter.
4. High-pressure laminate top with 3mm edge banding and powder coated steel base.
5. Optional power capabilities for charging stations.
6. Design team is responsible for coordinating power at all necessary locations.
7. Casters are not allowed.

Multi-Learner Foldable Dining Table

Example Products:

MT Series Round Mobile Cafeteria Table, Virco

Uniframe Rollaway Cafeteria Table, KI

Performance Requirements

1. Only for use in Dining Commons.
2. High-pressure laminate top with edge banding.
3. Heavy-duty swivel casters with locks are required.
4. Tables with integral seating are prohibited.
5. Provide seating for a minimum of eight learners at multi-learner dining tables.
6. Provide foldable solutions for ease of moving and storage.
7. Preference for ADA-compliant tables.
8. Preference for tables that can be ganged together.

Laptop Table

Example Products:

C-Table, KI

Campfire Skate Table, Steelcase/Turnstone

Performance Requirements

1. Functions as a touchdown worksurface for individual learners.
2. Lightweight for ease of mobility by any user. Consider specifying casters to assist with movement; however, casters are only allowed on 2 of the 4 legs.
3. Facilitates technology-based learning from any location.
4. Slides underneath seating for efficient use of space. Coordinate with adjacent furniture to verify table heights with seating heights.
5. Consider a height adjustable laptop table for versatility as well as the low worksurface height requirements for some elementary grades.

Magnetic Mobile Markerboards

Example Products:

Etch, Watson

Hierarchy Magnetic Glass Board, MooreCo

Performance Requirements

1. Magnetic mobile markerboard to assist with collaborative learning and problem solving.
2. Utilize for space separation in addition to writeable surface.
3. Locking casters for ease of movement.
4. Various sizes are available and minimum size required is 30 inches wide by 48 inches high. Ensure writeable surface is at a height accessible by all users.
5. Optional tackable surfaces where needed or required.
6. Refer to *Chapter 5, Safety and Security* for additional security functionality.
7. Refer to *Chapter 5, Section 101100 – Visual Display Units* for performance requirements.
8. If using for outdoor application, ensure that all materials are suitable for exposure to the elements.
9. Any specialty markerboards (i.e. with music staff lines) require double-sided porcelain with design baked in.

Mobile Tackboards

Example Products:

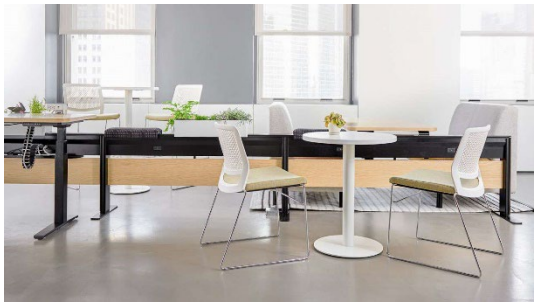
Pin Screen, Watson

Performance Requirements

1. Casters required for ease of mobility.
2. Facilitates collaborative learning and can also function as a room and group separator as needed.
3. Finished with tackable fabric finish over cork backing.
4. Minimum size requirement is 30 inches wide by 48 inches high.
5. Refer to *Chapter 5, Section 101100 – Visual Display Units* for performance requirements.

Systems Beam

Example Products:



Agile, OFS

Xsede Power Beam, Kimball

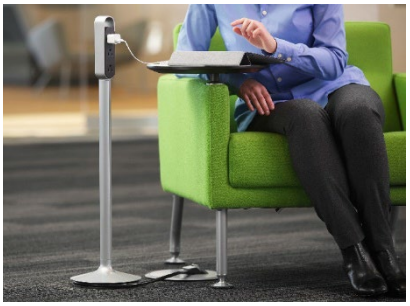
Performance Requirements

1. Power distribution beam available in multiple configurations and lengths. Reconfiguration is possible with the assistance of maintenance staff.
2. Use at open collaboration spaces as a social hub and to create adjacent seating spaces.
3. Include power and data connections for easy technological connectivity. The design team is responsible to coordinate power locations.
4. Do not permanently affix to the floor.
5. Provide powder coated steel for frame and base.
6. High-pressure table tops and modesty panels are required.
7. Provide fabric-wrapped and tackable, or glass privacy screens.
8. Refer to *Chapter 6, Material Requirements* for standard material specifications.

Mobile/Tabletop Power

Example Products:

Hitch, National



Thread, Steelcase

Edgepower, Kwikboost

Performance Requirements

1. Mobile power for maximum flexibility.
2. Explore powered tabletop devices that can hold long term charges.
3. Coordinate mobile power distribution devices with floor power boxes.
4. Used at open collaboration spaces to adapt to the location of the learners.
5. Learners can share ownership of these devices.
6. Can serve as part of a community function or near individual learners.
7. Any USB outlets must be approved by ASID.

Table Privacy Screen

Example Products:

Tonic Slide Screen, Watson

Pop Up Desktop Screen, Knoll

Performance Requirements

1. Used for testing and privacy separation.
2. Provide felt or fabric-wrapped acoustic material.
3. Anchors directly to the countertop edge or free-standing and does not require permanent attachment to a worksurface.
4. Mobile

Mobile Cabinets

Example Product:

Shift, VS America

Accelerator Storage, Alumni

Performance Requirements

1. Provide lockable casters for safety and easy reconfiguration of learning spaces.
2. Storage cabinets with closed doors or open shelving are acceptable. For closed doors, verify with the Owner all locking requirements.
3. Suggested size is 15 inches wide by 48 inches in length by 30 to 48 inches high. Confirm all heights to allow for proper sight lines and ensure no windows are blocked.
4. Optional plastic bins or other componentry to match cabinets.
5. Construction is either fully metal, or laminate shell with metal shelves.

STORAGE

Mobile Shelving

Example Products:

Voyager Mobile Bookcase, Haskell

Rockwell Unscripted, Knoll

Performance Requirements

1. Provide lockable casters for safety and easy reconfiguration of learning spaces.
2. Provide storage cabinets with open shelving. Finished back panel is optional for additional markerboard or tack surface display.
3. Suggested size is 15 to 24 inches wide by 48 inches in length by 30 to 72 inches high. Confirm all heights to allow for proper sight lines and ensure no windows are blocked..
4. Provide adjustable shelves.
5. Optional plastic bins or other componentry to match cabinets.
6. Provide solid wood, high-pressure laminate, or metal. For longer shelf widths, additional supports are required to aid with shelf deflection.

Mobile Cubby/Tote Storage

Example Products:

Accelerator Cubby, Alumni

Serie 600, VS America

Cubby Storage, Fleetwood

Performance Requirements

1. Provide lockable casters for safety and easy reconfiguration of learning spaces.
2. Provide storage cubbies with open shelving. Finished back panel is required.
3. Suggested size is 15 to 24 inches wide by 48 inches in length by 30 to 48 inches high. Confirm all heights to allow for proper sight lines and ensure no windows are blocked..
4. Cubby sizes shall meet the requirements of personal learner storage such as backpacks, boots, coats, personal bins, etc. Verify specific cubby sizes and function with the Owner prior to procurement.
5. Optional plastic bins or other componentry to match cabinets.
6. High-pressure laminate is required.
7. If providing mobile cubbies for personal cubby storage, provide enough to support storage for an entire class of learners. Confirm learner count with owner.
    a. Additional or alternative storage solutions acceptable where square footage deviates from the Ed Specs.

STORAGE

Studio Cart

Example Products:

Everything Cart, Smith Systems

Serie 600 Storage Module, VS America

Performance Requirements

1. Provide lockable casters for safety and easy reconfiguration of learning spaces.
2. Provide storage with open shelving. A finished back panel and handle is optional.
3. Suggested size is 15 to 24 inches wide by 30 to 48 inches in length by 30 to 48 inches high. Confirm all heights to allow for proper sight lines and ensure no windows are blocked..
4. Optional plastic bins or other componentry to match cabinets.
5. Verify bin size preferences per discipline.
6. Provide furniture with high-pressure laminate or powder coated metal materials.

EDUCATOR FURNITURE

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*For *Informal Seating* and *Informal Worksurfaces* for Educators, refer to *Chapter 6, Learner Furniture*. This includes seating and worksurfaces for PLCs and workrooms. Select and size products to meet educators' needs.

*For additional seating and worksurfaces, refer to *Chapter 6, Administrator Furniture*.

FORMAL SEATING

Task Stool for Lectern

Example Products:

Intellect Wave Task Stool, KI

Lumin Task Stool, Sit On It

Performance Requirements

1. Provide an ergonomic seating solution with appropriate lumbar support, to support body movement and flexibility.
2. Lightweight and easily moveable to support various teaching styles and studio configurations.
3. Provide casters.
4. Provide height adjustable capabilities for maximum flexibility and usage.

Educator Lectern

Example Products:

Ruckus, KI

Sit-Stand, Steelcase

Performance Requirements

1. Provide a height adjustable work surface with locking functionality to provide educators with a variety of body postures and ergonomic positions.
2. A mobile lectern with lockable casters is required.
3. Explore additional componentry to meet educator needs to include small lockable storage unit.
4. Must ship fully assembled.
5. Provide a modesty panel for spatial division.

PLC Workstation

Example Products:

Empower Benching, HON

Alloy, National

Performance Requirements

1. Provide a worksurface solution that supports educator heads-down workspace.
2. Select products with integrated technology for seamless connections.
3. Explore height adjustable, sit-to-stand, solutions to allow for educator wellness and a variety of postures.
4. Explore additional componentry for work space adaptability and to support heads-down, educator work.
5. Where possible, provide mobile storage for each individualized station to support the educators' work functionalities and collaboration abilities.

* Refer to *Chapter 6, Supplementary Furniture - Table Privacy Screen for optional acoustical barrier add-on.*

PLC Lockers

Example Products:

Mile Marker 2 Tier Locker, OFS

Alloy Locker, National Office Furniture

Performance Requirements

1. Provide individual storage for educators that is lockable with a digital locking code.
2. Each individual locker to have internal power capabilities.
3. Provide the correct quantity of lockers for each educator in a studio group. Refer to *Chapter 6, Example Furniture Layouts* for required counts.
4. Provide lockers with high-pressure laminate or metal finishes.
5. Provide an integral toe kick of 4 inches.
6. Power requirements: lockers must be hardwired and daisy chained. Power coordination is required by the design team. Battery-powered storage is prohibited.
7. Provide a master key for all lockers in a campus for backup access.

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ADMINISTRATOR FURNITURE

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*For *Informal Seating* and *Informal Worksurfaces* for administrators, refer to *Chapter 6, Learner Furniture*. Select and size products to meet administrator's needs.

Basic Task Chair

Example Product:

Wit, Sit On It

Laudio, National Office Furniture

Ignition, HON

Performance Requirements

1. Provide height adjustable seating with lockable, mobile casters for flexible furniture arrangements.
2. Height adjustable arms and lumbar support are required to support a range of body types. Arms must have a polyurethane top cap for comfort and durability.
3. Mesh or upholstered back and upholstered seat with waterfall cushion for long term comfort and breathability.

FORMAL SEATING

Conference Chair

Example Product:

HB, Highmark

Lavoro, National Office Furniture

Performance Requirements

1. Provide full upholstered seat and back conference chair with fixed loop arms to maximize comfort.
2. Lumbar support is required support a range of body types.
3. Optional mid back or high back for functionality
4. Polished aluminum five-star caster base.
5. Seat height adjustability to meet needs of various table heights and ergonomics for comfort.
6. Arms must have a polyurethane top cap for comfort and durability.

Administrative Reception Desk

Example Products:

Tessera, National Office Furniture

Expansion, Teknion

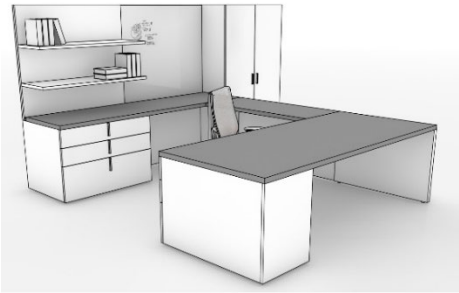
Performance Requirements

1. Minimum of 36 inches wide space at 30 inches above finish floor for ADA accessibility.
2. Minimum of 36 inches wide space at 42 inches above finish for transaction counter use.
3. Locking cabinets, drawers, and open shelving keyed alike. Owner to provide keying standards and standardization of storage.
4. Laminate top, sides, and faces.
5. L-configuration or U-configuration for ergonomics and maximum usage and based upon Owner's requirements.
6. Provide 2 grommets, location determined and placed in the field.
7. Power capabilities for technology-based learning. If power is required, cable raceways to be incorporated as needed.

FORMAL WORKSURFACES

Private Office – Tier 1

Example Products:



Expansion, Teknion

Epic, National

Performance Requirements

1. Locking cabinets, drawers, and open shelving keyed alike in space. Owner to provide keying standards and standardization of storage.
2. Laminate top, sides, and faces.
3. Used for Principals' offices, Assistant Principals' offices, and Athletic Directors' offices.
4. L-configuration or U-configuration for ergonomics and maximum usage and based upon Owner's requirements.
5. Provide a tackboard 18 inches high minimum for full length of desk with upper storage.
6. Provide 2 grommets. Specify location per manufacturer's options to best align with available power.
7. Power capabilities for technology-based learning. If power is required, cable raceways to be incorporated as needed.
8. Explore height adjustable, sit-to-stand solutions to allow for educator wellness and a variety of postures.
9. Provide monitor arms as needed for maximum flexibility and function.
10. Minimum Requirements: one mobile ped with cushion, one 2-drawer lateral file, tackboard, and shelf.
11. Optional: Overhead storage, full height cabinet, and height adjustable desk.

Private Office – Tier 2

Example Products:

Voi, HON

Staks, Carolina (OFS)

Performance Requirements

1. Locking cabinets, drawers, and open shelving keyed alike. Owner to provide keying standards and standardization of storage.
2. Laminate top, sides, and faces.
3. Used for counselors' offices, ancillary offices, etc.
4. L-configuration for ergonomics and maximum usage.
5. Provide a tackboard 18 inches high minimum for full length of desk with upper storage.
6. Provide 2 grommets. Specify location per manufacturer's options to best align with available power.
7. Power capabilities for technology-based learning. If power is required, cable raceways to be incorporated as needed.
8. Explore height adjustable, sit-to-stand solutions to allow for educator wellness and a variety of postures.
9. Provide monitor arms as needed for maximum flexibility and function.
10. Minimum Requirements: 60" worksurface, mobile ped (cushion optional), one 2-drawer lateral file.
11. Optional: Overhead storage, shelf, tackboard, adjustable height desk.

FORMAL WORKSURFACES

Private Office – Tier 3

Example Products:

Byward, Teknion

Staks, Carolina (OFS)

Performance Requirements

1. Locking cabinets and drawers keyed alike in space. Owner to provide keying standards.
2. Laminate top, sides, and faces.
3. Used for coaches' offices, kitchen staff offices, and small offices 100 square feet or less.
4. L-configuration for ergonomics and maximum usage.
5. Provide a tackboard 18 inches high minimum for full length of desk.
6. Optional mobile box/box/file for guest usage with fabric cushion.
7. Provide 2 grommets. Specify location per manufacturer's options to best align with available power.
8. Power capabilities for technology-based learning. If power is required, cable raceways to be incorporated as needed.
9. Explore height adjustable, sit-to-stand solutions to allow for educator wellness and a variety of postures.
10. Provide monitor arms as needed for maximum flexibility and function.
11. Minimum requirements: 60" worksurface, mobile ped (cushion optional).
12. Optional: Overhead storage, shelf, tackboard.

Open Office Workstation

Example Products:

Everyspace, Kimball

Seven Open Plan, Watson

Performance Requirements

1. Provide removable/adjustable panel to allow for heads-down, focused work.
2. Explore height adjustable, sit-to-stand solutions to allow for educator wellness and a variety of postures.
3. Optional mobile box/box/file for guest usage with fabric cushion.
4. Provide 2 grommets, located in the field.
5. Optional locking cabinets and drawers keyed alike. Owner to provide keying standards.
6. Provide acoustical or glass panel for individual work space division and acoustics.
7. Laminate top, sides, and faces.
8. Maximum number of 6 workstations on 1 electrical circuit and hardwired to building, with floor or wall power.
    A. Power poles are not preferred. Any instance where a power pole is specified must be approved by the Owner.
9. Owner to determine required storage needs in each individual space.
10. Provide monitor arms as needed for maximum flexibility and function.

Conference Table

Example Products:

Huddle, HON

Footings Table, National

Performance Requirements

1. Minimum 2 leg panel base with levelers, reinforcing bars, linking plates, recessed power/data module, and mounting hardware. Specify wire management.
2. Laminate edge and trim.
3. Size is dependent on individual space and campus needs.
4. Minimum one surface power module based on length and technology needs of campus

Lounge / Mother's Room Lounge

Example Products:

SW_1, Coalesse

Mabel, National Office Furniture

Performance Requirements

1. Metal 4-star base with optional swivel capability when applicable.
2. Optional ottoman available.
3. Fully upholstered seat and back available in various sizes from mid back to high back to optimize use.

INFORMAL SEATING

Waiting Bench

Example Products:

Raven, ERG International

Fringe, National Office Furniture

Zola, Krug

Performance Requirements

1. Provides maximum flexibility for privacy or collaboration spaces with medium or high back, and single sided or double-sided functionality.
2. Optional ganging bracket for bench configuration in waiting/dining
3. Power capabilities for technology-based learning. If power is required, coordination with floor boxes in construction will be required.
4. Provide metal legs measuring 4 inches with an open plinth of 4 inches minimum for cleanability.
5. Optional toss pillows can be specified.

Guest/Side Chair

Example Product:

Zee, Via

Verve, Stylex

Bourne, JSI

Beo, Kimball

Performance Requirements

1. Stackable guest chair with options for upholstered seat, back, and arms.
2. Frames are full body propylene.

INFORMAL SEATING

Workroom Stool

Example Product:

Grin Stool, National

Gingko Barstool, Davis

Performance Requirements

1. Metal or polypropylene base and frame for maximum durability.
2. Easy to move and reconfigure for a variety of educator activities.
3. Optional cushion can be specified.
4. Must coordinate seat heights with table heights.
5. Provide a back with appropriate lumbar support.

Stationary Table

Example Products:

Parma, ERG International

Endzone, SPEC

Performance Requirements

1. Available in various heights to accommodate various postures and sizing.
2. Power capabilities for technology-based learning. If power is required, specify cable management.

INFORMAL WORKSURFACES

Occasional Table

Example Products:

Marlo, ERG International

Flirt Occasional Table, Arcadia

Performance Requirements

1. Lightweight and easy to move.
2. Casters not required.
3. Metal base and laminate top for maximum durability.
4. Coordinate table height with nearby seat heights.

Meeting Table

Example Products:

Expansion Table, Teknion

Moto Conical Work Table, JSI Community

Performance Requirements

1. Lightweight and durable for easy configuration in an office environment.
2. Provide high-pressure laminate surface for maximum durability. If used in offices, coordinate laminate to match other laminates used in the same room.
3. Optional electrical connection available.

STORAGE

Credenza

Example Products:

Tessera Credenza, National Office Furniture

Exponents Credenza, Coalesse

Performance Requirements

1. Storage unit with various options, drawers, cabinets, open shelving, or a combination of all items.
2. Chassis required for cleanability
3. Non marring adjustable glides.
4. High pressure laminate finish.
5. Additional drawer pulls included.
6. Power capabilities for technology-based learning.
7. If power is required, coordination with electrical in construction phase for accuracy is required.
8. Grommets for wire management required.

File Storage

Example Product:

700 Series Lateral Files, KI

Brigade, HON

Performance Requirements

1. Lockable storage
2. Provide number of drawers to meet campus needs.
3. Where applicable should match casework manufacturer and finish.
4. If files are 5 drawers hight, top drawer should flip up for more ergonomic acces to files.

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LIBRARY MEDIA CENTER FURNITURE

FORMAL WORKSURFACE 6-117

Circulation Desk 117

STORAGE 6-118

Book Cart 6-118

Library Media Center Shelving 6-119

*For all *Formal* and *Informal Seating* and *Formal and Informal Worksurfaces* for Library Media Center, refer to *Chapter 6, Learner Furniture*.

FORMAL WORKSURFACE

Circulation Desk

Example Products:

Mobile Circulation Desk, Mooreco

Information Commons Library Circulation Desk, Paragon

Performance Requirements

1. Provide lockable casters for safety and easy reconfiguration.
2. Provide minimum of 9 feet of linear workspace.
3. Countertops should be solid surface. Plastic laminate is not permitted.
4. Provide book cart with depressible cart for returned books.
5. Provide lockable storage, mobile box/box/file.
6. Consider integrated power. Coordinate power access where power is not integrated.
7. Provide grommets in countertop for cord management.

Book Cart

Example Products:

Gorilla Booktruck, Smith System

Flex-Space Book Cart, Lakeshore Learning

Performance Requirements

1. Provide lockable casters for safety and easy reconfiguration of learning spaces.
2. Provide metal open shelving storage sloped and flat, finished back panel, with optional handles.
3. Suggested size is 15 to 24 inches wide by 30 to 48 inches in length by 30 to 48 inches high. Confirm all heights to allow for proper sight lines.

STORAGE

Library Media Center Shelving

Example Products:

Sola, Palmieri

Information Commons Shelving, Paragon

Performance Requirements

1. Mobile, with lockable casters for easy spatial reconfiguration optional. Provide mobile media resource shelving in the center of the space. Provide fixed media resource shelving on the perimeter walls, no casters.
2. Moveable shelving to be 48 inches high.
3. Perimeter shelving to be 72 inches high.
    A. Perimeter shelving may be less than 72 inches high in instances where shelving will otherwise block glazing or sightlines in and out of Media Center.
    B. Where integral power is provided in perimeter shelving, incorporate outlets into the toe kick and coordinate accordingly.
4. Maximum shelf length to be 36 inches or less. In instances where a length longer than 48 inches is desired, additional steel supports are required to protect against deflection.
5. Provide adjustable shelves.
6. Material can be solid wood, metal, or acrylic. High pressure laminate is not permitted.
7. Additional storage bins, drawers, magazine display and picture book display accessories optional and to be determined by owner needs.
8. No bullnose edges.
9. Mobile cubby storage is not acceptable for shelving intended to meeting minimum book storage requirements.

10. A maximum of 20% of mobile shelving may be curved for accent and space definition. All other shelving should be linear. Coordinate with Owner if more curved mobile shelving is desired.

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FORMAL SEATING

Metal Chairs

Example Products:

Phoenix Dining Side Chair, Source Furniture

Emu Pattern Seating, Coalesse

Performance Requirements

1. Provide lightweight, mobile furniture.
2. Refer to *Chapter 6, Sizing Guide*.
3. Fully-welded stainless steel frames.
4. Outdoor grade, level 4 powder coating or higher, or marine grade finish that is UV-resistant on all metal items.
5. Optional cushion in marine grade fabric available.
6. Allows for choice and variety in learner types.
7. Include a stackable cart to allow for maximum flexibility and storage.
8. Provide solutions that allow for outdoor accessible seating.

Low Stools

Example Products:

Pal Stool, Mondo Collection

Pix Outdoor, Arper

Performance Requirements

1. Provide lightweight, mobile furniture.
2. Refer to *Chapter 6, Sizing Guide.*
3. Fully-welded, powder coated stainless steel frames or UV-resistant polypropylene shell.
4. Outdoor grade, level 4 powder coating or higher, or marine grade finish that is UV-resistant on all metal items.
5. Optional cushion in marine grade fabric available.
6. Allows for choice and variety in learner types.
7. Provide solutions that allow for outdoor accessible seating.
8. Add weight to pieces that should only move minimal, short distances. Optional ability to be bolted to the ground for weather-safe practices.

Bar Stools

Example Products:

Niwa Barstool, Janus Et Cie

Ilsa Barstool, BeauFurn

Performance Requirements

1. Provide lightweight, mobile furniture that is UV Resistant.
2. Refer to *Chapter 6, Sizing Guide*.
3. Fully-welded, powder coated stainless steel frames or UV-resistant polypropylene shell.
4. Outdoor grade, level 4 powder coating or higher, or marine grade finish that is UV-resistant on all metal items.
5. Optional cushion in Marine grade fabric available.
6. Provide solutions that allow for outdoor accessible seating.

Benches

Example Products:

Morelli Bench, Arconas

Oasis, Peter Pepper Products

Performance Requirements

1. Full body concrete, concrete and wood, UV-resistant polypropylene shell, or fully-welded stainless steel frames for maximum durability
2. Outdoor grade, level 4 powder coating or higher, or marine grade finish that is UV-resistant on all metal items.
3. Optional ability to fasten to the ground for weather safe practices.
4. Provide solutions that allow for accessible seating.
5. Optional cushion in marine grade fabric available.

Outdoor Picnic Tables

Example Products:

Demountable A-Frame, Muzo

Hopper Table, Janus Et Cie

Performance Requirements

1. Fully-welded stainless steel frames.
2. Outdoor grade, level 4 powder coating or higher, or marine grade finish that is UV-resistant.
3. Optional ability to fasten to the ground for weather safe practices.
4. Provide solutions that allow for accessible seating.
5. Specify coordinating benches if not attached to table.

Outdoor Side Table

Example Products:

Aria Coffee Table, Source Furniture

Tides Side Table, Source Furniture

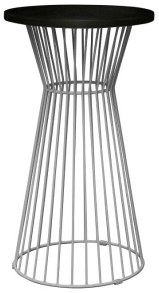
Performance Requirements

1. Full body concrete, UV-resistant polypropylene shell, or fully-welded stainless steel frames for maximum durability
2. Outdoor grade, level 4 powder coating or higher, or marine grade finish that is UV-resistant on all metal items.
3. Coffee tables: optional ability to bolt to ground or weighted for weather safe practices.
4. Side tables: should be lightweight for learner flexibility.

Outdoor Bar Height Table

Example Products:

Bistro Table, BeauFurn



Tribeca 2 Seat Bar Table (round), Source Furniture

Performance Requirements

1. Full body concrete, UV-resistant polypropylene shell, or fully-welded stainless steel frames for maximum durability
2. Outdoor grade, level 4 powder coating or higher, or marine grade finish that is UV-resistant on all metal items.
3. Provides flexibility in exterior studios to allow for all learner types.

Outdoor Café Table

Example Products:

Block Table, Muzo

Disc Outdoor, WCI

Performance Requirements

1. Full body concrete, UV-resistant polypropylene shell, fully-welded stainless steel frames, or weather safe treated wood for maximum durability
2. Outdoor grade, level 4 powder coating or higher, or marine grade finish that is UV-resistant on all metal items.
3. Optional ability to fasten to the ground for weather safe practices.
4. Provide solutions that allow for outdoor accessible seating.

INFORMAL SEATING

Outdoor Lounge Chair

Example Products:

Ivy Lounge Chair, Emu (Steelcase)

Pal Armchair, Mondo Collection

Performance Requirements

1. Outdoor grade, level 4 powder coating or higher, or UV-resistant polypropylene shell.
2. Provides choice for outdoor learning environments.
3. Provide weights for wind control and drainage hole for rain release.
4. Optional cushions available in marine grade fabric that is UV-resistant.
5. Provide solutions that allow for outdoor accessible seating.

Outdoor Lounge Sofa

Example Products:

Ivy Sofa, Emu (Steelcase)

Jut Sofa, Mondo Collection

Performance Requirements

1. Outdoor grade, level 4 powder coating or higher, or UV-resistant polypropylene shell.
2. Provides choice for outdoor learning environments.
3. Provide weights for wind control and drainage hole for rain release.
4. Optional cushions available in marine grade fabric that is UV-resistant.
5. Provide solutions that allow for outdoor accessible seating.

INFORMAL SEATING

Outdoor Modular Lounge

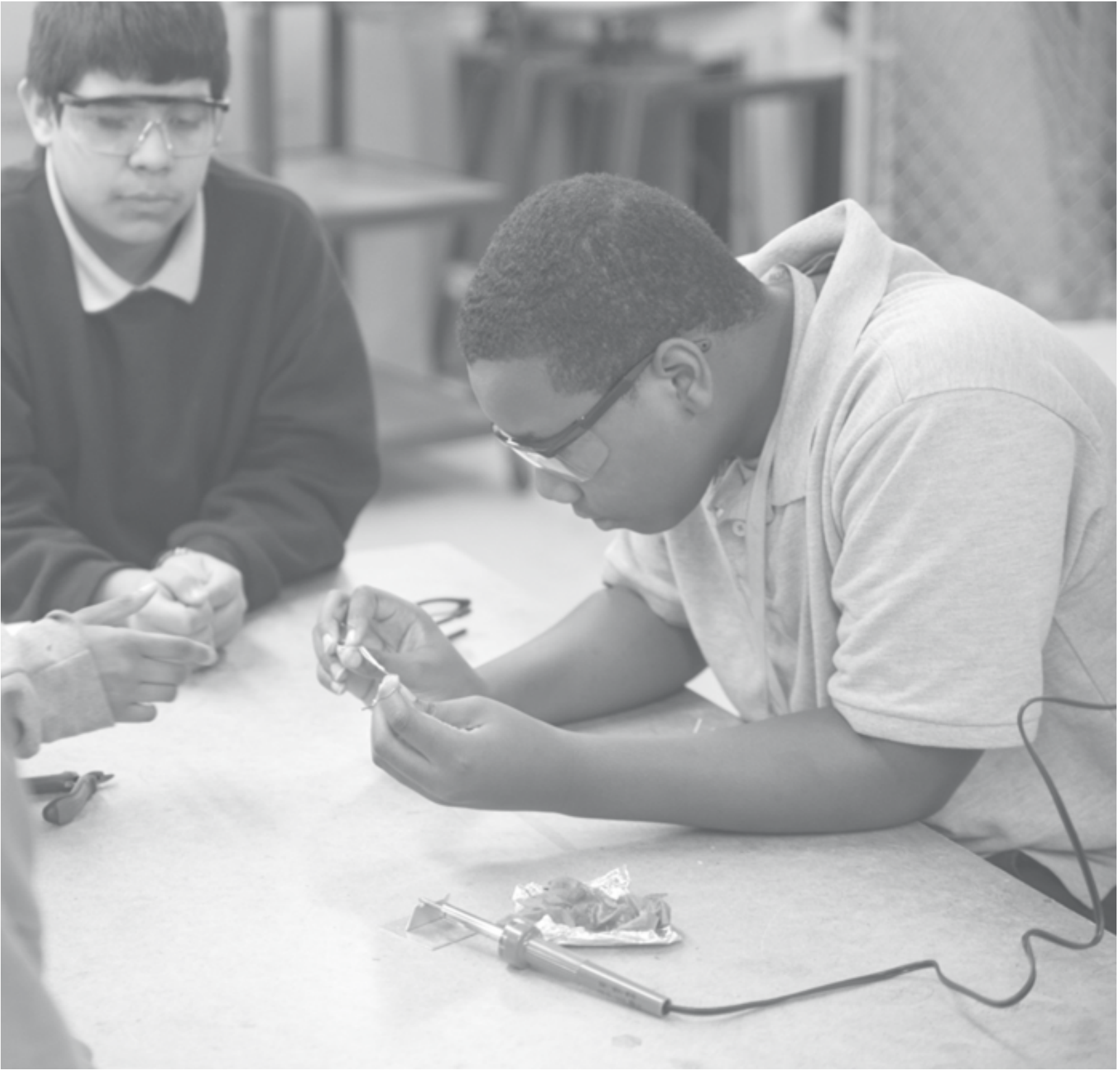
Example Products:

Delano Armless Loveseat, Source Furniture

Vitali Full Back, Janus Et Cie

Performance Requirements

1. Outdoor grade, level 4 powder coating or higher, or marine grade finish that is UV-resistant.
2. Optional cushions available in marine grade fabric that is UV-resistant.
3. Optional ability to bolt to ground or weighted for weather safe practices.
4. Provide removeable cushions that can be secured for ease of cleaning and maintenance.
5. Allows for easy re-configuration.
6. Provide solutions that allow for outdoor accessible seating.



APPENDIX A

FULL SPECIFICATIONS

AUSTIN
Independent School District

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SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. General coordination procedures.
2. Coordination drawings.
3. RFIs.
4. Digital project management procedures.
5. Project meetings.

B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.

C. Related Requirements:

1. Section 013200 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
2. Section 017700 "Closeout Procedures" for coordinating closeout of the Contract.
3. Section 019113 "General Commissioning Requirements" for coordinating the Work with Owner's Commissioning Authority.

1.3 DEFINITIONS

A. BIM: Building Information Modeling.

B. RFI: Request for Information. Request from Owner, [**Construction Manager,**]Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

1.4 INFORMATIONAL SUBMITTALS

A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

1. Name, address, telephone number, and email address of entity performing subcontract or supplying products.
2. Number and title of related Specification Section(s) covered by subcontract.
3. Drawing number and detail references, as appropriate, covered by subcontract.

B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.

1. Post copies of list in project meeting room, in temporary field office, in web-based Project software directory, and in prominent location in each built facility. Keep list current at all times.

1.5 GENERAL COORDINATION PROCEDURES

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

B. Coordination: Each contractor shall cooperate with Project coordinator who shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate its own operations with operations included in different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.

2. Coordinate installation of different components with other contractors to ensure maximum performance and accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

C. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

D. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and scheduled activities of other contractors and direction of Project coordinator to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's construction schedule.
2. Preparation of the schedule of values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Preinstallation conferences.
7. Project closeout activities.
8. Startup and adjustment of systems.

1.6 COORDINATION DRAWINGS

A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely indicated on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.

1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:

a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.

b. Coordinate the addition of trade-specific information to coordination drawings by multiple contractors in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.

c. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
e. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
f. Indicate required installation sequences.
g. Indicate dimensions shown on Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternative sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

B. Coordination Drawing Organization: Organize coordination drawings as follows:

1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
2. Plenum Space: Indicate sub framing for support of ceiling, raised access floor, and wall systems, mechanical and electrical equipment, and related Work. Locate components within plenums to accommodate layout of light fixtures and other components indicated on Drawings. Indicate areas of conflict between light fixtures and other components.
3. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
6. Mechanical and Plumbing Work: Show the following:

    a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
    b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
    c. Fire-rated enclosures around ductwork.

7. Electrical Work: Show the following:

    a. Runs of vertical and horizontal conduit 1-1/4 inches (32 mm) in diameter and larger.
    b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
    c. Panel board, switch board, switchgear, transformer, busway, generator, and motor-control center locations.
    d. Location of pull boxes and junction boxes, dimensioned from column center lines.

8. Fire-Protection System: Show the following:

    a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.

9. Review: Architect will review coordination drawings to confirm that in general the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Architect will so inform Contractor, who shall make suitable modifications and resubmit.

10. Coordination Drawing Prints: Prepare coordination drawing prints according to requirements in Section 013300 "Submittal Procedures."

C. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:

1.
2. File Preparation Format: DWG, Current Version , operating in Microsoft Windows operating system.
3. File Submittal Format: Submit or post coordination drawing files using PDF format.

4. BIM File Incorporation: Develop and incorporate coordination drawing files into BIM established for Project.

    a. Perform three-dimensional component conflict analysis as part of preparation of coordination drawings. Resolve component conflicts prior to submittal. Indicate where conflict resolution requires modification of design requirements by Architect.

5. Architect will furnish Contractor one set of digital data files of Drawings for use in preparing coordination digital data files.

    a. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.
    b. Digital Data Software Program: Drawings are available in <**Insert name and version of digital data software program and operating system**>.
    c. Contractor shall execute a data licensing agreement in the form of Agreement form acceptable to Owner and Architect.

1.7 REQUEST FOR INFORMATION (RFI)

A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.

1. Architect will return without response those RFIs submitted to Architect by other entities controlled by Contractor.
2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:

1. Project name.
2. Project number.
3. Date.
4. Name of Contractor.
5. Name of Architect[**and Construction Manager**].
6. RFI number, numbered sequentially.
7. RFI subject.
8. Specification Section number and title and related paragraphs, as appropriate.
9. Drawing number and detail references, as appropriate.
10. Field dimensions and conditions, as appropriate.
11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
12. Contractor's signature.
13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

    a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

C. RFI Forms: Software-generated form with substantially the same content as indicated above, acceptable to Architect.

1. Attachments shall be electronic files in PDF format.

D. Architect's[**and Construction Manager's**] Action: Architect[**and Construction Manager**] will review each RFI, determine action required, and respond. Allow [**seven**] <**Insert number**> working days for Architect's response for each RFI. RFIs received by Architect[**or Construction Manager**] after 1:00 p.m. will be considered as received the following working day.

1. The following Contractor-generated RFIs will be returned without action:

    a. Requests for approval of submittals.
    b. Requests for approval of substitutions.
    c. Requests for approval of Contractor's means and methods.
    d. Requests for coordination information already indicated in the Contract Documents.
    e. Requests for adjustments in the Contract Time or the Contract Sum.
    f. Requests for interpretation of Architect's actions on submittals.
    g. Incomplete RFIs or inaccurately prepared RFIs.

2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt by Architect [**or Construction Manager**]of additional information.
3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 012600 "Contract Modification Procedures."

    a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect[**and Construction Manager**] in writing within [**10**] <**Insert number**> days of receipt of the RFI response.

E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Include the following:

1. Project name.
2. Name and address of Contractor.
3. Name and address of Architect[**and Construction Manager**].
4. RFI number including RFIs that were returned without action or withdrawn.
5. RFI description.
6. Date the RFI was submitted.
7. Date Architect's[**and Construction Manager's**] response was received.
8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
9. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

F. On receipt of Architect's[**and Construction Manager's**] action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect[**and Construction Manager**] within [**seven**] <**Insert number**> days if Contractor disagrees with response.

1.8 DIGITAL PROJECT MANAGEMENT PROCEDURES

A. Architect's Data Files Not Available: Architect will not provide Architect's [**BIM model**] [**CAD drawing**] digital data files for Contractor's use during construction.

B. Use of Architect's Digital Data Files: Digital data files of Architect's [**BIM model**] [**CAD drawings**] will be provided by Architect for Contractor's use during construction.

1. Digital data files may be used by Contractor in preparing coordination drawings, Shop Drawings, and Project record Drawings.

2. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Contract Drawings.
3. Digital Drawing Software Program: Contract Drawings are available in <**Insert name and version of digital drawing software program and operating system**>.
4. Contractor shall execute a data licensing agreement in the form of [**AIA Document C106 Digital Data Licensing Agreement**] [**Agreement included in Project Manual**] [**Agreement form acceptable to Owner and Architect**].

    a. Subcontractors, and other parties granted access by Contractor to Architect's digital data files shall execute a data licensing agreement in the form of [**AIA Document C106**] [**Agreement included in this Project Manual**] [**Agreement acceptable to Owner and Architect**].

5. <**Insert additional conditions on which digital data drawing files will made available**>.

6. The following digital data files will be furnished for each appropriate discipline:

    a. Floor plans.
    b. Reflected ceiling plans.
    c. <**Insert name of digital data file**>.

C. Web-Based Project Software: Use Owner's web-based Project software site for purposes of hosting and managing Project communication and documentation until Final Completion.
1. The Owner is using Procore Project Management Information System (PMIS) software for program management, project life cycle management, cost management, and document management. PMIS software is used to manage projects in one system that the Owner, third-party staff, and vendors will utilize to capture funds, budgets, contract, purchase orders, request for information, and submittal documentation into one system that allows for day-to-day management of project costs and collaboration of activities. The Owner will provide software licenses, system access, and training for software use.
    a. PMIS enables communication and coordination through digital sharing of forms and workflow processing. The system encompasses:
        1) Non-Cost elements – Requests for Information, Submittals, and Document Management.
        2) Cost Management –Budgets, Funding, Contracts, Change Orders, Purchase Orders, Pay Applications, and Invoices.

D. PDF Document Preparation: Where PDFs are required to be submitted to Architect, prepare as follows:

1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
2. Name file with submittal number or other unique identifier, including revision identifier.

3. Certifications: Where digitally submitted certificates and certifications are required, provide a digital signature with digital certificate on where indicated.

1.9 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times a minimum of 10 working days prior to meeting.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner[**, Construction Manager,**] and Architect, within one day of the meeting.

B. Preconstruction Conference: Schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than [**15**] <**Insert number**> days after execution of the Agreement.

1. Attendees: Authorized representatives of Owner[**, Owner's Commissioning Authority,**] [**, Construction Manager,**] Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Discuss items of significance that could affect progress, including the following:

a. Responsibilities and personnel assignments.
b. Tentative construction schedule.
c. Phasing.
d. Critical work sequencing and long lead items.
e. Designation of key personnel and their duties.
f. Lines of communications.
g. Use of web-based Project software.
h. Procedures for processing field decisions and Change Orders.
i. Procedures for RFIs.
j. Procedures for testing and inspecting.
k. Procedures for processing Applications for Payment.
l. Distribution of the Contract Documents.
m. Submittal procedures.

n. Sustainable design requirements.
o. Preparation of Record Documents.
p. Use of the premises[**and existing building**].
q. Work restrictions.

r. Working hours.
s. Owner's occupancy requirements.
t. Responsibility for temporary facilities and controls.
u. Procedures for moisture and mold control.
v. Procedures for disruptions and shutdowns.
w. Construction waste management and recycling.
x. Parking availability.
y. Office, work, and storage areas.
z. Equipment deliveries and priorities.
aa. First aid.
bb. Security.
cc. Progress cleaning.

3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.

C. Sustainable Design Requirements Coordination Conference: [**Owner will schedule and conduct**] [**Construction Manager will schedule and conduct**] a sustainable design coordination conference before starting construction, at a time convenient to Owner[**, Construction Manager,**] Architect, and Contractor.

1. Attendees: Authorized representatives of Owner,[**Owner's Commissioning Authority,**] [**Construction Manager,**] Architect, and their consultants; Contractor and its superintendent and sustainable design coordinator; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Discuss items of significance that could affect meeting sustainable design requirements, including the following:

a. Sustainable design Project checklist.
b. General requirements for sustainable design-related procurement and documentation.
c. Project closeout requirements and sustainable design certification procedures.
d. Role of sustainable design coordinator.
e. Construction waste management.
f. Construction operations and sustainable design requirements and restrictions.

3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.

D. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity when required by other sections and when required for coordination with other construction.

1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect[**, Construction Manager**] [**, and Owner's Commissioning Authority**] of scheduled meeting dates.

2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:

    a. Contract Documents.
    b. Options.
    c. Related RFIs.
    d. Related Change Orders.
    e. Purchases.
    f. Deliveries.
    g. Submittals.

    h. Sustainable design requirements.
    i. Review of mockups.
    j. Possible conflicts.
    k. Compatibility requirements.
    l. Time schedules.
    m. Weather limitations.
    n. Manufacturer's written instructions.
    o. Warranty requirements.
    p. Compatibility of materials.
    q. Acceptability of substrates.
    r. Temporary facilities and controls.
    s. Space and access limitations.
    t. Regulations of authorities having jurisdiction.
    u. Testing and inspecting requirements.
    v. Installation procedures.
    w. Coordination with other work.
    x. Required performance results.
    y. Protection of adjacent work.
    z. Protection of construction and personnel.

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

E. Progress Meetings: [**Conduct**] [**Construction Manager will conduct**] progress meetings at [**weekly**] [**biweekly**] [**monthly**] [**regular**] <**Insert appropriate interval**> intervals.

1. Coordinate dates of meetings with preparation of payment requests.

2. Attendees: In addition to representatives of Owner[**, Owner's Commissioning Authority**] [**, Construction Manager,**] and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.

3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

   a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

      1) Review schedule for next period.

   b. Review present and future needs of each entity present, including the following:

      1) Interface requirements.
      2) Sequence of operations.
      3) Resolution of BIM component conflicts.
      4) Status of submittals.
      5) Status of sustainable design documentation.
      6) Deliveries.
      7) Off-site fabrication.
      8) Access.
      9) Site use.
      10) Temporary facilities and controls.
      11) Progress cleaning.
      12) Quality and work standards.
      13) Status of correction of deficient items.
      14) Field observations.
      15) Status of RFIs.
      16) Status of Proposal Requests.

17) Pending changes.
18) Status of Change Orders.
19) Pending claims and disputes.
20) Documentation of information for payment requests.

4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.

a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

F. Coordination Meetings: [**Conduct**] [**Construction Manager will conduct**] [**Project Coordinator will conduct**] Project coordination meetings at [**weekly**] [**biweekly**] [**monthly**] [**regular**] <**Insert appropriate interval**> intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.

1. Attendees: In addition to representatives of Owner[**, Owner's Commissioning Authority**] [**, Construction Manager,**] and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meetings shall be familiar with Project and authorized to conclude matters relating to the Work.

2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

a. Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to combined Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
b. Schedule Updating: Revise combined Contractor's construction schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
c. Review present and future needs of each contractor present, including the following:

1) Interface requirements.
2) Sequence of operations.
3) Resolution of BIM component conflicts.
4) Status of submittals.
5) Deliveries.

6) Off-site fabrication.
7) Access.
8) Site use.
9) Temporary facilities and controls.
10) Work hours.
11) Hazards and risks.
12) Progress cleaning.
13) Quality and work standards.
14) Status of RFIs.
15) Proposal Requests.
16) Change Orders.
17) Pending changes.

3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Startup construction schedule.
2. Contractor's Construction Schedule.
3. Construction schedule updating reports.
4. Daily construction reports.
5. Material location reports.
6. Site condition reports.
7. Unusual event reports.

B. Related Requirements:

1. Section 013100 “Project Management Coordination”
   a. Reference PMIS system requirements.
2. Section 017839 “Project record Documents”

1.3 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction Project. Activities included in a construction schedule consume time and resources.

1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
2. Predecessor Activity: An activity that precedes another activity in the network.
3. Successor Activity: An activity that follows another activity in the network.

B. Cost Loading: The allocation of the schedule of values for completing an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum.

C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.

D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

E. Event: The starting or ending point of an activity.

F. Float: The measure of leeway in starting and completing an activity.

1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

G. Resource Loading: The allocation of manpower and equipment necessary for completing an activity as scheduled.

1.4 INFORMATIONAL SUBMITTALS

A. Format for Submittals: Submit required submittals in the following format:

1. PDF file.

B. Startup construction schedule.

C. Construction Schedule Updating Reports: Agenda should be submitted with Progress Meeting.

D. Construction Schedule Updating Reports: Submit with Applications for Payment.

E. Daily Construction Reports: Submit at weekly intervals.

F. Material Location Reports: Submit at weekly intervals.

G. Site Condition Reports: Submit at time of discovery of differing conditions.

H. Unusual Event Reports: Submit at time of unusual event.

I. Qualification Data: For scheduling consultant.

1.5 QUALITY ASSURANCE

A. COORDINATION

B. Coordinate Contractor's Construction Schedule with the schedule of values, submittal schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from entities involved.
2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

1.6 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Time Frame: Extend schedule from date established for the Notice to Proceed to date of Substantial Completion.

1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

B. Activities: Treat each floor or separate area as a separate numbered activity for each main element of the Work. Comply with the following:

1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.
2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.

a. <**Insert list of major items or pieces of equipment**>.

3. Submittal Review Time: Include review and resubmittal times indicated in Section 013300 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with submittal schedule.

4. Startup and Testing Time: Include no fewer than 15 days for startup and testing.
5. Commissioning Time: Include no fewer than 15 days for commissioning.

6. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's[**and Construction Manager's**] administrative procedures necessary for certification of Substantial Completion.
7. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.

C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.

1. Phasing: Arrange list of activities on schedule by phase.
2. Work under More Than One Contract: Include a separate activity for each contract.
3. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
4. Products Ordered in Advance: Include a separate activity for each product. Include delivery date. Delivery dates indicated stipulate the earliest possible delivery date.
5. Owner-Furnished Products: Include a separate activity for each product. Include delivery date. Delivery dates indicated stipulate the earliest possible delivery date.
6. Work Restrictions: Show the effect of the following items on the schedule:

    a. Coordination with existing construction.
    b. Limitations of continued occupancies.
    c. Uninterruptible services.
    d. Partial occupancy before Substantial Completion.
    e. Use-of-premises restrictions.
    f. Provisions for future construction.
    g. Seasonal variations.
    h. Environmental control.

7. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:

    a. Subcontract awards.
    b. Submittals.
    c. Purchases.
    d. Mockups.
    e. Fabrication.
    f. Sample testing.
    g. Deliveries.
    h. Installation.
    i. Tests and inspections.
    j. Adjusting.
    k. Curing.

    l. Building flush-out.

m. Startup and placement into final use and operation.
n. Commissioning.

D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion.

E. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:

1. Unresolved issues.
2. Unanswered Requests for Information.
3. Rejected or unreturned submittals.
4. Notations on returned submittals.
5. Pending modifications affecting the Work and the Contract Time.

F. Contractor's Construction Schedule Updating: At weekly intervals, update schedule to reflect actual construction progress and activities. Issue schedule at each regularly scheduled progress meeting.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
3. As the Work progresses, indicate final completion percentage for each activity.

G. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, equipment required to achieve compliance, and date by which recovery will be accomplished.

H. Distribution: Distribute copies of approved schedule to Architect, Construction Manager, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

1. Post copies in Project meeting rooms and temporary field offices.
2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

1.7 STARTUP CONSTRUCTION SCHEDULE

A. Gantt-Chart Schedule: Submit startup, horizontal, Gantt-chart-type construction schedule within seven days of date established for the Notice to Proceed.

1. Base schedule on the startup construction schedule and additional information received since the start of Project.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

1.8 GANTT-CHART SCHEDULE REQUIREMENTS

A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's Construction Schedule within 30 days of date established for the Notice to Proceed.

1. Base schedule on the startup construction schedule and additional information received since the start of Project.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.

1. For construction activities that require three months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.

1.9 CPM SCHEDULE REQUIREMENTS

A. General: Prepare network diagrams using AON (activity-on-node) format.

B. Startup Network Diagram: Submit diagram within 14 days of date established for the Notice to Proceed. Outline significant construction activities for the first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

C. CPM Schedule: Prepare Contractor's Construction Schedule using a cost- and resource-loaded, time-scaled CPM network analysis diagram for the Work.

1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 60 days after date established for the Notice to Proceed.

a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates.

2. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.

3. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.

4. Use "one workday" as the unit of time for individual activities. Indicate nonworking days and holidays incorporated into the schedule to coordinate with the Contract Time.

D. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the startup network diagram, prepare a skeleton network to identify probable critical paths.

1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:

    a. Preparation and processing of submittals.
    b. Mobilization and demobilization.
    c. Purchase of materials.
    d. Delivery.
    e. Fabrication.
    f. Utility interruptions.
    g. Installation.
    h. Work by Owner that may affect or be affected by Contractor's activities.
    i. Testing and inspection.
    j. Commissioning.
    k. Punch list and final completion.
    l. Activities occurring following final completion.

2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.

    a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.

5. Cost- and Resource-Loading of CPM Schedule: Assign cost to construction activities on the CPM schedule. Do not assign costs to submittal activities. Obtain Architect's approval prior to assigning costs to fabrication and delivery activities. Assign costs under main subcontracts for testing and commissioning activities, operation and maintenance manuals, punch list activities, Project record documents, sustainable design documentation, and demonstration and training (if applicable), in the amount of 5 percent of the Contract Sum.

    a. Each activity cost shall reflect an appropriate value subject to approval by Architect.
    b. Total cost assigned to activities shall equal the total Contract Sum.

E. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall Project schedule.

F. Initial Issue of Schedule: Prepare initial network diagram from a sorted activity list indicating straight "early start-total float." Identify critical activities. Prepare tabulated reports showing the following:

1. Contractor or subcontractor and the Work or activity.
2. Description of activity.
3. Main events of activity.
4. Immediate preceding and succeeding activities.
5. Early and late start dates.
6. Early and late finish dates.
7. Activity duration in workdays.
8. Total float or slack time.
9. Average size of workforce.
10. Dollar value of activity (coordinated with the schedule of values).

G. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:

1. Identification of activities that have changed.
2. Changes in early and late start dates.
3. Changes in early and late finish dates.
4. Changes in activity durations in workdays.
5. Changes in the critical path.
6. Changes in total float or slack time.
7. Changes in the Contract Time.

H. Value Summaries: Prepare two cumulative value lists, sorted by finish dates.

1. In first list, tabulate activity number, early finish date, dollar value, and cumulative dollar value.
2. In second list, tabulate activity number, late finish date, dollar value, and cumulative dollar value.
3. In subsequent issues of both lists, substitute actual finish dates for activities completed as of list date.
4. Prepare list for ease of comparison with payment requests; coordinate timing with progress meetings.

1.10 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

1. List of subcontractors at Project site.
2. List of separate contractors at Project site.
3. Approximate count of personnel at Project site.
4. Equipment at Project site.
5. Material deliveries.
6. High and low temperatures and general weather conditions, including presence of rain or snow.
7. Testing and inspection.
8. Accidents.
9. Meetings and significant decisions.
10. Unusual events.
11. Stoppages, delays, shortages, and losses.
12. Meter readings and similar recordings.
13. Emergency procedures.
14. Orders and requests of authorities having jurisdiction.
15. Change Orders received and implemented.

16. Construction Change Directives received and implemented.
17. Services connected and disconnected.
18. Equipment or system tests and startups.
19. Partial completions and occupancies.
20. Substantial Completions authorized.

B. Material Location Reports: At weekly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site. Indicate the following categories for stored materials:

1. Material stored prior to previous report and remaining in storage.
2. Material stored prior to previous report and since removed from storage and installed.
3. Material stored following previous report and remaining in storage.

C. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

D. Unusual Event Reports: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, responses by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

1. Submit unusual event reports directly to Owner within one day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013200

INDOOR AIR QUALITY MANAGEMENT

SECTION 01 35 46

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Protection of heating, ventilating, and air conditioning systems.

2. Reducing emissions through source control.

3. Pathway interruption.

4. Housekeeping.

5. Scheduling.

6. Indoor Air Quality Management Plan.

B. Related Sections:

1. 01 81 13 Sustainable Construction Requirements

1.2 REFERENCES

A. American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE) 52.2-2007, with errata - Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size.

B. Sheet Metal and Air Conditioning Manufacturer's Association International (SMACNA) - IAQ Guidelines for Occupied Buildings Under Construction, 2nd Edition, 2007, ANSI/SMACNA 008-2008, Chapter 3.

1.3 SUBMITTALS

A. Indoor Air Quality Management Plan:

1. Submit Indoor Air Quality Management Plan for review within ten days

after date of Notice to Proceed. Plan should address key issues for IAQ protections such as scheduling, source control, HVAC protection pathway interruption, and housekeeping. Include:

a. Procedures for implementing requirements of SMACNA IAQ Guideline.
b. Substitution procedures for products that are responsibility of Contractor and proposed source control implementation measures to minimize building contamination.

c. Construction sequencing and storage plans for protection of stored on-site or installed absorptive materials against moisture absorption and contamination.

d. Filter media change schedule. Minimum MERV filtration media per Section 3.1.

e. Contact Information including name, phone number, and email address of Contractor's personnel responsible for instructing workers and overseeing and documenting results of Indoor Air Quality Management Plan.

2. If required, revise and resubmit plan within ten days after receipt of comments.

3. Distribute copies of approved Indoor Air Quality Management Plan to concerned parties.

B. Photographs: Document indoor air quality management measures implemented, including protection of ducts, on-site storage, source control including use of low-VOC products, pathway interruption, green housekeeping, scheduling, and protection of installed absorptive materials. Provide date stamped and annotated photographs during construction and pre-occupancy. Highlight materials stored or installed on-site.

1.4 QUALITY ASSURANCE

A. Review and discuss Indoor Air Quality Management Plan implementation and progress at Preconstruction Conference and Progress Meetings.

1.5 DELIVERY, STORAGE AND HANDLING

A. Designate specific storage areas to facilitate protection of stored absorptive

materials.

B. Clearly identify storage areas. Keep clean and orderly; prevent contamination of materials.

C. Monitor storage areas for contamination; correct problems and implement preventative measures.

D. Store materials off ground on pallets or skids. Keep materials covered and protected until ready for installation.

1.6 TRAINING

A. Provide training of indoor air quality management methods to be used at appropriate stages of Project.

B. Include Indoor Air Quality Management plan and implementation as an agenda item to Pre-Construction meeting as well as Pre-Installation meetings.

C. Require participation of all subcontractors and include as agenda item to subcontractor meetings.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

3.1 IMPLEMENTATION

A. During construction, meet or exceed SMACNA minimum requirements for heating, ventilating, and air conditioning system protection, source control, pathway interruption, housekeeping, and scheduling.

B. Protect stored on-site or installed absorptive materials from moisture damage and volatile organic compound contamination through construction sequencing and proper storage.

C. If air handlers are used during construction, use filtration media with minimum MERV of 8 at air handler outdoor intakes

D. For equipment with dedicated outdoor air coils, provide 4-inch

MERV 13 filter racks just prior to occupancy. All other filtration media should be MERV 8. Also reference Chapter 5 Section 234100 – Air Filters of the Project Development Manual.

E. Heating, Ventilating, and Air Conditioning System Protection:

1. Keep duct systems including supply air, return air, and exhaust air and associated equipment including air handlers, variable air volume boxes, silencers, fans, and filter boxes, clean and uncontaminated.

2. Seal taps and open ends of duct systems not actively being worked on with plastic and tape.

3. Provide 1-inch polyester filter media over return and exhaust air inlets during construction and until Substantial Completion.

4. Ensure that temporary and permanent filters are in place at openings before running fans.

F. Source Control:

1. For temporary and ancillary materials used in construction, follow requirements of similar products in Divisions 2 through 49 to minimize adverse indoor air quality impacts.

2. Use nontoxic and no- and low-VOC formulations and implement other source control measures to minimize building contamination.

3. Prohibit use of tobacco products inside the building and within 30 feet of the building entrance during construction.

G. Pathway Interruption: Isolate areas where work is being performed to prevent contamination of clean spaces.

H. Housekeeping:

1. Implement cleaning activities concentrating on heating, ventilating, and air conditioning systems and building space to remove contaminants prior to occupancy.

2. Comply with AISD Green Housekeeping policy.

3. Protect materials from weather and store in clean area prior to unpacking.

4. Clean coils, air filters, and fans before performing testing and balancing.

I. Scheduling:

1. Sequence construction activities to reduce absorption of any volatile organic compounds by materials.

2. Complete applications of wet and odorous materials before installing absorptive materials.

J. Documentation/Recordkeeping:

1. Photograph each IAQ measure and annotate images for documentation.

2. Photograph the methods employed to protect stored and installed absorptive materials from moisture damage during construction and preoccupancy.

3 Record the filtration media used in HVAC equipment and date(s) media was replaced.

END OF SECTION 013546

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

B. Related Requirements:

1. Section 017419 “Construction Waste Management and Disposal”
2. Section 312000 "Earth Moving" for disposal of ground water at Project site.

1.3 USE CHARGES

A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, occupants of Project, testing agencies, and authorities having jurisdiction.

B. Sewer Service: [Pay sewer-service use charges for sewer usage by all entities for construction operations.

C. Water Service: Pay water-service use charges for water used by all entities for construction operations.

D. Electric Power Service: Pay electric-power-service use charges for electricity used by all entities for construction operations.

E. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

F. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

1.4 INFORMATIONAL SUBMITTALS

A. Site Utilization Plan: Show temporary facilities, temporary utility lines and connections, staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel.

B. Implementation and Termination Schedule: Within 15 days of date established for commencement of the Work, submit schedule indicating implementation and termination dates of each temporary utility.

C. Project Identification and Temporary Signs: Show fabrication and installation details, including plans, elevations, details, layouts, typestyles, graphic elements, and message content.

D. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.

E. Moisture- and Mold-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage and mold.

F. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Include the following:

1. Locations of dust-control partitions at each phase of work.
2. HVAC system isolation schematic drawing.
3. Location of proposed air-filtration system discharge.
4. Waste-handling procedures.
5. Other dust-control measures.

1.5 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

C. Accessible Temporary Egress: Comply with applicable provisions in the Texas Accessibility Standards and ICC/ANSI A117.1.

1.6 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Chain-Link Fencing: Minimum 2-inch, 0.148-inch-thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet high with galvanized-steel pipe posts; minimum 2-3/8-inch-OD line posts and 2-7/8-inch-OD corner and pull posts, with galvanized barbed-wire top strand.

B. Portable Chain-Link Fencing: Minimum 2-inch, 0.148-inch-thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet high with galvanized-steel pipe posts; minimum 2-3/8-inch-OD line posts and 2-7/8-inch-OD corner and pull posts, with 1-5/8-inch-OD top and bottom rails. Provide galvanized-steel bases for supporting posts.

C. Fencing Windscreen Privacy Screen: Polyester fabric scrim with grommets for attachment to chain link fence, sized to height of fence, in color selected by Architect from manufacturer's standard colors.

D. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10-mil minimum thickness, with flame-spread rating of 15 or less per ASTM E84 and passing NFPA 701 Test Method 2.

Retain "Dust-Control Adhesive-Surface Walk-Off Mats" Paragraph below for dust control at entries to dust-controlled work areas.

E. Dust-Control Adhesive-Surface Walk-Off Mats: Provide mats minimum 36 by 60 inches.

F. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.

2.2 TEMPORARY FACILITIES

A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.

B. Common-Use Field Office: Of sufficient size to accommodate needs of Owner, Architect**[, Construction Manager]**, and construction personnel office activities and to accommodate Project meetings specified in other Division 01 Sections. Keep office clean and orderly. Furnish and equip offices as follows:

1. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases.
2. Conference room of sufficient size to accommodate meetings of 10 individuals. Provide electrical power service and 120-V ac duplex receptacles, with no fewer than one receptacle on each wall. Furnish room with conference table, chairs, and 4-foot-square tack and marker boards.
3. Drinking water and private toilet.
4. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F.
5. Lighting fixtures capable of maintaining average illumination of 20 fc at desk height.

C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.

1. Store combustible materials apart from building.

2.3 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.

1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.

C. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

PART 3 - EXECUTION

3.1 TEMPORARY FACILITIES, GENERAL

A. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

3.2 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

1. Locate facilities to limit site disturbance as specified in Section 011000 "Summary."

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.3 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.

1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.

1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.

C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.

D. Water Service: Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.

E. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

F. Temporary Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.

1. Provide temporary dehumidification systems when required to reduce ambient and substrate moisture levels to level required to allow installation or application of finishes and their proper curing or drying.

G. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.

1. Prior to commencing work, isolate the HVAC system in area where work is to be performed according to coordination drawings.

    a. Disconnect supply and return ductwork in the work area from HVAC systems servicing occupied areas.
    b. Maintain negative air pressure within the work area using HEPA-equipped air-filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.

2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.
3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.

H. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.

I. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.

1. Install electric power service [**overhead**] [**underground**] unless otherwise indicated.

2. Connect temporary service to Owner's existing power source, as directed by Owner.

J. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

K. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install WiFi cell phone access equipment and one land-based telephone line(s) for each field office.

1. Provide additional telephone lines for the following:

2. At each telephone, post a list of important telephone numbers.

a. Police and fire departments.
b. Ambulance service.
c. Contractor's home office.
d. Contractor's emergency after-hours telephone number.
e. Architect's office.
f. [**Construction Manager's home office.**]
g. Engineers' offices.
h. Owner's office.
i. Principal subcontractors' field and home offices.

3.4 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible according to ASTM E136. Comply with NFPA 241.
2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas as indicated on Drawings.

1. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.

C. Temporary Use of Planned Permanent Roads and Paved Areas: Locate temporary roads and paved areas in same location as permanent roads and paved areas. Construct and maintain temporary roads and paved areas adequate for construction operations. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.

1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
2. Prepare subgrade and install subbase and base for temporary roads and paved areas according to Section 312000 "Earth Moving."

3. Recondition base after temporary use, including removing contaminated material, regrading, proof-rolling, compacting, and testing.

4. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Substantial Completion. Repair hot-mix asphalt base-course pavement before installation of final course according to Section 321216 "Asphalt Paving."

D. Traffic Controls: Comply with requirements of authorities having jurisdiction.

1. Protect existing site improvements to remain including curbs, pavement, and utilities.
2. Maintain access for fire-fighting equipment and access to fire hydrants.

E. Parking: Provide temporary parking areas for construction personnel.

F. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.

1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
2. Remove snow and ice as required to minimize accumulations.

G. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.

1. Identification Signs: Provide Project identification signs as indicated on Drawings.
2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.

a. Provide temporary, directional signs for construction personnel and visitors.

3. Maintain and touch up signs so they are legible at all times.

H. Waste Disposal Facilities: Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."

I. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 017300 "Execution."

J. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.

1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

K. Temporary Elevator Use: [**Use of elevators is not permitted.**] [**See**] [**Section 142100 "Electric Traction Elevators"**] [**Section 142113 "Electric Traction Freight Elevators"**] [**Section 142123.16 "Machine Room-Less Electric Traction Passenger Elevators"**] [**Section 142400 "Hydraulic Elevators"**] [**Section 142413 "Hydraulic Freight Elevators"**] [**Section 142600 "Limited-Use/Limited-Application Elevators"**] [**for temporary use of new elevators**].

L. Existing Elevator Use: Use of Owner's existing elevators will be permitted, provided elevators are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore elevators to condition existing before initial use, including replacing worn cables, guide shoes, and similar items of limited life.

1. Do not load elevators beyond their rated weight capacity.
2. Provide protective coverings, barriers, devices, signs, or other procedures to protect elevator car and entrance doors and frame. If, despite such protection, elevators become damaged, engage elevator Installer to restore damaged work so no evidence remains of correction work. Return items that cannot be refinished in field to the shop, make required repairs and refinish entire unit, or provide new units as required.

M. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate.

N. Existing Stair Usage: Use of Owner's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use.

1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas so no evidence remains of correction work.

O. Temporary Use of Permanent Stairs: Use of new stairs for construction traffic will be permitted, provided stairs are protected and finishes restored to new condition at time of Substantial Completion.

3.5 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.

1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.

B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

1. Comply with work restrictions specified in Section 011000 "Summary."

C. Temporary Erosion and Sedimentation Control: Comply with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent and requirements specified in Section 311000 "Site Clearing."

D. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings and requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.

1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant-protection zones.
2. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.

4. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

E. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.

F. Tree and Plant Protection: Comply with requirements specified in Section 015639 "Temporary Tree and Plant Protection."

G. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.

H. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using materials approved by authorities having jurisdiction.

I. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people from easily entering site except by entrance gates.

1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.

2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Furnish one set of keys to Owner.

J. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each workday.

K. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

L. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.

M. Covered Walkway: Erect protective, covered walkway for passage of individuals through or adjacent to Project site. Coordinate with entrance gates, other facilities, and obstructions. Comply with regulations of authorities having jurisdiction and requirements indicated on Drawings.

1. Provide overhead decking, protective enclosure walls, handrails, barricades, warning signs, exit signs, lights, safe and well-drained walkways, and similar provisions for protection and safe passage.
2. Paint and maintain appearance of walkway for duration of the Work.

N. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.

1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.

O. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner and tenants from fumes and noise.

1. Construct dustproof partitions with gypsum wallboard with joints taped on occupied side, and fire-retardant-treated plywood on construction operations side.

2. Construct dustproof partitions with two layers of 6-mil polyethylene sheet on each side. Cover floor with two layers of 6-mil polyethylene sheet, extending sheets 18 inches up the sidewalls. Overlap and tape full length of joints. Cover floor with fire-retardant-treated plywood.

    a. Construct vestibule and airlock at each entrance through temporary partition with not less than 48 inches between doors. Maintain water-dampened foot mats in vestibule.

3. Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
4. Insulate partitions to control noise transmission to occupied areas.
5. Seal joints and perimeter. Equip partitions with gasketed dustproof doors and security locks where openings are required.
6. Protect air-handling equipment.
7. Provide walk-off mats at each entrance through temporary partition.

P. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.

1. Prohibit smoking in construction areas. Comply with additional limits on smoking specified in other Sections.

2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.6 MOISTURE AND MOLD CONTROL

A. Contractor's Moisture-Protection Plan: Describe delivery, handling, storage, installation, and protection provisions for materials subject to water absorption or water damage.

1. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
2. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
3. Indicate methods to be used to avoid trapping water in finished work.

B. Exposed Construction Period: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:

1. Protect porous materials from water damage.
2. Protect stored and installed material from flowing or standing water.
3. Keep porous and organic materials from coming into prolonged contact with concrete.
4. Remove standing water from decks.
5. Keep deck openings covered or dammed.

C. Partially Enclosed Construction Period: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:

1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
2. Keep interior spaces reasonably clean and protected from water damage.
3. Periodically collect and remove waste containing cellulose or other organic matter.
4. Discard or replace water-damaged material.
5. Do not install material that is wet.
6. Discard and replace stored or installed material that begins to grow mold.
7. Perform work in a sequence that allows wet materials adequate time to dry before enclosing the material in gypsum board or other interior finishes.

D. Controlled Construction Period: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:

1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
2. Use temporary or permanent HVAC system to control humidity within ranges specified for installed and stored materials.
3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.

    a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for 48 hours are considered defective and require replacing.
    b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of exposure and continuing daily for 48 hours. Identify materials containing moisture levels higher than allowed. Report findings in writing to Architect.
    c. Remove and replace materials that cannot be completely restored to their manufactured moisture level within 48 hours.

3.7 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal.

1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.

2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace

street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.

3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION 015000

SECTION 016500 – GENERAL COMMISSIONING REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes general requirements that apply to implementation of commissioning without regard to specific systems, assemblies, or components.

B. Related Sections:
   1. Division 22 Section “Commissioning of Plumbing Systems” for commissioning process activities for plumbing systems, assemblies, equipment and components.
   2. Division 23 Section "Commissioning of Mechanical Systems" for commissioning process activities for mechanical systems, assemblies, equipment, and components.
   3. Division 26 Section "Commissioning of Electrical Systems" for commissioning process activities for electrical systems, assemblies, equipment, and components.

1.3 DEFINITIONS

A. Approval: Acceptance that a piece of equipment or system has been properly installed and is functioning in tested modes according to Contract Documents.

B. Basis of Design (**BoD**): A document that records concepts, calculations, decisions, and product selections used to meet the OPR and to satisfy applicable regulatory requirements, standards, and guidelines. The document includes both narrative descriptions and lists of individual items that support the design process. Describes systems, components, conditions, and methods chosen to meet design intent.

C. Building Commissioning: A joint team effort to ensure that all mechanical equipment, controls, and systems function together properly to meet the design intent, to document system performance parameters for fine-tuning of control sequences and operational procedures, and to ensure that personnel are adequately trained to operate systems.

D. Commissioning Plan: A document that outlines the organization, schedule, allocation of resources, and documentation requirements of the commissioning process.

E. Commissioning Authority (**CxA**): Independent agent hired by Owner and not associated with Contractor or its subcontractors, Architect or its sub-consultants, or Owner’s Contracting Officer Technical Representative or its staff or consultants. Under Owner’s direction, and not Contractor’s direction, CA will direct and coordinate day-to-day commissioning activities without assuming oversight responsibilities.

F. Commissioning (**Cx**) Process: A process that encompasses and coordinates the traditionally separate functions of system documentation, equipment start-up, control system calibration, testing and balancing, training and performance testing. Commissioning requirements do not supersede other requirements of the specifications, but may expand on some of them.

G. Commissioning Team: Consists of a Commissioning Authority retained by the Owner, Owner's Representative, major equipment suppliers and Contractors/subcontractors.

H. Contractor (**CONTRACTOR**): Representatives from the Design Build contractor, with whom Owner is contractually obligated to carry out overall planning, coordination, and control of project from inception to completion in accordance with contract documents.

I. Deferred Functional Tests: Functional tests performed later, after Substantial Completion, due to partial occupancy, equipment, seasonal requirements, design, or other Site conditions that disallow test from being performed.

J. Design Intent: Dynamic document that provides explanation of ideas, concepts, and criteria that are considered to be important to Owner. Initially, outcome of programming and conceptual design phases.

K. Functional Test: Test of dynamic function of systems, as opposed to components, under full operation in various modes through all control system’s sequences of operation using manual (direct observation) or monitoring methods following prescribed test procedures in sequential written form.

L. Owner's Project Requirements (**OPR**): A document that details the functional requirements of a project and the expectations of how it will be used and operated. These include Project goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting information.

M. Pre-functional Checklist: List, provided by Commissioning Authority to installer, of items to inspect and elementary component tests to conduct to verify proper installation of equipment prior to functional testing.

N. Sampling: Functionally testing only a fraction of total number of identical or near identical pieces of equipment.

O. Seasonal Commissioning: Testing of equipment that can be done only during periods of peak heating or cooling, when HVAC equipment is operating at full-load or heavy-load conditions.

P. Simulated Condition: Condition created for purpose of testing response of system.

Q. Systems, Subsystems, Equipment, and Components: Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, equipment, and components.

R. Trending: Monitoring using building control system.

1.4 COMMISSIONING TEAM

A. Members Appointed by CONTRACTOR: Individuals, each having the authority to act on behalf of the entity he or she represents, explicitly organized to implement the commissioning process through coordinated action. The commissioning team shall consist of, but not be limited to, representatives of CONTRACTOR, including Project superintendent and all subcontractors, installers, suppliers, specialists, etc. who are responsible for installing systems under this project.

B. Members Appointed by Owner:

1. Owner:
Austin Independent School District
4000 S IH 35 Frontage Road
Austin, Texas 78704
Contact: Construction Management Department
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2. Commissioning Authority (CxA):
ACR Engineering
3001 South Lamar, Ste. 210
Austin, Texas 78704
Contact: Ricardo Troncoso, P.E.
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Phone (mobile): 512-563-3493
E-mail: rtroncoso@acreng.com

C. Designated Members of the Design Team:

1. Architect: _____
Address: _____
Contact: _____
Phone (office): _____
Email: _____

2. MEP Engineer: _____
Address: _____
Contact: _____
Phone (office): _____
E-mail: _____

1.5 RESPONSIBILITIES

A. Responsibilities of the CxA during the Construction Phase include, but are not limited to the following:

1. Coordinate and direct each step of the total Commissioning Process for systems being installed as part of this contract. Coordinate commissioning work schedule with Owner and CONTRACTOR.
2. Provide commissioning plan.
3. Attend planning and job-site meetings as required to obtain information relating to Commissioning Process. Convene commissioning team meetings as required.
4. Plan and conduct Commissioning scoping and coordination meetings. Provide notice to all Team members to attend scheduled commissioning meetings.
5. Request all information required for Commissioning Process from manufacturers, CONTRACTOR, and Design Professionals.
6. Review Design Professionals' design documents to gain clear understanding of design intent.
7. Review CONTRACTOR submittals for compliance with commissioning needs.
8. Verify that systems and equipment have been installed and started in accordance with manufacturer's recommendations and with generally recognized construction standards, and that documentation of such has been provided.
9. Assist in resolving discrepancies.
10. Conduct periodic site observations during constructions and issue Cx Field Reports to documents findings and issues requiring Owner or Architect attention.
11. Prepare Pre-Functional Checklists to ensure systems have been installed according to project specifications. Verify that Pre-Functional Checklists have been addressed by CONTRACTOR and are accurate. Deliver final Pre-Functional Checklists to Owner.
12. Prepare Functional Test procedures to demonstrate performance of systems according to project specifications. Observe and document performance of systems, as per process detailed in Functional Test procedures.
13. Verify the execution of commissioning process activities using random sampling. The sampling rate may vary from 1 to 100 percent. Verification will include, but is not limited to, equipment submittals, construction checklists, training, operating and maintenance data, tests, and test reports to verify compliance with the OPR. When a random sample does not meet the requirement, the CxA will report the failure in the Issues Log.
14. Prepare and maintain an Issues Log.
15. Compile test data, inspection reports, and certificates; include them in the systems manual and commissioning process report.
16. Review testing and balancing (TAB) reports; notify Owner of deficiencies.
17. Recommend acceptance or non-acceptance of systems to Owner.
18. Verify that Operations and Maintenance (O&M) documentation is acceptable. Operations and Maintenance manuals shall be submitted simultaneously to CxA and to Design Professionals for review.
19. Prepare and maintain a current facilities requirements and operations and maintenance plan that contains the information necessary to operate the space efficiently.
20. Verify that training has taken place by collecting training documentation from CONTRACTOR.
21. Compile and maintain commissioning record.
22. Provide pre-final and final commissioning reports to all commissioning team members. The report shall include:

    a. Communications between Owner, CxA, Design Professionals, Vendors, and/or CONTRACTOR and Subcontractors related to Commissioning Process.
    b. Minutes of Commissioning meetings.
    c. Findings and pertinent observations.

d. A listing of any deficiencies, unresolved issues, and compromises in the environmentally responsive features of the project.
e. Manufacturer's start-up reports.
f. An Issues Log which will:

1) List design, installation, and performance issues that are at variance with the Owner's project requirements and Contract Documents.
2) Identify and track issues as they are encountered, documenting the status of unresolved and resolved issues.
3) Document corrective modifications made.

g. Pre-Functional Checklists.
h. Testing plans and Functional Test reports.
i. Listing of off-season test(s) not performed and a schedule for their completion.

23. Conduct an inspection of the building and its systems within 10 months after substantial completion and prior to the expiration of warranties. Prepare a report documenting findings that should be addressed prior to expiration of warranties. (Not in scope)

B. Contractor: Responsibilities of the Design Build Contractor as related to Commissioning Process include, but are not limited to the following:

1. Facilitate coordination of Commissioning work by CxA.
2. Attend Commissioning meetings or other meetings called by CxA to facilitate the Commissioning Process.
3. Integrate and coordinate commissioning process activities with construction schedule.
4. Provide CxA with all submittals, start-up instructions manuals, operating parameters, and other pertinent information related to Commissioning Process. This information shall be provided directly to the CxA as a digital PDF file at the same time that the submittals are made to the architect and/or engineer.
5. Review and accept Pre-Functional/Construction checklists provided by the CxA.
6. Review CxA's Functional Test procedures for feasibility, safety, and impact on warranty, and provide CxA with written comment on same.
7. Provide all documentation relating to manufacturer's recommended performance testing of equipment and systems.
8. Provide Operations and Maintenance Data to CxA for preparation of checklists and training manuals.
9. Provide testing and balancing report.
10. Provide As-built drawings and documentation to facilitate Functional Testing.
11. Assure and facilitate participation and cooperation of specialty subcontractors (electrical, mechanical, controls, etc.) and equipment suppliers as required for the Commissioning Process.
12. Install systems and equipment in strict conformance with project specifications, manufacturer's recommended installation procedures, and Pre-Functional Checklists, as prepared by CxA.
13. Require subcontractors to inspect systems installed and fill out Pre-functional Checklists (provided by CxA) to verify installation has taken place in accordance with manufacturer's instructions, and in a workmanlike manner in accordance with project documents and generally accepted construction practices. Certify to CxA that installation work listed in Pre-functional Checklists has been completed and accompany CxA during verification of completed Pre-functional Checklists.

14. Provide data concerning performance, installation, and start-up of systems.
15. Provide copy of manufacturer's filled-out start-up forms for equipment and systems.
16. Ensure systems have been started and fully checked for proper operation prior to arranging for Functional Testing with CxA. Prepare and submit to CxA written certification that each piece of equipment and/or system has been started according to manufacturer's recommended procedure, and that system has been tested for compliance with operational requirements.

    a. CONTRACTOR shall carry out manufacturer's recommended start-up and testing procedures, regardless of whether or not they are specifically listed in CxA's Functional Test procedures.
    b. CONTRACTOR is not relieved of obligation for systems / equipment demonstration where performance testing is required by specifications, but a Functional Performance Test is not specifically designated by CxA.

17. Coordinate with CxA to determine mutually acceptable date for Functional Performance Tests.
18. Direct and coordinate commissioning testing among subcontractors, suppliers, and vendors.
19. Complete commissioning process test procedures.
20. Provide qualified personnel to assist and participate in Commissioning.
21. Provide test instruments and communications devices, as prescribed by CxA and where identified in this specifications manual, as required for carrying out Functional Testing of systems.
22. Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend corrective action.
23. Cooperate with the CxA for resolution of issues recorded in the Issues Log.
24. Ensure deficiencies found in the Commissioning Process are corrected within the time schedule shown in the Cx report.
25. Prepare and submit to CxA proposed Training Program outline for each system.
26. Coordinate and provide training of Owner's personnel. Provide CxA with proposed training agenda no less than 14 days prior to proposed training sessions. Provide documentation that training took place (including system being trained, trainer's name and contact information, sign-in sheet verifying who attended training, length of training, and signature of owner's authorized person certifying training took place satisfactorily).
27. Provide a tracking method to ensure that all required positions or person received training.
28. Prepare Operation and Maintenance manuals and As-Built drawings in accordance with specifications; submit copy to CxA in addition to other contractually required submissions. Revise and resubmit manuals in accordance with Design Professionals and CxA's comments.
29. All costs associated with the participation of CONTRACTOR, Sub-Contractors, and Equipment Vendors in the Commissioning Process shall be included as part of the Construction Contract.

C. Subcontractors and vendors shall prepare and submit to Commissioning Authority Manufacturer's installation and performance test procedures to demonstrate performance of systems according to these specifications and checklists prepared by Commissioning Authority.

D. Owner's Representative: Responsibilities of the Owner's Representative as related to the Commissioning Process include, but are not limited to the following:

1. Provide the OPR documentation to the CxA and CONTRACTOR for information and use.
2. Assign operation and maintenance personnel and schedule them to participate in commissioning team activities.
3. Provide the BoD documentation, prepared by Architect and approved by Owner, to the CxA and CONTRACTOR for use in developing the commissioning plan, systems manual, and operation and maintenance training plan.
4. Manage contracts of Architect, CONTRACTOR and CxA.
5. Arrange for facility operating and maintenance personnel to attend various field commissioning activities and field training sessions.
6. Provide final approval for completion of commissioning Work.
7. Warranty Period: Ensure that seasonal or deferred testing and deficiency issues are addressed.

E. Architect: Responsibilities of the Architect as relate to Commissioning Process include, but are not limited to the following:

1. Attend commissioning scoping meeting and other commissioning team meetings as requested by Commissioning Authority and as selected by Architect.
2. Perform normal submittal review, construction observation, record drawing preparation, and operations and maintenance data preparation, as required by Contract Documents.
3. Review Commissioning Authority's submittal review comments and issue directive to CONTRACTOR and/or Design Professionals as deemed applicable.
4. Coordinate resolution of system deficiencies identified during commissioning, as required by Contract Documents. Review Commissioning Issues Logs and issue directives to CONTRACTOR and/or Design Professionals as applicable.
5. Prepare and submit final as-built design intent documentation for inclusion in Operation and Maintenance Data Manual, and review and approve Operation and Maintenance Data Manual.
6. Review Commissioning Report and issue directive to resolve all outstanding deficiencies prior to project close-out.
7. Warranty Period: Coordinate resolution of design non-conformance and design deficiencies identified during warranty period commissioning.

F. Design Professionals Responsible for Design of Each Portion of Work Being Commissioned:

1. Perform normal submittal review, construction observations, and record drawing preparation, as required by Contract Documents. Perform site observation immediately preceding system startup.
2. Respond to deficiencies identified by Commissioning Authority as directed by Architect.
3. Provide design narrative and sequence documentation requested by Commissioning Authority. Assist, along with CONTRACTOR, in clarifying operation and control of commissioned equipment in areas where specifications, control drawings, or equipment documentation are not sufficient for writing detailed testing procedures.
4. Attend commissioning scoping meetings and other commissioning team meetings as requested by Commissioning Authority and as directed by Architect or responsible design professional.
5. Participate in resolution of system deficiencies identified during commissioning, as required by Contract Documents.

6. Prepare and submit final as-built design intent and operating parameters documentation for inclusion in Operation and Maintenance Manual, and review and approve Operation and Maintenance Manual.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 GENERAL

A. Authority

1. The Commissioning Authority carries out his responsibilities as the Owner's authorized agent in accordance with plans, specifications, and contractual requirements.
2. CxA reports deficiencies found to the CONTRACTOR, Architect and Owner.
3. The Architect evaluates deficiencies and issues directive to CONTRACTOR to remedy CxA's deficiencies lists, in accordance with contract documents.
4. No change in scope work is to take place without express written consent of Owner. Any deficiencies identified by CxA that are deemed by Architect to be outside of the scope of work shall be discussed with Owner for consideration.
5. CONTRACTOR and CxA are to copy Architect on all correspondence related to the commissioning process.

B. CONTRACTOR Participation In The Commissioning Process

1. Attend meetings related to Commissioning process and arrange for attendance by subcontractors and vendors prior to commissioning of their systems, at the discretion of CxA.
2. Provide skilled technicians to start and test all systems, and place systems in complete and fully functioning service in accordance with contract documents and design intent.
3. Provide skilled technicians, experienced and familiar with systems being commissioned, to assist CxA in commissioning process.
4. Attend initial commissioning team scoping meeting, pre-commissioning meetings specific to each system, and other meetings requested by CxA as required to discuss resolution of deficiencies.
5. Coordinate with sub-Contractors and equipment vendors/representatives to set aside adequate time to address Pre-Functional Checklists, Functional Testing, Operations and Maintenance Training, and associated coordination meetings.

C. Work Prior To Testing

1. A commissioning team scoping meeting shall be held at a time and place designated by Commissioning Authority. Owner, Architect, Commissioning Authority, Contractor, and Mechanical, Electrical, and Controls Contractors, shall be present at this meeting. The main objectives of the meeting are to familiarize all parties with the requirements of the commissioning process; to ensure that the responsibilities of each party are clearly understood; and obtain information to develop the preliminary commissioning plan, including:

a. Personnel representing the various entities participating in the process (CONTRACTOR, subcontractors, Owner, Architect, Engineer, CxA)
b. Lines of communications;
c. Assignment of responsibilities;
d. Review pre-functional checklists;
e. Submittal schedule;
f. Preliminary construction schedule

2. Following the initial commissioning team scoping meeting, and upon reviewing submittals, CxA shall prepare a Preliminary Commissioning Plan outlining procedures and responsibilities, including names and contact information of responsible parties, tentative dates for commissioning activities, and pre-functional checklists. Preliminary Commissioning Plan shall be distributed to CONTRACTOR and Owner electronically for review and comment. CxA shall modify the Commissioning Plan based on feedback from CONTRACTOR and Owner and will generate a final Cx Plan.
3. Prior to pre-functional and functional testing, CxA will conduct site inspections at critical times and issue Cx Field Reports with observations on installation deficiencies so that they may be issued by Architect as deemed appropriate
4. CONTRACTOR shall complete all phases of the work so the systems can be started, tested, adjusted, balanced, and otherwise commissioned.
5. CONTRACTOR shall verify requirements of Divisions 22, 23 and 26 outlining responsibilities for start-up of equipment with obligations to complete systems, including all sub-systems so that they are fully functional.
6. Convene system-specific pre-commissioning meetings prior to start of pre-functional testing of each system. The CONTRACTOR shall hold a pre-commissioning meeting with all Team members in attendance. The purpose of the meeting is to review the pre-functional checklists, and equipment start-up procedures for each system to be commissioned, confirm that systems are ready for testing, and define a schedule for testing activities.
7. A minimum of seven (7) days prior to any verification by CxA (Pre-functional Checklists or Functional Testing) submit to Commissioning Authority for review copies of all required completed checklists, start-up forms, and test procedures CONTRACTOR proposes to perform to demonstrate conformance of systems to specifications and commissioning checklists.

D. Pre-functional checks and functional performance tests

1. The CONTRACTOR shall provide all materials, services, and labor required to operate equipment and/or system in order to perform the pre-functional checks and functional performance tests. A pre-functional check or functional performance test shall be aborted if any system deficiency prevents the successful completion of the test or if any participating commissioning team member of which participation is specified is not present for the test. The CONTRACTOR shall reimburse the Owner and A/E for all costs associated with effort lost due to tests that are aborted. These costs shall include salary, travel costs and per diem (where applicable).
2. Functional performance tests may sometimes duplicate the checking, testing, and inspection methods established in related Sections. Where checking, testing, and inspection methods are not specified in other Sections, methods shall be established which will provide required information. Testing and verification required by this section shall be performed during the Commissioning phase. Requirements in related Sections are independent from the

requirements of this Section and shall not be used to satisfy any of the requirements specified in this Section without the approval of CxA.

3. Follow start-up and initial checkout procedures listed in article titled "RESPONSIBILITIES" in Part 1, and additional requirements specified in this Section. Divisions 22, 23 and 26 have startup responsibilities and are required to complete systems and sub-systems so systems are fully functional, meeting design requirements of Contract Documents. Commissioning procedures and functional testing do not relieve or lessen this responsibility or shift this responsibility, in whole or in part, to Commissioning Agent or Owner.

E. Work To Resolve Deficiencies

1. Complete corrective work in a timely manner to allow expeditious completion of commissioning process. If deadlines pass without resolution of identified problems, Owner reserves the right to obtain supplementary services and/or equipment to resolve the problem. Costs thus incurred will be CONTRACTOR's responsibility.

3.2 LEED REQUIREMENTS

A. This Project will be LEED Silver (v4 for BD+C: Schools) certified. Comply with requirements listed in Specifications related to "Sustainable Design Requirements," and coordinate all paperwork and documentation with Designer's Sustainability lead/consultant.

3.3 PRE-FUNCTIONAL CHECKLISTS

A. General

1. Pre-functional checklists are important to ensure that equipment and systems are properly installed and connected in accordance with specifications, drawings, manufacturer's requirements, and all applicable codes.
2. Checklists ensure that system start-up and functional performance testing (in-depth checkout) may proceed without unnecessary delays.
3. Completion of pre-functional checklists, startup, and checkout shall be directed and executed by authorized subcontractors or vendors. Only individuals that have direct knowledge and who witnessed that line item task on pre-functional checklist was performed shall initial or check item off.
4. Each piece of equipment and major distribution system receives full pre-functional checkout. No sampling strategies are used.
5. Pre-functional checkout for given system must be successfully completed prior to requesting verification by CxA and to formal functional performance testing of equipment or subsystems of given system.

B. Pre-functional Checklists

1. Pre-functional performance tests shall be documented in a checklist format, as prepared and provided by CxA, for each piece of equipment. Each checklist shall be initialed by CONTRACTOR, verifying that all items on checklist have been addressed and completed.
2. Commissioning Pre-functional checklists are not to preclude CONTRACTOR or its subcontractor or vendors from applying their own construction inspection checklists.

3. All system elements shall be checked to verify that they have been installed, adjusted, and calibrated properly, that all connections have been made correctly, and that it is ready to be started-up and function as specified. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, control sequence, and other conditions which may cause damage.
4. Verify that tests, meter readings and specific electrical characteristics agree with those required by equipment or system manufacturer.
5. All discrete elements and sub-systems shall be adjusted and shall be checked for proper operation.
6. Verify wiring and support components for equipment are complete and tested.
7. Do not conduct start-up procedure recommended by equipment/system manufacturer prior to pre-functional testing.
8. When filling-out Pre-Functional Checklists, subcontractors shall clearly list outstanding items that were not successfully verified by noting them at bottom of procedures form or on separate sheet attached to form. Installing subcontractor or vendor shall correct deficient or incomplete areas in timely manner and shall submit updated pre-functional checklist and startup report with statement of correction on original non-compliance report.
9. Upon completion of pre-functional checklists for a particular system or subsystems CONTRACTOR will request verification by CxA.
10. Completed forms and attached start-up and documentation sheets shall be provided to Commissioning Authority seven (7) days prior to requested verification date.
11. CONTRACTOR and subcontractors shall accompany CxA during pre-functional checklist verification.
12. If during pre-functional checklist verification, CxA finds a significant number of deficiencies, CONTRACTOR shall have all the checklists associated with similar system redone.

3.4 SYSTEM START-UP

A. CONTRACTOR will arrange for start-up of operating equipment and systems after completion of pre-functional checklists and prior to requesting CxA verification. In some cases (at CxA's discretion and when in the best interest of the project schedule), equipment start-up by specialized vendors may take place at the same time as CxA verification of pre-functional checklists.

B. Start-up of equipment and systems shall be performed only by a manufacturer's representative, or person(s) who are specifically manufacturer-approved. All start-up personnel shall be trained and authorized, experienced and knowledgeable in the operations of such equipment and systems.

C. Coordinate schedule for start-up of various equipment and systems so that subsystems required for major systems operation are tested first.

D. Manufacturer's start-up reports must be submitted to CxA prior to scheduling Functional Testing.

3.5 FUNCTIONAL TESTING

A. The objective of Functional Testing is to demonstrate that each system is operating according to documented design intent and Contract Documents, through all possible modes of operation.

B. CONTRACTOR and sub-Contractors shall include in his bid proposal all costs associated with preparation and execution of Testing Procedures for all systems to be commissioned in accordance with requirements specified under Divisions 22, 23 and 26

C. Functional testing is intended to begin after pre-functional checklists have been completed and verified for all related systems. Functional testing for some systems/subsystems may proceed prior to pre-functional verification of all systems at discretion of Commissioning Authority. Beginning system testing before completion does not relieve CONTRACTOR from fully completing all work, including pre-functional checklists as early as possible.

D. CONTRACTOR and sub-Contractors shall provide detailed Testing Procedures and resources that will allow all items to be verified.

E. Testing shall be conducted under specified operating conditions as recommended or approved by Commissioning Authority.

F. A Functional Performance Test shall be performed on each complete system. Each function shall be demonstrated to the satisfaction of Commissioning Authority in accordance with proposed test procedures developed to demonstrate compliance with specifications.

G. Each Functional Test shall be witnessed and signed off by Commissioning Authority upon satisfactory completion. Functional Test is not to be considered complete until Owner accepts Commissioning Authority's recommendation for completion.

H. All elements of system shall be tested to demonstrate that total systems satisfy all requirements of these specifications. Testing shall be accomplished on hierarchical basis. Test each piece of equipment for proper operation, followed by each subsystem, followed by the entire system, followed by any inter-ties to other major systems.

I. Notification, Scheduling Of Functional Testing and Re-Testing

1. Notify CxA and Owner, in writing, of request for scheduling Functional Testing. Submit request no fewer than seven (7) days prior to desired date for beginning functional testing.

    a. CONTRACTOR must certify that systems and equipment are functioning satisfactorily, according to specifications and design intent, prior to requesting Functional Testing. Upon receipt of such certification, CxA will schedule with CONTRACTOR a time for the particular system test.

        1) CxA will attempt to schedule Functional Testing when convenient for CONTRACTOR and his vendors, and to minimize lost time to CONTRACTOR.

    b. CONTRACTOR will resolve all deficiencies identified during initial test prior to submitting request, in writing, for re-testing. Such request for re-testing shall certify that CONTRACTOR has resolved all deficiencies, or list reason why any deficiencies remain which cannot be resolved.

    c. CxA will witness re-test to ensure that all deficiencies have been resolved.

1) Deficiencies that were not detected in first Functional Test, but are discovered in subsequent re-testing, are to be resolved by CONTRACTOR as if they had been discovered in initial testing.

J. Functional Testing Requirements and Procedures:

1. CONTRACTOR and sub-Contractors shall perform tests in the presence of CxA. Tests not witnessed by CxA shall not be considered complete.
2. To facilitate Functional Testing, CONTRACTOR shall provide services of personnel to accompany CxA for the duration of Functional Testing, including any follow-up testing. Such personnel must be experienced, qualified, and intimately familiar with the system being tested.

    a. Participation by representative(s) of direct digital controls (DDC) systems is of particular importance in Functional Testing. All systems which are controlled and/or monitored by DDC are to be thoroughly tested, point by point, through all modes of operation, with the assistance of manufacturer's representative. DDC graphics, setpoints, and programming are to be included as a part of Functional Testing as well.
    b. CONTRACTOR's or subcontractor's assigned personnel shall be responsible for subjecting systems to test procedures. Should these personnel suspect that a given test condition may be detrimental to the system or equipment, he/she shall notify CxA and test shall be aborted.
    c. CONTRACTOR continues to bear full responsibility for equipment warranty throughout the Commissioning process. Owner and CxA will not be held responsible for damage to equipment, or other actions which might impact warranty, when performing Functional Testing of systems.

3. Each system shall be operated through all modes of operation including, but not limited to seasonal, occupied, unoccupied, warm-up, cool-down, part-load, and full-load, where system response is specified.

    a. For multiple units, sampling strategy established by Commissioning Authority and subject to approval of Owner may be used.
    b. Verification of each sequence in sequences of operation is required.
    c. Proper responses to such modes and conditions as power failure, freeze condition, low oil pressure, no flow, equipment failure, and the like, shall also be tested.

4. Where possible, inspections carried out on systems by local Authorities Having Jurisdiction (AHJ) may serve as Functional Testing for purposes of Commissioning.

    a. CxA will accompany AHJ during testing procedures required by AHJ.
    b. It is responsibility of CONTRACTOR to arrange for testing by AHJ and to coordinate with CxA to find mutually convenient times for testing. Provide CxA a minimum of four days in advance of intent to schedule testing by AHJ.
    c. CxA will issue a separate report with results of testing.
    d. CxA reserves the right to require additional testing, should testing by AHJ not adequately cover all system components in all modes of operation.

5. Functional Testing is to be dedicated solely to testing of equipment and systems, and not to resolution of deficiencies. Deficiencies identified during testing process must be corrected by CONTRACTOR at a time other than during Functional Testing.
6. Within six days of performing functional test, CxA will issue test report with findings and a list of deficiencies that must be addressed by CONTRACTOR or sub-Contractors.
7. Commissioning Authority shall submit a Final Report to Owner recommending acceptance or non-acceptance of individual system components as well as the systems as a whole.

K. Re-Testing and Failure To Remedy Deficiencies:

1. Despite CONTRACTOR's best efforts to ensure systems are problem-free, it is expected that some deficiencies will be found during initial inspection of Pre-functional Checklist, and during initial Functional Testing; such deficiencies are expected to be minimal.
2. It is CONTRACTOR's responsibility to remedy identified deficiencies, both in Pre-functional Checklist and in Functional Testing phases of work, in a timely and thorough manner.
3. It is CONTRACTOR's responsibility to ensure that all deficiencies are corrected prior to requesting a re-inspection or re-test of systems and equipment. Do not request re-inspection or re-test until deficiencies are corrected.

    a. At his discretion, CxA may agree to re-testing systems or equipment where deficiencies remain which are beyond CONTRACTOR's control to resolve expeditiously.
    b. Typically such re-testing of incomplete systems and equipment will take place only if remaining deficiencies are minor in scope and nature, and are of such nature that they cannot be resolved in a timely manner (such as those due to difficulties in obtaining parts, or where Owner has requested a change that has delayed work, etc.)

4. CxA will carry out a second re-inspection or re-test of systems and equipment subsequent to receiving CONTRACTOR's request.

    a. If CxA finds deficiencies identified in initial inspection or test have not been remedied (with exception of un-resolvable deficiencies in 3.b. above), and such remaining deficiencies are significant enough to require additional inspection or re-testing, CONTRACTOR will be back-charged for CxA's expenses, and time at a rate of $120 per hour, for a third and any subsequent re-inspections and re-tests.

3.6 DEFERRED TESTING

A. "Seasonal Commissioning" pertains to testing during peak heating or cooling seasons when HVAC equipment is operating at full-load or heavy-load conditions. Initial commissioning will be done as soon as contract work is completed, regardless of season. Seasonal Commissioning under full- or heavy-load conditions other than the current season will be handled at later time by CONTRACTOR and CxA.

1. If adequate load may be artificially placed upon heating or cooling equipment, CxA, at his discretion, may perform functional testing during non-peak load periods.
2. CONTRACTOR is to provide services of personnel and participate in seasonal testing process in the same manner as he would in non-seasonal testing.

3. Until off-season commissioning can be accomplished, Owner may retain an amount from CONTRACTOR's payment sufficient to cover the cost of off-season testing.

B. Unforeseen Deferred Tests: If any check or test cannot be completed due to building structure, required occupancy condition, or other reason, execution of checklists and functional testing may be delayed upon approval of Owner. Tests shall be conducted in same manner as seasonal tests, as soon as possible. Services of required parties will be negotiated. Make final adjustments to Operation and Maintenance Manuals and record drawings due to unforeseen deferred tests.

1. CONTRACTOR is to provide services of personnel and participate in deferred testing in the same manner as he would for normal commissioning.
2. Until deferred testing can be accomplished, Owner may retain an amount from CONTRACTOR's payment sufficient to cover the cost of deferred testing.

3.7 TRAINING

A. The following requirements are in addition to operation and maintenance requirements specified elsewhere in this specifications manual. CONTRACTOR shall be responsible for training coordination and scheduling, and ultimately to ensure that training is completed.

B. Scheduling

1. Organize training to fit Owner's schedule and to optimize the learning experience. Limit continuous sessions to no more than four hours, or otherwise only as approved by Owner and/or Architect.
2. Provide an outline of the proposed training agenda for review by Owner and CxA a minimum of 10 days prior to proposed date for training session.
3. Provide CxA a minimum 5 days advance notice of intent to carry out a training session.
4. The CxA will not be required to attend all training sessions for building personnel, but will attend selected sessions and monitor progress and content.
5. No training will take place prior to successful completion of Functional Testing.

C. Training Materials

1. Develop Training Manuals to meet requirements of individual equipment specification sections.
2. Operating and Maintenance Manuals alone are NOT considered training manuals. O&M Manuals may be used as reference, but shall not be considered to meet requirements for training materials.
3. Develop a detailed outline showing how training program will be organized, including classroom and hands-on training as required by individual specifications sections.
4. Provide with training materials, a quick-reference "how-to" index which will allow operators to easily access information included in Training Manuals and/or O&M Manuals. This reference will include, as a minimum; routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions.
5. Refer to individual equipment or system specifications and paragraph 3.10 of this specification for minimum requirements.

D. Documentation

1. All training sessions are to be fully documented. Document:

    a. Basic information on training session (name of system, time, date, and location of training, name of presenter, length of training session, etc.).
    b. Names of persons who attended the training session (provide a sign-in sheet).
    c. Signature from authorized Owner's representative indicating that training took place and was satisfactory.

2. Provide CxA copy of sign-in sheet with training session documentation.

E. System-Specific Training Requirements:
1. General:
    a. Participants that will receive training on the systems will be determined by Owner.
    b. The minimum level of instruction and topics to be covered for each system are as follows:
        1) Emergency instructions and procedures.
        2) Operation instructions and procedures.
        3) Troubleshooting procedures.
        4) Maintenance and inspection procedures.
        5) Repair procedures.
        6) Upkeep the system manual and associated maintenance documentation logs.

3.8 SPECIAL WARRANTY

A. Provide special warranty in accordance with equipment specifications. Refer to the tables in paragraph 3.10 for a summary.

3.9 O&M MANUALS

A. Provide operation and maintenance manuals as specified in section 017700 Closeout Submittals, and as outlined in individual sections of Divisions 22, 23 and 26.

B. Provide CxA with a single copy of Operation and Maintenance Manuals for review. CxA's copy of O&M manuals shall be submitted through Architect.

C. CxA shall review O&M Manuals and submit comments through the Architect.

3.10 SYSTEMS TO BE COMMISSIONED

A. Summary of commissioning-related activities for Plumbing Systems.

Plumbing Systems - Commissioning-related Activities		Submittals	Shop Dwgs	Cx Testing	Demonstration	Training	As-Builts	Special Warranty	O&M Manuals
Section	Title	Y/N	Y/N	Y/N	Y/N	Hours	Y/N	Years	Y/N
22 05 16	Expansion Fittings and Loops for Plumbing Piping	Y	N	FO	N	N/A	N	N/A	Y
22 05 17	Sleeves and Sleeve Seals for Plumbing Piping	Y	N	FO	N	N/A	N	N/A	N
22 05 18	Escutcheons for Plumbing Piping	Y	N	FO	N	N/A	N	N/A	N
22 05 19	Meters and Gages for Plumbing Piping	Y	N	FO	N	N/A	N	N/A	Y
22 05 23.12	Ball Valves for Plumbing Piping	Y	N	FO	N	N/A	N	N/A	Y
22 05 23.13	Butterfly Valves for Plumbing Piping	Y	N	FO	N	N/A	N	N/A	Y
22 05 23.14	Check Valves for Plumbing Piping	Y	N	FO	N	N/A	N	N/A	Y
22 05 23.15	Gate Valves for Plumbing Piping	Y	N	FO	N	N/A	N	N/A	Y
22 05 29	Hangers and Supports for Plumbing Piping and Equipme	Y	N	FO	N	N/A	N	N/A	N
22 05 53	Identification for Plumbing Piping and Equipment	Y	N	FO	N	N/A	N	N/A	N
22 07 19	Plumbing Piping Insulation	Y	Y	FO	Y	N/A	N	N/A	Y
22 11 16	Domestic Water Piping	Y	N	FO	N	N/A	Y	N/A	N
22 11 19	Domestic Water Piping Specialties	Y	Y	PF	Y	N/A	Y	N/A	Y
22 13 16	Sanitary Waste and Vent Piping	Y	Y	FO	N	N/A	Y	N/A	N
22 13 19	Sanitary Waste Piping Specialties	Y	Y	FO	Y	N/A	Y	N/A	Y
22 13 19.13	Sanitary Drains	Y	N	FO	N	N/A	Y	N/A	Y
22 13 23	Sanitary Waste Interceptors	Y	Y	PF	Y	N/A	Y	N/A	Y
22 14 13	Facility Storm Drainage Piping	Y	Y	PF	Y	N/A	Y	N/A	N
22 14 23	Storm Drainage Piping Specialties	Y	Y	PF	Y	N/A	Y	N/A	Y
22 14 29	Sump Pump	Y	Y	PF	Y	Y	Y	N/A	Y
22 33 00	Electric, Domestic-Water Heaters	Y	Y	PF/F	Y	Y	Y	5 years	Y
22 34 00	Fuel-Fired, Domestic-Water Heaters	Y	Y	PF/F	Y	Y	Y	5 years	Y
22 42 00	Commercial Plumbing Fixtures	Y	Y	PF/F	N	N/A	N	N/A	Y
Y - Yes, N - No, FO - Field Report, PF - Pre-Functional Checklist, F - Functional Test/Script									

B. Summary of commissioning-related activities for Mechanical Systems.

HVAC Systems - Commissioning-related Activities		Submittals	Shop Dwgs	Cx Testing	Demonstration	Training	As-Builts	Special Warranty	O&M Manuals
Section	Title	Y/N	Y/N	Y/N	Y/N	Hours	Y/N	Years	Y/N
230513	Common Motor Requirements for HVAC Equipment	N	N	N	N	N/A	N	N/A	N
230517	Sleeves and Sleeve Seals for HVAC Piping	Y	N	FO	N	N/A	N	N/A	N
230518	Escutcheons for HVAC Piping	Y	N	FO	N	N/A	N	N/A	N
230523.11	Globe Valves for HVAC Piping	Y	N	FO	N	N/A	N	N/A	Y
230523.12	Ball Valves for HVAC Piping	Y	N	FO	N	N/A	N	N/A	Y
230523.13	Butterfly Valves for HVAC Piping	Y	N	FO	N	N/A	N	N/A	Y
230523.14	Check Valves for HVAC Piping	Y	N	FO	N	N/A	N	N/A	Y
230523.16	Plug Valves for HVAC Piping	Y	N	FO	N	N/A	N	N/A	Y
230529	Hangers and Supports for HVAC Piping and Equipment	Y	Y	FO	N	N/A	N	N/A	N
230533	Heat Tracing for HVAC Piping	Y	Y	PF/F	Y	N/A	N	3 years	Y
230548.13	Vibration Controls for HVAC	Y	N	FO	N	N/A	N	N/A	N
230553	Identification for HVAC Piping and Equipment	Y	N	FO	N	N/A	N	N/A	N
230593	Testing, Adjusting, and Balancing for HVAC	Y	N	F	N	N/A	Y	N/A	Y
230713	Duct Insulation	Y	Y	FO	N	N/A	N	N/A	Y
230716	HVAC Equipment Insulation	Y	Y	FO	N	N/A	N	N/A	Y
230719	HVAC Piping Insulation	Y	Y	FO	N	N/A	N	N/A	Y
231123	Facility Natural-Gas Piping	Y	Y	FO	N	N/A	Y	N/A	Y
231126	Facility Liquefied-Petroleum Gas Piping	Y	Y	FO	N	N/A	Y	N/A	Y
232113	Hydronic Piping	Y	Y	FO	N	N/A	Y	N/A	N
232116	Hydronic Piping Specialties	Y	Y	FO	N	N/A	N	N/A	Y
232123	Hydronic Pumps	Y	Y	PF/F	Y	2 hrs	Y	N/A	Y
232300	Refrigerant Piping	Y	Y	FO	N	N/A	Y	N/A	Y
232513	Water Treatment for Closed-Loop Hydronic Systems	Y	Y	FO	N	N/A	Y	N/A	Y
233113	Metal Ducts	Y	Y	FO	N	N/A	Y	N/A	N
233300	Air Duct Accessories	Y	N	FO	N	N/A	Y	N/A	Y
233346	Flexible Ducts	Y	Y	FO	N	N/A	N	N/A	Y
233423	HVAC Power Ventilators	Y	Y	PF/F	Y	N/A	Y	N/A	Y
233600	Air Terminal Units	Y	Y	PF/F	Y	4 hrs	Y	N/A	Y
233713.13	Air Diffusers	Y	N	FO	N	N/A	Y	N/A	Y
233713.23	Registers and Grilles	Y	N	FO	N	N/A	N	N/A	N
235113.16	Vent Dampers	Y	N	FO	N	N/A	Y	2 years	Y
235123	Gas Vents	Y	Y	FO	N	N/A	Y	N/A	N
235216	Condensing Boilers	Y	Y	PF/F	Y	4 hrs	Y	10 years	Y
236423.21	Air-Cooled Water Chillers	Y	Y	PF/F	Y	8 hrs	Y	5 years	Y
237313	Indoor Central-Station Air-Handling Units	Y	Y	PF/F	Y	4 hrs	Y	N/A	Y
237416.11	Packaged, Small-Capacity, RTUs	Y	Y	PF/F	Y	4 hrs	Y	5 years	Y
238126	Split-System Air-Conditioners	Y	Y	PF/F	Y	4 hrs	Y	5 years	Y
238239.16	Propeller Unit Heaters	Y	Y	PF/F	Y	2 hrs	Y	N/A	Y
Y - Yes, N - No, FO - Field Report, PF - Pre-Functional Checklist, F - Functional Test/Script									

C. Summary of commissioning-related activities for Electrical Systems.

Electrical Systems - Commissioning-related Activities		Submittals	Shop Dwgs	Cx Testing	Demonstration	Training	As-Builts	Special Warranty	O&M Manuals
Section	Title	Y/N	Y/N	Y/N	Y/N	Hours	Y/N	Years	Y/N
26 00 01	Basic Requirements for Electrical	N	N	N	N	N/A	N	N/A	N
26 05 19	Low-Voltage Electrical Power Conductors and Cables	Y	Y	FO	N	N/A	N	N/A	Y
26 05 26	Grounding and Bonding for Electrical Systems	Y	Y	FO	N	N/A	Y	N/A	Y
26 05 29	Hangers and Supports for Electrical Systems	Y	Y	FO	N	N/A	N	N/A	N
26 05 33	Raceways and Boxes for Electrical Systems	Y	Y	FO	N	N/A	N	N/A	Y
26 05 53	Identification for Electrical Systems	Y	Y	FO	N	N/A	Y	N/A	N
26 09 23	Lighting Control Devices	Y	Y	PF/F	Y	4 hrs	Y	N/A	Y
26 22 13	Low-Voltage Distribution Transformers	Y	Y	PF/F	N	N/A	Y	N/A	Y
26 24 13	Switchboards	Y	Y	PF/F	N	3 hrs	Y	N/A	Y
26 24 16	Panelboards	Y	Y	PF/F	N	N/A	Y	5 years	Y
26 27 26	Wiring Devices	Y	Y	PF/F	N	N/A	Y	N/A	Y
26 28 16	Enclosed Switches and Circuit Breakers	Y	Y	PF/F	N	N/A	Y	N/A	Y
26 51 19	LED Interior Lighting	Y	Y	PF/F	Y	2 hrs	Y	5 years	Y
26 52 19	Emergency and Exiting Lighting	Y	Y	PF/F	Y	2 hrs	Y	5 years	Y
26 56 13	Lighting Poles and Standards	Y	Y	FO	Y	N/A	Y	N/A	Y
26 56 19	LED Exterior Lighting	Y	Y	PF/F	Y	2 hrs	Y	5 years	Y
Y - Yes, N - No, FO - Field Report, PF - Pre-Functional Checklist, F - Functional Test/Script									

D. Commissioning-related activities for Building Automation System and Controls are stated in Section 230926c.

END OF SECTION

CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT

SECTION 017419

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Construction and demolition waste management goals, plan, and records.

2. General requirements for compliance with certain LEED and AEGB prerequisites and credits.

B. Related Sections:

1. 018113 Sustainable Construction Requirements

1.2 REFERENCES

A. City of Austin Construction and Demolition Ordinance, 20151119-098
http://www.austintexas.gov/edims/document.cfm?id=244998
Austin Resource Recovery, Online Construction Recycling Report,
https://connect.re-trac.com/registration/austin-cdordinance

1.3 WASTE MANAGEMENT REQUIREMENTS

A. Reuse, salvage, or recycle non-hazardous waste materials.

B. Maximize diversion of non-hazardous construction and demolition debris from landfill.

C. Prioritize non-hazardous demolition and construction waste management in following order:

1. As a first phase of demolition, identify and carefully dismantle, disassemble and store salvageable materials for salvage/reuse. Deconstruct in a manner that preserves material integrity. Coordinate storage and reuse with owner.

2. Reuse materials through on-site reuse or off-site salvaging, including sale or donation.

3. Recycle materials at permitted recycling facilities.

4. Properly dispose of materials with no practical use or economic benefit at permitted landfill.

5. Ensure proper disposition of materials classified as hazardous waste under federal and state law and regulations, and/or local ordinances.

C. Divert minimum 75 percent of non-hazardous construction and demolition waste by weight (in tons) from landfills through reuse, recycling and composting. Land clearing debris and excavated soil and rocks do not contribute to the calculation.

D. Reduce the amount of construction waste generated to not exceed 2.5 pounds per square foot of building area.

E. Comply with the provisions of City of Austin No. 20151119-098 “Construction and Demolition Ordinance.”

1.4 CONSTRUCTION WASTE MANAGEMENT

A. Take proactive role in management of construction and demolition waste:

1. Practice efficient waste management when sizing, cutting, and installing products.

2. Facilitate reuse and recycling and utilize all reasonable means to divert construction and demolition waste from landfills.

3. Return unused products and overages to supplier, or donate to non-profit group.

4. Carefully install products; avoid removal of ill-timed and poorly installed products.

5. Use centralized cutting areas to facilitate waste collection.

6. Deliver, store, and handle products to prevent damage.

7. Specify delivery of product and materials with minimum packaging;

all packaging shall be specified as reusable and returned to manufacturer, or recyclable.

B. Require subcontractors and suppliers to implement the Construction Waste Management Plan by prioritizing waste reduction, reuse, and recycling.

C. Construction and demolition waste includes:

1. Products from deconstruction, demolition and removal.

2. Excess and unusable construction products.

3. Packaging materials for construction products.

4. Other materials generated during construction process but not incorporated into the work.

D. Give consideration to:

1. Availability of viable recycling markets.

2. Condition of materials.

3. Ability to provide material in suitable condition and in quantities acceptable to available markets.

4. Time constraints imposed by internal project completion mandates.

E. Be responsible for implementation of special programs involving rebates and similar incentives related to recycling of waste.

F. Revenues and other savings obtained for salvage and recycling accrue to Contractor.

G. Ensure that firms and facilities used for recycling, reuse, and disposal have legal permits for intended uses.

1.5 SUBMITTALS

A. Construction and Demolition Waste Management Plan:

1. Submit Construction and Demolition Waste Management Plan, aligned with the requirements of current LEED and AEGB requirements, and City of Austin Ordinances, within ten days after Notice to Proceed and

prior to initiating site preparation.

2. Include:

   a. Name and contact information of individual on Contractor's staff responsible for waste prevention and management.

   b. Actions proposed to reduce construction and demolition waste generation and achieve waste diversion goal, including but not limited to selective deconstruction.

   c. Description of proposed methods for recycling and reuse of materials generated, including areas and equipment for processing, sorting, and temporary storage.

   d. Identification of at least 4 material streams and estimated quantities, in tons, of waste to be generated.

   e. Name of construction debris haulers and landfills to be used.

   f. Name of recycling service providers and recycling collection facilities to be used.

   g. Identification of local and regional reuse programs that will accept waste materials.

   h. List of waste materials to be salvaged for resale, donation, salvaged and reused, or recycled. Identify recycling facilities to be used.

   i. Identification of materials that cannot be recycled or reused, with justification, including, alternative daily cover, land clearing debris, stones, and soil.

3. If required, revise and resubmit Construction and Demolition Waste Management Plan within ten days after receipt of comments.

4. Distribute copies of approved Construction and Demolition Waste Management Plan. Update Construction Waste Management Plan periodically through duration of Project to reflect changed conditions.

B. Construction and Demolition Waste Management Documents:

1. Maintain records to document:

a. Quantities of waste generated, in tons.

b. Quantities of waste diverted through sale, donation, reuse, salvage, or recycling, in tons, and diversion location.

c. Quantities of waste sent to landfill, in tons

2. Submit monthly summary of waste disposal and diversion to date in conjunction with each request for payment.

3. Keep records of manifests, weight tickets, receipts, or invoices, identifying Project and waste materials, to be available upon request.

4. Deliver final summary of construction and demolition waste disposal and diversion to Architect upon completion of project.

5. If commingled, provide evidence of facility's average recycling rates, or project-specific recycling rates, during the construction timeline.

6. If project uses a third-party verified waste hauler, such as through Recycling Certification Institute's Certification of Real Rates (CORR), provide the following:

a. Proof that the facility was certified over the timeframe that waste was generated on the project and sent to the processing facility.

b. Diversion log demonstrating that all waste was sent to the facility.

c. Facility's weighted average of diverted waste over the time in which the project sent materials to the facility.

1.6 QUALITY ASSURANCE

A. Review and discuss Construction and Demolition Waste Management Plan implementation and progress at Preconstruction Conference and Progress Meetings.

1.7 DELIVERY, STORAGE AND HANDLING

A. Designate separate areas to facilitate separation of materials for potential

recycling, salvage, reuse and return.

B. Identify areas and receptacles with signage clearly written in both English and Spanish.

C. Keep storage areas and receptacles clean and orderly; prevent contamination of materials.

D. Monitor storage areas; correct problems and implement preventative measures.

1.8 TRAINING

A. Provide training of construction and demolition waste management methods to be used at appropriate stages of Project.

B. Include Construction and Demolition Waste Management as an agenda item for Pre-Construction meeting, at each Pre-Installation meeting, and at weekly site meetings.

C. Require participation of all subcontractors.

PART 2 – PRODUCTS
Not Used

PART 3 – EXECUTION

3.1 CONSTRUCTION AND DEMOLITION RECYCLABLES COLLECTION

A. Designate and clearly label containers and storage areas to facilitate construction waste management. Provide signage written in both English and Spanish.

B. Separate salvageable and recyclable materials from other waste materials to prevent contamination by incompatible products and materials.

C. Separate and store salvageable materials by:

1. Clean salvaged products.

2. After cleaning, pack or crate items; identify contents of containers with label indicating elements, date of removal, quantity, fragility (as relevant), and location where removed.

3. Protect items from damage during transport and storage.

4. Store items in a secure, protected area until installation.

5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for intended use.

D. Separate recyclable materials by:

1. Place into separate, marked containers, then transport to recycling facility.

2. Place into single container, then transport to commingled recycling facility for separation.

E. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.

3.2 DISPOSAL

A. Dispose of nonhazardous waste materials that cannot be reused, recycled, or salvaged at permitted landfill.

B. Handle, store, and dispose of hazardous waste in accordance with applicable codes, ordinances, rules, and regulations.

C. Do not burn or incinerate waste materials.

3.3 REPORTING

A. Upon request of Final Building Inspection, prepare and submit City of Austin Construction Recycling report (https://connect.re-trac.com/registration/austin-cdordinance) providing the following information:

1. Contact information for general contractor and owner
2. Permit numbers, floor area, location address
3. Tons of materials landfilled
4. Tons of materials diverted from landfill
5. Weight ticket summary or Qualified Processor report

END OF SECTION 01 74 19

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Substantial Completion procedures.
2. Final completion procedures.
3. Warranties.
4. Final cleaning.
5. Repair of the Work.

B. Related Requirements:

1. Section 017900 "Demonstration and Training" for requirements to train the Owner's maintenance personnel to adjust, operate, and maintain products, equipment, and systems.
2. Section 017400 – Final cleaning.
3. Section 017419 – Construction Waste Management
4. Section 017839 – Project record documents.
5. Section 017500 – Operation and maintenance data.
6. Section 017600 – Warranties and bonds.
7. Section 018113 – Sustainable Construction Requirements
8. Section 071843 – Spare Parts and maintenance materials.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of cleaning agent.

B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.

C. Certified List of Incomplete Items: Final submittal at final completion.

1.4 CLOSEOUT SUBMITTALS

A. Certificates of Release: From authorities having jurisdiction.

B. Certificate of Insurance: For continuing coverage.

C. Field Report: For pest control inspection.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.6 SUBSTANTIAL COMPLETION PROCEDURES

A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.

B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by [**Architect**] [**Construction Manager**]. Label with manufacturer's name and model number.

a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain [**Architect's**] [**Construction Manager's**] [**Owner's**] signature for receipt of submittals.

5. Submit testing, adjusting, and balancing records.

6. Submit sustainable design submittals not previously submitted.
7. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Advise Owner of pending insurance changeover requirements.
2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
3. Complete startup and testing of systems and equipment.
4. Perform preventive maintenance on equipment used prior to Substantial Completion.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 017900 "Demonstration and Training."
6. Advise Owner of changeover in utility services.
7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
9. Complete final cleaning requirements.
10. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect[**and Construction Manager**] will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for final completion.

1.7 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:

1. Submit a final Application for Payment according to Section 012900 "Payment Procedures."
2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report.
5. Submit final completion photographic documentation.

B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect[and Construction Manager] will either proceed with inspection or notify Contractor of

unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

C. When contractor considers work complete, submit written certification that:
1. Contract documents have been reviewed.
2. Work has been inspected for compliance with contract documents.
3. Equipment and systems have been tested, adjusted and balanced, and are fully operational.
4. Operation of systems has been demonstrated to Owner's personnel.
5. Work is complete and ready for final inspection.

D. Should Architect/Engineer's or Project Manager's inspection find work incomplete, he will promptly notify contractor in writing, listing observed deficiencies.

E. Contractor shall remedy deficiencies and send a second certification of final completion.

F. When Architect/Engineer and Project Manager find work is complete, they will consider closeout submittals.

1.8 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Submit list of incomplete items in the following format:

a. PDF electronic file. Architect[**, through Construction Manager,**] will return annotated file.

1.9 SUBMITTAL OF PROJECT WARRANTIES

A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.

B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.

C. For items of work delayed beyond date of substantial completion, provide updated submittal listing date of acceptance as start of warranty period.

D. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.

E. Execute and assemble documents from subcontractors, suppliers and manufacturers.

F. Submit prior to final application for payment.

G. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

1. Submit on digital media acceptable to Architect.

H. Provide additional copies of each warranty to include in operation and maintenance manuals.

1.10 SPARE PARTS AND MAINTENANCE MATERIALS

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:

a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
c. Rake grounds that are not planted, mulched, or paved to a smooth, even-textured surface.
d. Remove tools, construction equipment, machinery, and surplus material from Project site.
e. Remove snow and ice to provide safe access to building.
f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
h. Sweep concrete floors broom clean in unoccupied spaces.
i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
k. Remove labels that are not permanent.
l. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
o. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.

1) Clean HVAC system and provide written report on completion of cleaning.

p. Clean luminaires, lamps, globes, and reflectors to function with full efficiency.
q. Leave Project clean and ready for occupancy.

C. Pest Control: Comply with pest control requirements in Section 015000 "Temporary Facilities and Controls." Prepare written report.

D. Construction Waste Disposal: Comply with waste disposal requirements in Section 017419 "Construction Waste Management and Disposal."

3.2 REPAIR OF THE WORK

A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.

B. Repair, or remove and replace, defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.

a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.

3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION 017700

SECTION 017823 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

1. Operation and maintenance documentation directory manuals.
2. Emergency manuals.
3. Systems and equipment operation manuals.
4. Systems and equipment maintenance manuals.
5. Product maintenance manuals.

B. Related Requirements:
1. Section 013300 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
2. Individual Specifications Sections: Specific requirements for operation and maintenance data.

1.3 CLOSEOUT SUBMITTALS

A. Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.

1. Architect[**and Commissioning Authority**] will comment on whether content of operation and maintenance submittals is acceptable.
2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.

B. Format: Submit operation and maintenance manuals in the following format:

1. Submit on digital media acceptable to Architect. Enable reviewer comments on draft submittals.
2. Provide manufacturer’s data and drawings for each system or product.
3. Provide one hard copy of operation and maintenance manuals at each major system equipment in a see-through, waterproof sleeve attached to the equipment.

C. Initial Manual Submittal: Submit draft copy of each manual at least 45 days prior to Substantial Completion. . Architect[**and Commissioning Authority**] will comment on whether general scope and content of manual are acceptable. Revise content of all document sets as required prior to final submission

D. For equipment or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.

E. Final Manual Submittal: Submit each manual in final form prior to requesting inspection at least 10 days after final inspection. . Final release of retainage by the Owner is contingent, among other things, upon receipt and approval by the Architect/Engineer of all O&M manuals due the Owner by the Contractor. Final payment will not be made until such time as all manuals have been submitted and approved.

F. Comply with Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

1.4 FORMAT OF OPERATION AND MAINTENANCE MANUALS

A. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.

1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
2. File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

B. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, in three parts as follows:
1. Part 1: Directory, listing names, addresses and telephone numbers of Project Manager, Architect/Engineer, contractor, subcontractors and major equipment suppliers.

2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by Specification Section. For each category, identify names, addresses and telephone numbers of Subcontractors and suppliers. Identify the following:
   a. Significant design criteria.
   b. List of equipment.
   c. Parts list for each component.
   d. Operating instructions.
   e. Maintenance instructions for equipment and systems.
   f. Maintenance instructions for finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.

3. Part 3: Project documents and certificates, including the following:

a. Shop drawings and product data.
b. Air and water balance reports.
c. Certificates.
d. Copies of warranties and bonds.

1.5 MANUAL FOR MATERIALS AND FINISHES

A. Building Products, Applied Materials and Finishes: Include product data, with catalog number, size, composition, and color and texture designations. Provide information for reordering custom manufactured products.

B. Instructions for Care and Maintenance: Include manufacturer’s recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

C. Moisture Protection and Weather Exposed Products: Include product data listing applicable reference standards, chemical composition and details of installation. Provide recommendations for inspections, maintenance and repair.

D. Additional Requirements: As specified in individual Product Specification Sections.

E. Provide a listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

F. The O&M Manual will include all of that O&M data referenced or addressed in the Divisions 2 to 49 Sections.

1.6 EMERGENCY MANUALS

A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.

B. Content: Organize manual into a separate section for each of the following:

1. Type of emergency.
2. Emergency instructions.
3. Emergency procedures.

C. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:

1. Fire.
2. Flood.
3. Gas leak.
4. Water leak.
5. Power failure.
6. Water outage.
7. System, subsystem, or equipment failure.

8. Chemical release or spill.

D. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.

E. Emergency Procedures: Include the following, as applicable:

1. Instructions on stopping.
2. Shutdown instructions for each type of emergency.
3. Operating instructions for conditions outside normal operating limits.
4. Required sequences for electric or electronic systems.
5. Special operating instructions and procedures.

1.7 SYSTEMS AND EQUIPMENT OPERATION MANUALS

A. Systems and Equipment Operation Manual: Assemble a complete set of data indicating operation of each system, subsystem, and piece of equipment not part of a system. Include information required for daily operation and management, operating standards, and routine and special operating procedures.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

B. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
2. Performance and design criteria if Contractor has delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

C. Descriptions: Include the following:

1. Product name and model number. Use designations for products indicated on Contract Documents.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.

7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

D. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

E. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

F. Piped Systems: Diagram piping as installed, and identify color coding where required for identification.

1.8 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

A. Systems and Equipment Maintenance Manuals: Assemble a complete set of data indicating maintenance of each system, subsystem, and piece of equipment not part of a system. Include manufacturers' maintenance documentation, preventive maintenance procedures and frequency, repair procedures, wiring and systems diagrams, lists of spare parts, and warranty information.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

B. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranties and bonds as described below.

C. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

D. Manufacturers' Maintenance Documentation: Include the following information for each component part or piece of equipment:

1. Standard maintenance instructions and bulletins; include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component

incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

a. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.

2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
3. Identification and nomenclature of parts and components.
4. List of items recommended to be stocked as spare parts.

E. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.
6. Demonstration and training video recording, if available.

F. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.

G. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

H. Each Item of Equipment and Each System: Include description of unit or system, and component parts. Identify function, normal operating characteristics and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.

I. Panelboard Circuit Directories: Provide electrical service characteristics, controls and communications, typed or by label machine.

J. Include color-coded wiring diagrams as installed.

K. Operating Procedures: Include start-up, break-in and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instruction.

L. Maintenance Requirements: Include routine procedures and guide for troubleshooting; disassembly, repair and assembly instruction; and alignment, adjusting, balancing and checking instructions.

M. Provide servicing and lubrication schedule, and list of lubricants required.

N. Include manufacturer’s printed operation and maintenance instructions.

O. Include Sequence of Operation by controls manufacturer.

P. Provide original manufacturer’s parts list, illustrations, assembly drawings, and diagrams required for maintenance.

Q. Provide control diagrams by controls manufacturer as installed.

R. Provide Contractor’s coordination drawings with color-coded piping diagrams as installed.

S. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

T. Provide list of original manufacturer’s spare parts, current prices, and recommended quantities to be maintained in storage.

U. Include test and balancing reports.

V. Additional Requirements: As specified in individual Product Specification Sections.

W. Provide a listing in Table of Contents for design data, with tabbed indexes and space for insertion of data.

X. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

Y. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

Z. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.

1. Do not use original project record documents as part of maintenance manuals.

1.9 PRODUCT MAINTENANCE MANUALS

A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

B. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

C. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

D. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

E. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

F. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

G. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 017823

SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for project record documents, including the following:

1. Record Drawings.
2. Record Specifications.
3. Record Product Data.
4. Miscellaneous record submittals.

B. Related Requirements:
1. Section 017700 "Closeout Procedures" for general closeout procedures.
2. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.
3. Individual Specifications Sections: Manufacturer’s certificates and certificates of inspection.

1.3 MAINTENANCE OF DOCUMENTS AND SAMPLES

A. In addition to requirements in General Conditions, Maintain at the site for Owner one record copy of:
1. Contract Drawings.
2. Specifications.
3. Addenda.
4. Reviewed shop drawings, product data, and samples.

B. Store Record Documents and samples in Field Office apart from documents used for construction. Provide files, and secure storage for Record Documents and samples.

C. Label and file record Documents and samples in accordance with Section number listings in Table of Contents of this Project Manual. Label each document “PROJECT RECORD” in neat, large, printed letters.

D. Maintain Record Documents in a clean, dry and legible condition. Do not use Records Documents for construction purposes.

E. Keep Record Documents and samples available for inspection by Architect/Engineer.

1.4 RECORDING

A. Record information on a set of black line opaque drawings, and in a copy of a Project Manual.

B. Record information concurrently with construction progress. Do not conceal any work until required information is recorded.

C. Construction Drawings and Shop Drawings: Legibly mark each item to record actual construction, including:
1. Measured depths of elements of foundation in relation to finish first floor datum.
2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of construction.
4. Field changes of dimension and detail.
5. Details not on original Contract Drawings.

D. Other Documents: Maintain manufacturer's certifications, inspection certifications, and field test records, required by individual Specifications sections.

1.5 CLOSEOUT SUBMITTALS

A. At Contract closeout, deliver Record Documents and samples under provisions of Section 017710

B. Record Drawings: Comply with the following:

1. Number of Copies: Submit one PDF set of marked-up record prints.
2. Transmit, listing:
   a. Date.
   b. Project title and number.
   c. Contractor's name, address, and telephone number.
   d. Number and title of each Record Document.
   e. Signature of Contractor or authorized representative.
3. Number of Copies: Submit copies of record Drawings as follows:

   a. Final Submittal:
      1) Submit PDF electronic files of record drawings. Provide each drawing, whether or not changes and additional information were recorded.

C. Record Specifications: Submit annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.

D. Record Product Data: Submit annotated PDF electronic files and directories of each submittal.

1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.

E. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit annotated PDF electronic files and directories of each submittal.

F. Reports: Submit written report weekly indicating items incorporated into project record documents concurrent with progress of the Work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.

1.6 RECORD DRAWINGS

A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.

1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.

    a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
    b. Accurately record information in an acceptable drawing technique.
    c. Record data as soon as possible after obtaining it.
    d. Record and check the markup before enclosing concealed installations.
    e. Cross-reference record prints to corresponding photographic documentation.

2. Content: Types of items requiring marking include, but are not limited to, the following:

    a. Dimensional changes to Drawings.
    b. Revisions to details shown on Drawings.
    c. Depths of foundations.
    d. Locations and depths of underground utilities.
    e. Revisions to routing of piping and conduits.
    f. Revisions to electrical circuitry.
    g. Actual equipment locations.
    h. Duct size and routing.
    i. Locations of concealed internal utilities.
    j. Changes made by Change Order or [**Construction**] [**Work**] Change Directive.
    k. Changes made following Architect's written orders.
    l. Details not on the original Contract Drawings.
    m. Field records for variable and concealed conditions.
    n. Record information on the Work that is shown only schematically.

3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.

6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

1.7 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
4. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals instead of submitted as record Product Data.
5. Note related Change Orders[**, record Product Data,**] and record Drawings where applicable.

B. Format: Submit record Specifications as annotated PDF electronic file.

1.8 RECORD PRODUCT DATA

A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.

B. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders[**, record Specifications,**] and record Drawings where applicable.

C. Format: Submit record Product Data as annotated PDF electronic file.

1. Include record Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.

1.9 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

B. Format: Submit miscellaneous record submittals as PDF electronic file.

1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

1.10 MAINTENANCE OF RECORD DOCUMENTS

A. Maintenance of Record Documents: Store record documents in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's[**and Construction Manager's**] reference during normal working hours.

PART 2 - PRODUCTS

PART 3 - EXECUTION

END OF SECTION 017839

SECTION 017900 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:

1. Instruction in operation and maintenance of systems, subsystems, and equipment.
2. Demonstration and training video recordings.

B. Allowances: Furnish demonstration and training instruction time under the demonstration and training allowance as specified in Section 012100 "Allowances."

C. Unit Price for Instruction Time: Length of instruction time will be measured by actual time spent performing demonstration and training in required location. No payment will be made for time spent assembling educational materials, setting up, or cleaning up. See requirements in Section 012200 "Unit Prices."

1.3 INFORMATIONAL SUBMITTALS

A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.

1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.

B. Qualification Data: For instructor.

C. Attendance Record: For each training module, submit list of participants and length of instruction time.

D. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

1.4 CLOSEOUT SUBMITTALS

A. Demonstration and Training Video Recordings: Submit copies within seven days of end of each training module.

1. Identification: On each copy, provide an applied label with the following information:

    a. Name of Project.
    b. Name and address of videographer.
    c. Name of Architect.
    d. Name of Construction Manager.
    e. Name of Contractor.
    f. Date of video recording.
2. Transcript: Prepared in PDF electronic format. Include a cover sheet with same label information as the corresponding video recording and a table of contents with links to corresponding training components. Include name of Project and date of video recording on each page.
3. At completion of training, submit complete training manual(s) for Owner's use prepared in same PDF file format required for operation and maintenance manuals specified in Section 017823 "Operation and Maintenance Data."

1.5 QUALITY ASSURANCE

A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.

B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Section 014000 "Quality Requirements," experienced in operation and maintenance procedures and training.

C. Videographer Qualifications: A professional videographer who is experienced photographing demonstration and training events similar to those required.

D. Preinstruction Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination." Review methods and procedures related to demonstration and training including, but not limited to, the following:

1. Inspect and discuss locations and other facilities required for instruction.
2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.
3. Review required content of instruction.
4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

1.6 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data have been reviewed and approved by Architect.

1.7 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.

B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:

1. Basis of System Design, Operational Requirements, and Criteria: Include the following:

    a. System, subsystem, and equipment descriptions.
    b. Performance and design criteria if Contractor is delegated design responsibility.
    c. Operating standards.
    d. Regulatory requirements.
    e. Equipment function.
    f. Operating characteristics.
    g. Limiting conditions.
    h. Performance curves.

2. Documentation: Review the following items in detail:

    a. Emergency manuals.
    b. Systems and equipment operation manuals.
    c. Systems and equipment maintenance manuals.
    d. Product maintenance manuals.
    e. Project Record Documents.
    f. Identification systems.
    g. Warranties and bonds.
    h. Maintenance service agreements and similar continuing commitments.

3. Emergencies: Include the following, as applicable:

    a. Instructions on meaning of warnings, trouble indications, and error messages.
    b. Instructions on stopping.
    c. Shutdown instructions for each type of emergency.

d. Operating instructions for conditions outside of normal operating limits.
e. Sequences for electric or electronic systems.
f. Special operating instructions and procedures.

4. Operations: Include the following, as applicable:

a. Startup procedures.
b. Equipment or system break-in procedures.
c. Routine and normal operating instructions.
d. Regulation and control procedures.
e. Control sequences.
f. Safety procedures.
g. Instructions on stopping.
h. Normal shutdown instructions.
i. Operating procedures for emergencies.
j. Operating procedures for system, subsystem, or equipment failure.
k. Seasonal and weekend operating instructions.
l. Required sequences for electric or electronic systems.
m. Special operating instructions and procedures.

5. Adjustments: Include the following:

a. Alignments.
b. Checking adjustments.
c. Noise and vibration adjustments.
d. Economy and efficiency adjustments.

6. Troubleshooting: Include the following:

a. Diagnostic instructions.
b. Test and inspection procedures.

7. Maintenance: Include the following:

a. Inspection procedures.
b. Types of cleaning agents to be used and methods of cleaning.
c. List of cleaning agents and methods of cleaning detrimental to product.
d. Procedures for routine cleaning.
e. Procedures for preventive maintenance.
f. Procedures for routine maintenance.
g. Instruction on use of special tools.

8. Repairs: Include the following:

a. Diagnosis instructions.
b. Repair instructions.
c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
d. Instructions for identifying parts and components.
e. Review of spare parts needed for operation and maintenance.

1.8 PREPARATION

A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 017823 "Operation and Maintenance Data."

B. Set up instructional equipment at instruction location.

1.9 INSTRUCTION

A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.

B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
   1. Owner will furish an instructor to describe Owner's operational philosophy.
   2. Owner will furnish Contractor with names and positions of participants.

C. Scheduling: Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.

   1. Schedule training with Owner, through Construction Manager, with at least seven days' advance notice.

D. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.

E. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of an oral or a demonstration performance-based test.

F. Cleanup: Collect used and leftover educational materials and give to Owner. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

1.10 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

A. Digital Video Recordings: Provide high-resolution, digital video in MPEG format, produced by a digital camera with minimum sensor resolution of at least 12 megapixels and capable of recording in full HD mode

   1. Submit video recordings on CD-ROM or thumb drive.
   2. File Hierarchy: Organize folder structure and file locations according to Project Manual table of contents. Provide complete screen-based menu.
   3. File Names: Utilize file names based on name of equipment generally described in video segment, as identified in Project specifications.
   4. Contractor and Installer Contact File: Using appropriate software, create a file for inclusion on the equipment demonstration and training recording that describes the

following for each Contractor involved on the Project, arranged according to Project Manual table of contents:

a. Name of Contractor/Installer.
b. Business address.
c. Business phone number.
d. Point of contact.
e. Email address.

B. Light Levels: Verify light levels are adequate to properly light equipment. Verify equipment markings are clearly visible prior to recording.

1. Furnish additional portable lighting as required.

C. Narration: Describe scenes on video recording by audio narration by microphone while video recording is recorded. Include description of items being viewed.

D. Transcript: Provide a transcript of the narration. Display images and running time captured from videotape opposite the corresponding narration segment.

E. Preproduced Video Recordings: Provide video recordings used as a component of training modules in same format as recordings of live training.

PART 2 - PRODUCTS

PART 3 - EXECUTION

END OF SECTION 017900

SUSTAINABLE CONSTRUCTION REQUIREMENTS

SECTION 018113

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. General requirements and procedures for sustainable construction practices.

2. General guidelines for AEGB 2022, LEED v4/v4.1, and AISD Sustainability Scorecard. Documentation requirements needed to verify compliance may not be specifically identified in this section.

B. Related Sections:

1. Section 013546 – Indoor Air Quality Management
2. Section 017419 – Construction and Demolition Waste Management
3. Sections 016500, 019119.43, 220100, 230100, and 260100 – Commissioning Requirements
4. Divisions 1 through 33 Sections for sustainability requirements specific to the work of each of those sections.

1.2 DEFINITIONS

A. Austin Energy Green Building (AEGB) Commercial Program: Local green building rating system: https://www.greenbuildingsystem.austinenergy.com/Login/Help.aspx

B. Austin ISD Sustainability Scorecard: Criteria for projects with limited scope that are not whole building or major renovation projects, and not suited for AEGB or LEED.

C. Bio-Based Materials: Materials that are tested using ASTM D 6866 and are legally harvested, as defined by the exporting and receiving country. May meet the Sustainable Agriculture Network's Sustainable Agriculture Standard.

D. California Department of Public Health (CDPH) Standard Method: General VOC emissions testing protocol. Version v1.2-2017 or currently effective. https://www.cdph.ca.gov/Programs/cls/dehl/ehl/Pages/AQS/VOCs.aspx. Approved third-party certifications: https://tinyurl.com/CDPHs

E. Carpet and Rug Institute: Green Label Plus testing program for low VOC carpet; Green Label certification for low VOC carpet cushion: www.carpet-rug.com

F. Chain-of-Custody: A document that tracks movement of wood from the forest to a vendor and is used to verify compliance with Forest Stewardship Council (FSC) guidelines.

G. City of Austin Land Development Code Chapter 25-2 Subchapter E: Design Standards and Mixed Use, Article 2.5 Exterior Lighting: https://library.municode.com/tx/austin/codes/code_of_ordinances?nodeId=TIT25LADE_CH25-2ZO_SUBCHAPTER_EDESTMIUS_ART2SIDEST_S2.5EXLI

H. Composite Wood and Agrifiber: Product manufactured from wood particles or agricultural-based fiber, pressed and bonded with adhesive, resin and/or heat, included, but not limited to, particleboard, medium density fiberboard (MDF), plywood, wheatboard, strawboard, panel substrates, and door cores.

I. Cradle to Cradle: A multi-attribute standard and product database that certifies products and materials at different levels based on their human and environmental health attributes: https://c2ccertified.org

J. Declare Label: A transparency platform and product database that certifies products and materials at different levels based on their human and environmental health attributes: https://declare.living-future.org

K. Embodied Carbon/LCA Optimization: Products that demonstrate impact reductions relative to industry standards in global warming potential and additional impact categories: global warming potential; stratospheric ozone depletion; acidification; eutrophication, tropospheric ozone creation; nonrenewable resource depletion.

L. Environmental Product Declaration (EPD): An independently or third-party verified report based on life-cycle assessment studies that have been conducted according to a set of common product category rules and peer-reviewed. Resources:

1. EPD Database
2. UL's SPOT database
3. NSF Website

M. Extended Producer Responsibility (EPR): An environmental protection strategy that makes the manufacturer of a product responsible for the entire life cycle of the product and for the take back, recycling and final disposal of the product. (from: Lindhqvist, 2000; Khetriwal et al., 2009)

N. Forest Stewardship Council (FSC): Chain-of-custody product certification for wood and wood products. https://us.fsc.org/

O. Green Seal Standard GS-11: VOC thresholds for paints, primers and anti-corrosive coatings; reference standard in AEGB Commercial Rating: www.greenseal.org

P. GREENGUARD: Product certification for low-emitting interior building materials, furnishings, and finish systems; Gold level certification used as a basis to verify compliance with CDPH emissions testing: https://www.ul.com/services/ul-greenguard-certification

Q. Health Product Declaration (HPD): A standard specification format to report chemical content and associated health information for building products and materials: https://www.hpd-collaborative.org/

R. Indoor Air Quality (IAQ) Management Plan: Plan developed by the Contractor to provide a healthy indoor environment for workers and building occupants during construction. Plan must meet or exceed the recommendations of the Sheet Metal and Air Conditioning Contractors National Association (SMACNA) “IAQ Guidelines for Occupied Buildings Under Construction.”

S. LEED green building rating system, including versions v4 and v4.1, for Building Design and Construction (BD+C), Interior Design and Construction (ID+C), and other project types: https://www.usgbc.org/leed

T. Material Ingredient Reporting: Document disclosing product content and associated health information for building products and materials. Resources:

1. HPD Public Repository
2. Cradle to Cradle Registry
3. Declare Label Search
4. BIFMA search

U. Materials Reuse: Implementation strategies including salvaged, refurbished, or reused products.

V. Noise Reduction Coefficient (NRC): A scalar representation of how well a material reflects or absorbs sound. An NRC of 0 indicates perfect reflection; an NRC of 1 indicates perfect absorption.

W. Recycled Content Materials: The percentage of constituents that have been recovered or otherwise diverted from the solid waste stream, either during the manufacturing process (pre-consumer) or after consumer use (post-consumer).
    1. Spills and scraps from the original manufacturing process that are combined with other constituents after a minimal amount of

reprocessing for use in further production of the same product are not recycled materials.

2. Discarded materials from one manufacturing process that are used as constituents in another manufacturing process are pre-consumer recycled materials.

X. Regional Materials: Materials that are sourced (extracted, manufactured and purchased) within a 100-mile radius of the project site. Manufacturing refers to the final assembly of components into the building product that are installed at the Project site.

Y. Safety Data Sheet (SDS): A standard format that contains information about occupational exposure to hazardous chemicals and risks, and recommended procedures for treating exposure. SDS' are used to verify chemical composition, including VOCs, of construction materials and products.

Z. Scientific Certification Systems Global Services Indoor Advantage Gold: Certification for furniture, finishes and interior building materials used as a basis to verify compliance with CDPH emissions testing: www.scsglobalservices.com

AA. Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) "IAQ Guidelines for Occupied Buildings Under Construction," 2nd edition, Chapter 3 – Indoor air quality measures during construction: www.smacna.org

BB. South Coast Air Quality Management District (SCAQMD) Rule 1113: VOC limits for architectural coatings, as per most recent amendment: https://www.aqmd.gov/home/rules-compliance/compliance/vocs/architectural-coatings/tos

CC. South Coast Air Quality Management District (SCAQMD) Rule 1168: VOC limits for adhesives, sealants and sealant primers, as per most recent amendment: http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1168.pdf?sfvrsn=4

DD. Volatile Organic Compound (VOC): A chemical compound or mixture emitted as a gas from certain solids or liquids, some of which may have short- and long-term adverse health effects (from: EPA, 2024). For acceptable testing protocols, refer to California Department of Public Health (CDPH) Standard Method definition.

1.3 SUSTAINABLE CONSTRUCTION REQUIREMENTS

A. All projects: Adhere to requirements established by AISD and developed for project to advance sustainability and green building objectives using tools

such as LEED, AEGB, and/or AISD Sustainability Scorecard as applicable to each project.

B. Construction Activity Pollution Prevention: Implement Erosion and Sedimentation Control Plan and Stormwater Pollution Prevention Plan for all construction activities associated with the project.

C. Indoor Air Quality Management: Comply with requirements set forth in 013546 - Indoor Air Quality Management.

D. Construction and Demolition Waste Management: Comply with requirements set forth in 017419 - Construction and Demolition Waste Management.

E. Commissioning: Comply with commissioning requirements set forth in 016500, 019119.43, 220100, 230100, and 260100.

F. Integrated Pest Management: Comply with requirements of AISD Integrated Pest Management Plan, including specific alignment with termite control requirements.

G. Conduct a Phase I Environmental Site Assessment (ESA) as described in ASTM E1527-05, to be completed preferably 180 days prior to design commencement, and within a time period within which no substantive activities that could affect the ESA have occurred. If project deviates from this, provide letter explaining special circumstance.

    1. If contamination is suspected, conduct a Phase II Environmental Site Assessment as described in ASTM E1903-11.

    2. If site is confirmed to be contaminated, remediate site to meet local, state or national environmental protection agency residential (unrestricted) standards, whichever are most stringent.

H. Refrigerant Management: Verify no CFCs in HVAC and refrigeration systems, and provide global warming potential, ozone depletion and leakage data for HVAC and refrigerant systems containing >0.5 lbs of refrigerant. Prioritize refrigerants with a global warming potential (GWP) of less than 50 and ozone depleting potential (ODP) of zero.

I. Obtain Architect’s approval of substitution, change, or alteration of sustainable materials and systems and installation procedures prior to incorporation into Project.

J. Assist Architect in providing project sustainability documentation.

K. Provide submittals required to verify compliance with LEED, AEGB, and/or AISD Sustainability Scorecard criteria on a scheduled basis as requested by

Architect, Contractor, or other authorized party. For each submitted material and product requiring sustainability documentation, provide completed AISD Sustainability Submittal Sheet (Appendix F).

1.4 SUBMITTALS

A. For all projects, provide the following:

1. Rating System Compliance Tracking:

    a. Documentation using one or more of the following documents as appropriate / relevant to individual project scope. Assist Architect in completing and keeping current through project design and construction:

        i. Appendix A: LEED for Schools Checklist
        ii. Appendix B: LEED for New Construction and Major Renovations Checklist
        iii. Appendix C: LEED for Interior Design and Construction
        iv. Appendix D: AEGB Commercial Scorecard
        v. Appendix E: AISD Sustainability Scorecard

2. AISD Sustainability Submittal Sheet (Appendix F) for contractors / subcontractors to complete, coordinated with submittal process.

    a. Submit documentation for each material and product as follows:

        i. Materials identified by specification section number.
        ii. Separate line item for each material submitted.
        iii. Materials cost data, excluding labor and equipment, for each line item submitted.
        iv. Volume data for all wet-applied products submitted.
        v. Surface area data for each flooring, insulation, ceiling and wall material submitted (AEGB projects only).

3. Phase 1 Environmental Site Assessment (ESA) and other reports as determined necessary per Phase 1 ESA findings.

4. Schedule of Values for calculating materials-related credits, excluding labor and equipment, for Divisions 3-10, 31 (Section 316000 - Foundations) and 32 (Sections 321000 - Paving, 323000 - Site Improvements, and 329000 - Planting).

5. AEGB Primary Workbook (for AEGB projects), including material quantities of high-impact building materials as referenced in BR9 Material Quantities.

6. Construction Indoor Air Quality Management Plan.

7. Construction and Demolition Waste Management Plan.

8. Light Pollution Reduction:

    a. Backlight / uplight / glare (BUG) ratings and cut sheets for all exterior light fixtures.

    b. Maximum illuminance data for internally illuminated exterior signage (daytime / nighttime).

9. Indoor Water Use Reduction: Cut sheets for all faucets, showerheads, toilets and urinals indicating flow rates (gallons/minute) and flush volumes (gallons/flush), and for all clothes washers, dishwashers, pre-rinse spray valves, ice machines, cooling towers, food steamers, combination ovens.

10. Building Product Disclosure and Optimization

    a. Environmental Product Declarations and Material Ingredient documents disclosing and optimizing product content and associated health information.

    b. Product data indicating sourcing of raw materials which include: extended producer responsibility; bio-based materials; FSC certified wood products; materials reuse; recycled content; and other USGBC approved programs.

    c. Map indicating distance from project site for regional materials sourced (extracted, manufactured, purchased) within 100 miles (160 km) of the project site.

    d. Calculator(s) (including AEGB Primary Workbook and Baseline EC3 calculation, as applicable) listing all relevant contributing products used on the project.

11. Low-Emitting Materials:

    a. Product data, indicating compliance with VOC content, VOC emissions evaluation (as per CDPH Standard Method), and/or furniture emissions evaluation.

b. Low-emitting materials calculator (and/or AEGB Primary Workbook, as applicable) listing all relevant products used on the project.

12. Acoustical Performance: Product data for acoustic wall panels, ceiling finishes, and other sound-absorbent finishes indicating an NRC of 0.70 or higher.

1.5 QUALITY ASSURANCE

A. Designate personnel on Contractor's staff responsible for instructing workers and overseeing and documenting compliance with Project's sustainable requirements and goals. Provide contact name and information.

B. Require subcontractors and suppliers to comply with Project's sustainability requirements and goals.

C. Include sustainability requirements, goals and status updates as agenda items for Pre-Construction conference, Pre-Installation meeting and weekly subcontractor meetings.

PART 2 – PRODUCTS

2.1 GENERAL

Provide products and procedures necessary to comply with Project's sustainability requirements and goals required in this Section. Although other Sections may specify some products that contribute to these credits, the Contractor and/or Architect shall determine additional products and procedures necessary to comply.

1. Exclusions: Special equipment, such as elevators, escalators, process equipment, and fire suppression systems, is excluded from the credit calculations. Also excluded are products purchased for temporary use on the project, like formwork for concrete.

2.2 BUILDING PRODUCT DISCLOSURE AND OPTIMIZATION

A. For Projects registered for both LEED and AEGB, note that documentation requirements are different, as described below.

B. For Projects registered for LEED v4, pursue a v4.1 credit substitution for the credits under D, E, F below.

C. For LEED credit calculations under D, E, F below, products entirely sourced (extracted, manufactured, purchased) within 100 miles (160 km) of the project site are valued at twice their base contributing value, up to a maximum of 2 products, or 200% of cost.

D. Environmental Product Declarations (EPDs)

1. Environmental Product Declarations (LEED MRc EPDs, Option 1): Provide at least 20 permanently installed products (sourced from at least 5 different manufacturers) which have at least a cradle-to-gate scope and meet one of the following disclosure criteria:

    a. Product-Specific Declaration: A product with a publicly available, critically reviewed life-cycle assessment (LCA) conforming to ISO 14044. Valued as one whole product.

    b. Product-Specific Type III EPD (internally reviewed): A product with an internally critically reviewed LCA in accordance with ISO 14071. EPD must conform to ISO 14025, and EN 15804 or ISO 21930. Valued as one whole product.

    c. Industry-Wide (Generic) EPD: A product with third-party certification (type III), including external verification, in which the manufacturer is explicitly recognized by the program operator. Must conform to ISO 14025, and EN 15804 or ISO 21930. Valued as one whole product.

    d. Product-Specific Type III EPD (externally verified): A product with a third-party certification (type III), including external verification, in which the manufacturer is explicitly recognized by the program operator. Valued as 1 ½ products.

2. Embodied Carbon/LCA Optimization (LEED MRc EPD, Option 2): Provide at least 5 permanently installed products (sourced from at least 3 different manufacturers) which have a compliant embodied carbon optimization report or action plan separate from the LCA or EPD.

    a. Embodied carbon/LCA action plan. Valued as 1/2 product.
    b. <10% reduction in GWP. Valued as one whole product.
    c. 10%+ reduction in GWP. Valued as 1 ½ products.
    d. 20%+ reduction in GWP and 5%+ reduction in two additional impact categories. Valued as two whole products.

3. Environmental Product Declarations (AEGB MR2. EPD Option 1): Provide product-specific EPDs for all functional categories of the

concrete mix including the columns, beams, foundation, post-tensioned slabs, and slab-on-grade mixes.

4. Environmental Product Declarations (AEGB MR2. EPD Option 2 & 3): Provide product-specific EPDs for 20% (1 pt) or 40% (2 pts) of the Construction Materials by cost or Global Warming Potential (GWP).

E. Sourcing of Raw Materials (LEED MRc Sourcing of Raw Materials, AEGB MR3. Certified Wood): Provide products that meet at least one of the responsible extraction criteria below for at least 15%, by cost, of the total value of permanently installed building products in the project.

1. Extended producer responsibility program

2. Bio-based materials

3. Certified Wood: New wood-based materials certified by the Forest Stewardship Council including, but not limited to, carpentry, timber, decking, trusses, architectural woodwork, paneling, veneer, flooring, cabinets, furniture. To satisfy AEGB MR3. Certified Wood, avoid tropical hardwoods and specify FSC-certification for new wood-based materials at a minimum 30% by cost.

4. Materials Reuse: Salvaged, refurbished or reused products.

5. Recycled Content: Post-consumer (valued at 100%) and pre-consumer (valued at 50%) based on weight.

F. Material Ingredients

1. Material Ingredient Reporting (LEED MRc Material Ingredients, Option 1): Use at least 20 different permanently installed products from at least five different manufacturers that use any of the following programs to demonstrate the chemical inventory of the product to at least 0.1% (1000 ppm), which meet one of the following disclosure criteria:

    a. ANSI / BIFMA e3 Furniture Sustainability Standard
    b. Cradle to Cradle (C2C) Certified / Material Health Certificate
    c. Declare LBC Red List Free
    d. FACTS: NSF / ANSI 336
    e. Global Green TAG Product Health Declaration
    f. Health Product Declaration (HPD)
    g. Living Product Challenge
    h. Manufacturer Inventory: GreenScreen / Globally Harmonized System (GHS)
    i. UL Product Lens Certification

2. Material Ingredient Optimization (LEED MRc Material Ingredients, Option 2): Use at least 5 permanently installed products from at least three different manufacturers that document their material ingredient optimization using the paths below:

    a. Material Ingredient Screening and Optimization Action Plan. Valued at ½ product.
    b. Advanced Inventory and Assessment. Valued at 1 product.
    c. Material Ingredient and Optimization. Valued at 1 ½ products.

3. Material Ingredients (AEGB IEQ8. Material Ingredients): For flooring, interior insulation, and ceiling and wall systems, use at least 90% of materials, by surface area, that have been tested and determined compliant in accordance with CDPH Standard Method, or another certification or transparency program identified in the measure.

2.3 HEALTHY, LOW-EMITTING MATERIALS STANDARDS

A. For Projects registered for LEED v4, pursue a v4.1 credit substitution for EQc Low-Emitting Materials.

B. Material Categories

1. Paints and Coatings

    a. For field applications inside the waterproofing membrane, use products that comply with VOC content limits of the currently effective SCAQMD Rule 1113.

    b. Products must demonstrate they have been tested and determined compliant in accordance with CDPH Standard Method using the applicable exposure scenario. Manufacturer’s documentation demonstrating compliance must state the range of total VOCs (TVOC) as 0.5mg/m3 or less, between 0.5 and 5.0 mg/m3, or 5.0 mg/m3 or more.

    c. For Projects registered for AEGB 2022, products must comply with requirements of AEGB BR8. Interior Paints and Coatings.

    d. Methylene chloride and perchloroethylene may not be intentionally added.

SCAQMD Rule 1113 PAINTS AND COATINGS CATEGORIES	VOC Limit (g/L) Effective Date 1/1/19
Bond Breakers	350
Building Envelope Coatings	50
Concrete-Curing Compounds	100
Concrete-Curing Compounds For Roadways and Bridges	350
Concrete Surface Retarder	50
Default	50
Driveway Sealer	50
Dry-Fog Coatings	50
Faux Finishing Coatings	
Clear Topcoat	100
Decorative Coatings	350
Glazes	350
Japan	350
Trowel Applied Coatings	50
Fire-Proofing Coatings	150
Flats	50
Floor Coatings	50
Form Release Compound	100
Graphic Arts (Sign) Coatings	200
Industrial Maintenance (IM) Coatings	100
Color Indicating Safety Coatings	480
High Temp IM Coatings	420
Non-Sacrificial Anti-Graffiti Coatings	100
Zinc-Rich IM Primers	100
Magnesite Cement Coatings	450
Mastic Coatings	100
Metallic Pigmented Coatings	150
Multi-Color Coatings	250
Nonflat Coatings	50
Pre-Treatment Wash Primers	420
Primers, Sealers, Undercoaters	100

SCAQMD Rule 1113 PAINTS AND COATINGS CATEGORIES	VOC Limit (g/L) Effective Date 1/1/19
Reactive Penetrating Sealers	350
Recycled Coatings	150
Roof Coatings	50
Roof Coatings, Aluminum	100
Roof Primers, Bituminous	350
Rust Preventative Coatings	100
Sacrificial Anti-Graffiti Coatings	50
Shellac	
Clear	730
Pigmented	550
Specialty Primers	100
Stains	100
Stains, Interior	250
Stone Consolidants	450
Swimming Pool Coatings	
Repair	340
Other	340
Tile and Stone Sealers	100
Traffic Coatings	100
Tub and Tile Refinishing Coatings	420
Waterproofing Sealers	100
Waterproofing Concrete/Masonry Sealers	100
Wood Coatings	
Varnish	275
Sanding Sealers	275
Lacquer	275
Wood Conditioners	100
Wood Preservatives	
Below-Ground	350
Other	350

2. Adhesives and Sealants

   a. For field applications inside the waterproofing membrane, use adhesives and sealants that comply with VOC content limits of the currently effective SCAQMD Rule 1168.

   b. Products must demonstrate they have been tested and determined compliant in accordance with CDPH Standard Method using the applicable exposure scenario. Manufacturer's documentation demonstrating compliance must state the range of total VOCs (TVOC) as 0.5mg/m3 or less, between 0.5 and 5.0 mg/m3, or 5.0 mg/m3 or more.

   c. Methylene chloride and perchloroethylene may not be intentionally added.

SCAQMD Rule 1168 ADHESIVES & SEALANTS CATEGORIES	VOC Limit (g/L) Effective 1/1/2023
Adhesives	
Architectural Applications	
Bldg Env. Membrane Adhesive	250
Carpet pad adhesives	50
Ceramic Glass, Porcelain & Stone Tile Adhesive	65
Cove base adhesives	50
Dry wall and panel adhesives	50
Multipurpose construction adhesives	70
Roofing	
Hot Applied Modified Bitumen/Built Up Roof Adhesive	30
Single Ply Roof Membrane Adhesive, Except EPDM/TPO	30
All other roof adhesives	250
Rubber floor adhesive	60
Structural glazing adhesive	100
Structural wood member adhesive	140
Subfloor adhesive	50

SCAQMD Rule 1168 ADHESIVES & SEALANTS CATEGORIES	VOC Limit (g/L) Effective 1/1/2023
Substrate specific adhesives	
Metal	30
Plastic foams	50
Porous material (except wood)	50
Wood	30
Fiberglass	80
Reinforced plastic composite	200
Sealants	
Architectural applications	
Clear, paintable and immediately water-resistant sealant	380
Foam insulation (% VOC by weight)	5%
One-component foam sealant	250
High-pressure two-component foam sealant (% VOC by weight)	5%
Low-pressure two-component foam sealant (% VOC by weight)	5%
Grout	65
Roadway sealant	250

VCT and asphalt tile adhesive	50
Wood flooring adhesive	20
All other indoor floor covering adhesives	50
All other outdoor floor covering adhesives	50
Computer diskette manufacturing	350
Contact adhesive	80
Edge glue adhesive	250
Plastic welding cement	
ABS welding cement	325
ABS to PVC transition cement	425
CPVC welding cement	400
CPVC for life safety systems	490
Higher viscosity CPVC	490
PVC welding cement	425
All other plastic welding cements	100
Rubber vulcanization adhesive	850
Special purpose contact adhesive	250
Thin metal laminating adhesive	780
Tire tread adhesive	100
Top and trim adhesive	540
Waterproof resorcinol glue	170
All other adhesives	250

Non-staining plumbing putty	50
Potable water sealant	100
Roofing	
Single ply roof membrane sealant	250
All other roof sealants	300
All other architectural sealants	50
Marine deck sealant	760
All other sealants	250
Adhesive Primers	
Plastic	550
Pressure sensitive	785
Traffic marking tape	150
Vehicle glass	700
Roof adhesive primer	250
All other adhesive primers	250
Sealant Primers	
Architectural applications	
Non-porous	250
Porous	775
Marine deck	760
Modified bituminous	500
Roof sealant primer	750
All other sealant primers	750

3. Flooring: Products must demonstrate they have been tested and determined compliant in accordance with CDPH Standard Method using the applicable exposure scenario. Wet-applied flooring-related paints, coatings, adhesives and sealants must comply with requirements as described above, as applicable.

4. Composite Wood: Composite wood, agrifiber products, and adhesives shall be made with no added formaldehyde or shall be made using ultra-low-emitting formaldehyde (ULEF) resins as defined in the California Air Resources Board's "Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products."

5. Walls: Products must demonstrate they have been tested and determined compliant in accordance with CDPH Standard Method using the applicable exposure scenario.

6. Ceilings: Products must demonstrate they have been tested and determined compliant in accordance with CDPH Standard Method using the applicable exposure scenario.

7. Insulation: Products must demonstrate they have been tested and determined compliant in accordance with CDPH Standard Method using the applicable exposure scenario.

8. Furniture:

    a. Furniture and furnishings shall be tested in accordance with ANSI / BIFMA Standard Method M7.1; comply with ANSI / BIFMA e3 Furniture Sustainability Standard, Sections 7.6.1 OR 7.6.2, OR 7.6.2 AND 7.6.3. Testing laboratories must be accredited under ISO/IEC 17025 for the test methods they use. Products must be evaluated using the applicable exposure scenario (refer to AEGB 2022).

    b. Salvaged / reused furniture more than one year old is considered compliant, provided it meets requirements for field-applied paints, coatings, adhesives, and sealants.

9. Exterior Applied Materials: Adhesives, sealants, coatings, roofing and waterproofing materials applied on site must meet the VOC limits of CARB 2007 SCM for Architectural Coatings and currently effective SCAQMD Rule 1168.

    a. The following materials are prohibited:

        i. Hot-mopped asphalt for roofing.
        ii. Coal tar sealants for parking lots and other paved surfaces.

10. Additional Low-Emitting Materials Requirements:

    a. If the applicable regulation requires subtraction of exempt compounds, any content of intentionally added exempt compounds larger than 1% by weight by mass (total exempt compounds) must be disclosed.

    b. If a product cannot reasonably be tested as specified above, testing of VOC content must comply with ASTM D2369-10; ISO 11890, part 1; ASTM D6886-03; or ISO 11890-2.

2.4 INDOOR WATER USE REDUCTION

A. Plumbing Fixtures: Do not exceed water flush/flow requirements indicated in Division 22 – PLUMBING.

B. Appliances and Equipment: Comply with water use standards and maximum allowable water usage as indicated in LEED WEp/c Indoor Water Use Reduction and AEGB BR7/WEL5 Potable Water Use Reduction, as applicable.

PART 3 – EXECUTION

3.1 CONSTRUCTION ACTIVITY POLLUTION PREVENTION

A. Implement Erosion and Sedimentation Control Plan and Stormwater Pollution Prevention Plan (SWPPP) for all construction activities associated with this project.

3.2 INDOOR AIR QUALITY MANAGEMENT

A. Comply with Section 013546 - Indoor Air Quality Management.

3.3 CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT

A. Comply with Section 017419 - Construction and Demolition Waste Management.

3.3 COMMISSIONING

A. Comply with Sections 016500, 019119.43, 220100, 230100, and 260100

3.5 INTEGRATED PEST MANAGEMENT

A. Comply with the requirements of AISD Integrated Pest Management Plan, including specific alignment with termite control requirements.

APPENDIX A
LEED v4 for Schools Checklist

LEED v4 for BD+C: Schools

Project Checklist

Project Name:
Date:

Y	?	N			
			Credit	Integrative Process	1

0	0	0	**Location and Transportation**		15
			Credit	LEED for Neighborhood Development Location	15
			Credit	Sensitive Land Protection	1
			Credit	High Priority Site	2
			Credit	Surrounding Density and Diverse Uses	5
			Credit	Access to Quality Transit	4
			Credit	Bicycle Facilities	1
			Credit	Reduced Parking Footprint	1
			Credit	Green Vehicles	1

0	0	0	**Sustainable Sites**		12
Y			Prereq	Construction Activity Pollution Prevention	Required
Y			Prereq	Environmental Site Assessment	Required
			Credit	Site Assessment	1
			Credit	Site Development - Protect or Restore Habitat	2
			Credit	Open Space	1
			Credit	Rainwater Management	3
			Credit	Heat Island Reduction	2
			Credit	Light Pollution Reduction	1
			Credit	Site Master Plan	1
			Credit	Joint Use of Facilities	1

0	0	0	**Water Efficiency**		12
Y			Prereq	Outdoor Water Use Reduction	Required
Y			Prereq	Indoor Water Use Reduction	Required
Y			Prereq	Building-Level Water Metering	Required
			Credit	Outdoor Water Use Reduction	2
			Credit	Indoor Water Use Reduction	7
			Credit	Cooling Tower Water Use	2
			Credit	Water Metering	1

0	0	0	**Energy and Atmosphere**		31
Y			Prereq	Fundamental Commissioning and Verification	Required
Y			Prereq	Minimum Energy Performance	Required
Y			Prereq	Building-Level Energy Metering	Required
Y			Prereq	Fundamental Refrigerant Management	Required
			Credit	Enhanced Commissioning	6
			Credit	Optimize Energy Performance	18
			Credit	Advanced Energy Metering	1
			Credit	Demand Response	2
			Credit	Renewable Energy Production	3

0	0	0	**Materials and Resources**		13
Y			Prereq	Storage and Collection of Recyclables	Required
Y			Prereq	Construction and Demolition Waste Management Planning	Required
			Credit	Building Life-Cycle Impact Reduction	5
			Credit	Building Product Disclosure and Optimization - Environmental Product Declarations	2
			Credit	Building Product Disclosure and Optimization - Sourcing of Raw Materials	2
			Credit	Building Product Disclosure and Optimization - Material Ingredients	2
			Credit	Construction and Demolition Waste Management	2

0	0	0	**Indoor Environmental Quality**		16
Y			Prereq	Minimum Indoor Air Quality Performance	Required
Y			Prereq	Environmental Tobacco Smoke Control	Required
Y			Prereq	Minimum Acoustic Performance	Required
			Credit	Enhanced Indoor Air Quality Strategies	2
			Credit	Low-Emitting Materials	3
			Credit	Construction Indoor Air Quality Management Plan	1
			Credit	Indoor Air Quality Assessment	2
			Credit	Thermal Comfort	1
			Credit	Interior Lighting	2
			Credit	Daylight	3
			Credit	Quality Views	1
			Credit	Acoustic Performance	1

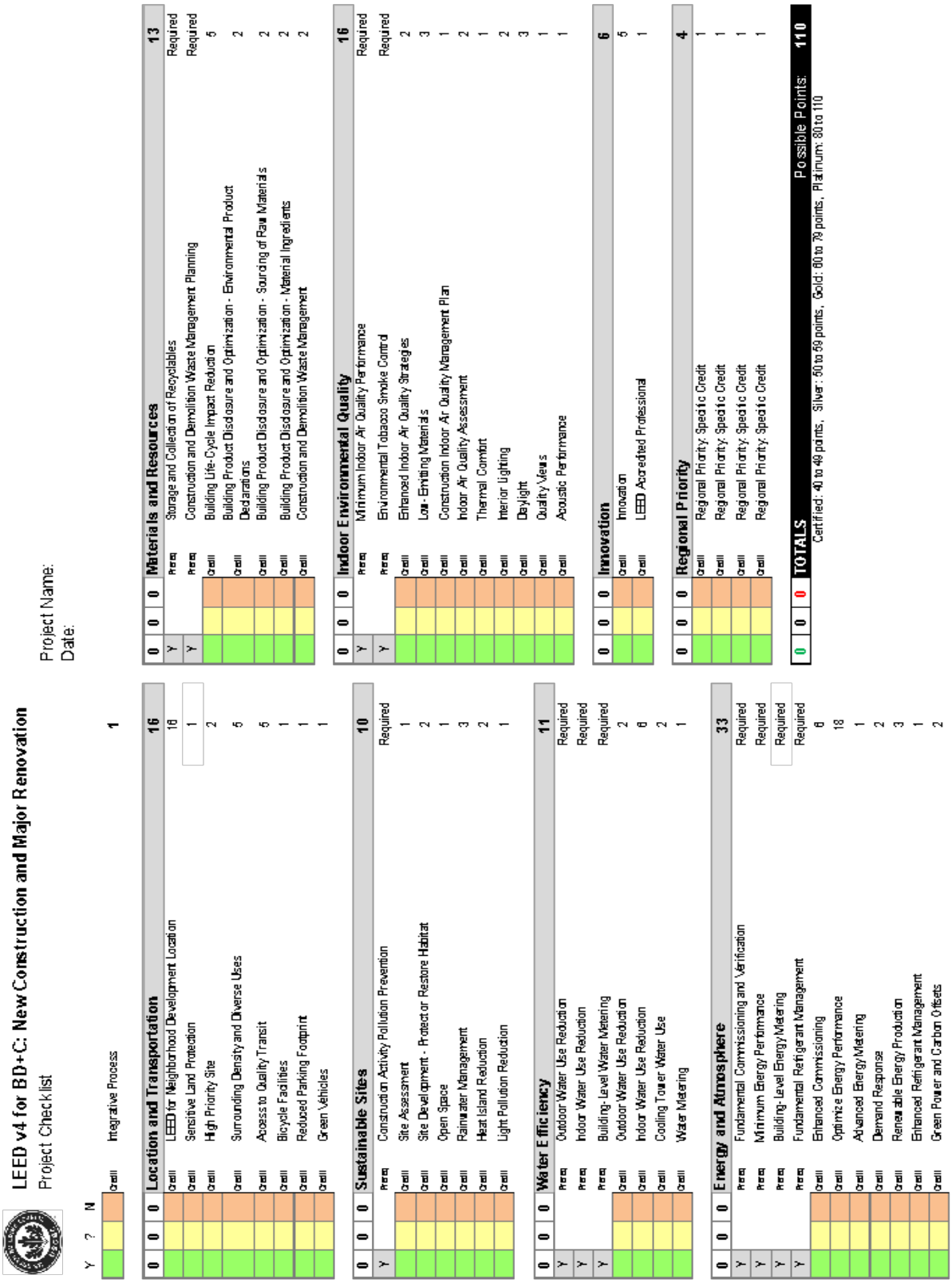
0	0	0	**Innovation**		6
			Credit	Innovation	5
			Credit	LEED Accredited Professional	1

0	0	0	**Regional Priority**		4
			Credit	Regional Priority: Specific Credit	1
			Credit	Regional Priority: Specific Credit	1
			Credit	Regional Priority: Specific Credit	1
			Credit	Regional Priority: Specific Credit	1

0	0	0	**TOTALS**	Possible Points:

Certified: 40 to 49 points, Silver: 50 to 59 points, Gold: 60 to 79 points, Platinum: 80 to 110

APPENDIX B
LEED v4 for New Construction and Major Renovations Checklist



LEED v4 for BD+C: New Construction and Major Renovation

Project Checklist

Project Name:
Date:

Y	?	N			
			Credit	Integrative Process	1

0	0	0	**Location and Transportation**		16
			Credit	LEED for Neighborhood Development Location	16
			Credit	Sensitive Land Protection	1
			Credit	High Priority Site	2
			Credit	Surrounding Density and Diverse Uses	5
			Credit	Access to Quality Transit	5
			Credit	Bicycle Facilities	1
			Credit	Reduced Parking Footprint	1
			Credit	Green Vehicles	1

0	0	0	**Sustainable Sites**		10
Y			Prereq	Construction Activity Pollution Prevention	Required
			Credit	Site Assessment	1
			Credit	Site Development - Protect or Restore Habitat	2
			Credit	Open Space	1
			Credit	Rainwater Management	3
			Credit	Heat Island Reduction	2
			Credit	Light Pollution Reduction	1

0	0	0	**Water Efficiency**		11
Y			Prereq	Outdoor Water Use Reduction	Required
Y			Prereq	Indoor Water Use Reduction	Required
Y			Prereq	Building-Level Water Metering	Required
			Credit	Outdoor Water Use Reduction	2
			Credit	Indoor Water Use Reduction	6
			Credit	Cooling Tower Water Use	2
			Credit	Water Metering	1

0	0	0	**Energy and Atmosphere**		33
Y			Prereq	Fundamental Commissioning and Verification	Required
Y			Prereq	Minimum Energy Performance	Required
Y			Prereq	Building-Level Energy Metering	Required
Y			Prereq	Fundamental Refrigerant Management	Required
			Credit	Enhanced Commissioning	6
			Credit	Optimize Energy Performance	18
			Credit	Advanced Energy Metering	1
			Credit	Demand Response	2
			Credit	Renewable Energy Production	3
			Credit	Enhanced Refrigerant Management	1
			Credit	Green Power and Carbon Offsets	2

0	0	0	**Materials and Resources**		13
Y			Prereq	Storage and Collection of Recyclables	Required
Y			Prereq	Construction and Demolition Waste Management Planning	Required
			Credit	Building Life-Cycle Impact Reduction	5
			Credit	Building Product Disclosure and Optimization - Environmental Product Declarations	2
			Credit	Building Product Disclosure and Optimization - Sourcing of Raw Materials	2
			Credit	Building Product Disclosure and Optimization - Material Ingredients	2
			Credit	Construction and Demolition Waste Management	2

0	0	0	**Indoor Environmental Quality**		16
Y			Prereq	Minimum Indoor Air Quality Performance	Required
Y			Prereq	Environmental Tobacco Smoke Control	Required
			Credit	Enhanced Indoor Air Quality Strategies	2
			Credit	Low-Emitting Materials	3
			Credit	Construction Indoor Air Quality Management Plan	1
			Credit	Indoor Air Quality Assessment	2
			Credit	Thermal Comfort	1
			Credit	Interior Lighting	2
			Credit	Daylight	3
			Credit	Quality Views	1
			Credit	Acoustic Performance	1

0	0	0	**Innovation**		6
			Credit	Innovation	5
			Credit	LEED Accredited Professional	1

0	0	0	**Regional Priority**		4
			Credit	Regional Priority: Specific Credit	1
			Credit	Regional Priority: Specific Credit	1
			Credit	Regional Priority: Specific Credit	1
			Credit	Regional Priority: Specific Credit	1

0	0	0	**TOTALS**	Possible Points:	110

Certified: 40 to 49 points, Silver: 50 to 59 points, Gold: 60 to 79 points, Platinum: 80 to 110

APPENDIX C
LEED v4 for Interior Design and Construction Checklist

LEED v4 for ID+C: Commercial Interiors
Project Checklist

Project Name:
Date:

Y	?	N			
			Credit	Integrative Process	2

0	0	0	**Location and Transportation**		18
			Credit	LEED for Neighborhood Development Location	18
			Credit	Surrounding Density and Diverse Uses	8
			Credit	Access to Quality Transit	7
			Credit	Bicycle Facilities	1
			Credit	Reduced Parking Footprint	2

0	0	0	**Water Efficiency**		12
Y			Prereq	Indoor Water Use Reduction	Required
			Credit	Indoor Water Use Reduction	12

0	0	0	**Energy and Atmosphere**		38
Y			Prereq	Fundamental Commissioning and Verification	Required
Y			Prereq	Minimum Energy Performance	Required
Y			Prereq	Fundamental Refrigerant Management	Required
			Credit	Enhanced Commissioning	5
			Credit	Optimize Energy Performance	25
			Credit	Advanced Energy Metering	2
			Credit	Renewable Energy Production	3
			Credit	Enhanced Refrigerant Management	1
			Credit	Green Power and Carbon Offsets	2

0	0	0	**Materials and Resources**		13
Y			Prereq	Storage and Collection of Recyclables	Required
Y			Prereq	Construction and Demolition Waste Management Planning	Required
			Credit	Long-Term Commitment	1
			Credit	Interiors Life-Cycle Impact Reduction	4
			Credit	Building Product Disclosure and Optimization - Environmental Product Declarations	2
			Credit	Building Product Disclosure and Optimization - Sourcing of Raw Materials	2
			Credit	Building Product Disclosure and Optimization - Material Ingredients	2
			Credit	Construction and Demolition Waste Management	2

0	0	0	**Indoor Environmental Quality**		17
Y			Prereq	Minimum Indoor Air Quality Performance	Required
Y			Prereq	Environmental Tobacco Smoke Control	Required
			Credit	Enhanced Indoor Air Quality Strategies	2
			Credit	Low-Emitting Materials	3
			Credit	Construction Indoor Air Quality Management Plan	1
			Credit	Indoor Air Quality Assessment	2
			Credit	Thermal Comfort	1
			Credit	Interior Lighting	2
			Credit	Daylight	3
			Credit	Quality Views	1
			Credit	Acoustic Performance	2

0	0	0	**Innovation**		6
			Credit	Innovation	5
			Credit	LEED Accredited Professional	1

0	0	0	**Regional Priority**		4
			Credit	Regional Priority: Specific Credit	1
			Credit	Regional Priority: Specific Credit	1
			Credit	Regional Priority: Specific Credit	1
			Credit	Regional Priority: Specific Credit	1

0	0	0	**TOTALS**	Possible Points: 110

Certified: 40 to 49 points, **Silver:** 50 to 59 points, **Gold:** 60 to 79 points, **Platinum:** 80+

APPENDIX D
Austin Energy Green Building Commercial Scorecard

AEGB 2022 COMMERCIAL RATING

Measures	Available Points	AEGB Approved	Yes	Maybe	No	Notes / Action Items
Basic Requirements						
1. Goal Setting	x					
2. Codes and Regulations	x					
3. Bicycle Parking	x					
4. Electric Vehicle Charging	x					
5. Commissioning	x					
6. Energy Performance	x					
7. Potable Water	x					
8. Interior Paints and Coatings	x					
9. Material Quantities	x					
10. Tenant Requirements	x					
Core Measures - Site + Transportation						
1. Intentional Site Selection	2					
2. Multi-Modal Transportation	3					
3. Site Engagement	1					
4. Parking Management	1					
5. Additional EV Charging	1					
6. Landscapes for Resilience	2					
7. Light Pollution Reduction	1					
subtotal	11	0	0	0	0	
Core Measures - Energy						
1. Energy Performance	10					
2. Renewables	5					
3. Additional Commissioning	2					
4. Refrigerants	1					
5. Grid Flexibility	2					
subtotal	20	0	0	0	0	
Core Measures - Water						
1. Rainwater and Condensate	4					
2. Water Metering	1					
3. Access to Quality Drinking Water	1					
4. Reclaimed Water	1					
5. Stormwater	3					
subtotal	10	0	0	0	0	

Measures	Available Points	AEGB Approved	Yes	Maybe	No	Notes / Action Items
Core Measures - Indooor Environmental Quality (IEQ)						
1. Active Occupants	1					
2. Daylight	1					
3. Operable Windows	1					
4. Indoor Air Quality	2					
5. Construction Indoor Air Quality	1					
6. Combustion Minimization	1					
7. Pollutant Source Control	1					
8. Material Ingredients	1					
9. Acoustic Quality	1					
10. Healthy Materials	2					
subtotal	12	0	0	0	0	
Core Measures - Materials and Resources						
1. Lifecycle Assessment	5					
2. Environmental Product Declarations	3					
3. Certified Wood	1					
4. Construction and Demolition Waste	3					
subtotal	12	0	0	0	0	
Core Measures - Education and Equity						
1. Educational Outreach	1					
2. Construction Worker Equity & Skills Training	3					
3. Inclusive Restrooms	1					
subtotal	5	0	0	0	0	
Priority						
1. Location Priority	5					
2. Typology Priority						
subtotal	5	0	0	0	0	
Elective and Performance Measures						
1. Elective Measures	25					
2. Exemplary Performance						
3. Equitable Performance						
4. Innovative Performance						
subtotal	25	0	0	0	0	

	Available Points	AEGB Confirmed	Yes	Maybe	No
TOTALS	100	0	0	0	0

APPENDIX E
Austin ISD Sustainability Scorecard

AUSTIN ISD SUSTAINABILITY SCORECARD

Revised 10/16/23

Y	N	NA	Mandatory Requirements	
			ALL 1M	Basis of Design Document: AE to prepare narrative at SD and update through design
			ALL 2M	Design Review Process: Sustainability Review at SD, DD, CD
			ALL 3Ma	Low Emitting Materials - Adhesives, Sealants, Paints, Coatings: Do not exceed VOC content limits of SCAQMD Rule 1168 & 1113; Confirm product is tested & compliant with CDPH
			ALL 3Mb	Low Emitting Materials - Composite wood and agrifiber: No added formaldehyde (NAF) or ultra low emitting formaldehyde (ULEF) per CARB ATCM
			ALL 3Mc	Low Emitting Materials - Flooring: Tested and compliant with CDPH Standard Method
			ALL 3Md	Low Emitting Materials - Insulation: Tested and compliant with CDPH Standard Method (exclude HVAC duct and piping insulation)
			ALL 3Me	Low Emitting Materials - Wall Panels: Tested and compliant with CDPH Standard Method
			ALL 3Mf	Low Emitting Materials - Ceilings: Tested and compliant with CDPH Standard Method
			ALL 4M	Construction + Demolition Waste Management: Divert minimum 75% of non-hazardous C+D debris by weight from landfill
			ALL 5M	Construction IAQ Management: Refer to IAQ Management Plan
			ALL 6M	Green Housekeeping: Comply with the requirements of the AISD Green Housekeeping Plan.
			M 1M	Energy Efficiency - Mechanical Renovation: 10%>IECC-2021
			M 2M	Commissioning - Mechanical: Reference AISD standard spec
			E 1M	Energy Efficiency - Lighting: 15% >IECC-2021
			E 2M	Commissioning - Electrical: Reference AISD standard spec
			P 1M	Indoor Water Use Reduction: Reduce aggregate water consumption by 20% using LEED v4/v4.1 baseline; Specify WaterSense fixtures where applicable
			P 2M	Commissioning - Plumbing: Reference AISD standard spec
			P 3M	Appliance and Process Water Use Reduction: Comply w/ LEED v4/v4.1 process water requirements
			ARCH 1M	Storage & Collection of Recyclables & Compostables: Include dedicated areas in all new and/or renovated spaces.
			ARCH 2M	Energy Efficiency - Envelope: Comcheck 20% better than IECC-2021
			ARCH 3M	Acoustic Performance - Comply with Chapter 5, Acoustics section of AISD Project Design Manual, as applicable to project
			SITE 1M	Native and Non-Invasive Adapted Species: Specify species using the City of Austin Grow Green Database and other resources noted in the PDM
			SITE 2M	Outdoor Water Use Reduction: Reduce project's landscape water requirement by minimum 30% using LEED v4/v4.1 baseline
			SITE 3M	Integrated Pest Management: Comply with the requirements of the AISD Integrated Pest Management Plan

Y	N	NA	Voluntary Requirements	
			ALL 1V	Optimize Energy Performance: 15% improvement over baseline using ASHRAE 90.1-2016 Appendix G Baseline.
			ALL 2V	Construction + Demolition Waste Management: Divert minimum 95% of non-hazardous C+D debris by weight from landfill
			ALL 3V	Sourcing of Raw Materials: Use recycled, bio-based, FSC-certified, and/or reused products for at least 15%, by cost, of all permanently installed building products
			ALL 4V	School As a Teaching Tool: Educate building occupants w/ signage, digital presentations, teacher training in green curriculum, etc.
			M1V	Enhanced Refrigerant Management: Use refrigerants with an ODP of zero and a GWP of less than 50
			M2V	Controllability of Systems - Thermal Comfort: Controls to allow occupants to adjust temperature, air speed and/or humidity for individual comfort
			M3V	Indoor Chemical & Pollutant Control: Walk-off mats; MERV 13 filters; Exhaust, door closers & deck-to-deck partitions or hard-lid ceiling at housekeeping closets
			E 1V	Renewable Energy: Offset at least 2% of building energy cost
			E 2V	Controllability of Systems - Lighting: Controls to allow occupants to adjust lighting to meet individual needs and preferences
			P 1V	Indoor Water Use Reduction: Reduce aggregate water consumption by minimum 25% using LEED v4/v4.1 baseline.
			ARCH 1V	Envelope Commissioning - Additions & Major Renovations: Cx of envelope to comply with ASHRAE Guideline 0-2013 and ASTM E2947-16
			ARCH 2V	Quality Views: Provide building occupants with a view to the outdoor natural or urban environment for 75% of all regularly occupied floor area
			ARCH 3V	Daylighting: Demonstrate an average sDA of at least 40%, or illumance levels between 300-3,000 lux for at least 55%, of regularly occupied floor area
			ARCH 4V	Low Emitting Materials - Furniture and Furnishings: Tested in accordance with ANSI/BIFMA Standard Method M7.1 and compliant with ANSI/BIFMA e3
			ARCH 5V	Moisture Protection: Install no vinyl or plastic laminate wall coverings or other fiber reinforced plastic or vinyl as the finish material on the interior of exterior walls
			ARCH 6V	Low Emitting Materials - Insulation: All insulation, including HVAC duct and piping insulation, to be tested and compliant with CDPH Standard Method
			ARCH 7aV	Indoor Air Quality - IAQ Testing: Testing for particulate matter and VOCs
			ARCH 7bV	Indoor Air Quality - Flush Out: Perform flush out per LEED requirements
			SITE 1V	Protect or Restore Habitat: Restore at least 15% or more of the site with native and non-invasive adapted plant species
			SITE 2V	Open Space: Provide open space greater than or equal to 30% of total site area
			SITE 3V	Stormwater: Direct runoff from at least 50% of the total impervious area using green infrastructure, and size water quality controls to manage volume, per the COA Environmental Criteria Manual
			SITE 4V	Site Assessment: Provide a narrative outlining the site analysis conducted to demonstrate how it influenced design, siting, and orientation
			SITE 5V	Outdoor Water Use Reduction: Reduce project's landscape water requirement by 50%
			SITE 6V	Parking Capacity: Reduce parking by minimum 20% above code and provide solutions for off-site parking when events are held at the facility
			SITE 7V	Reduce Heat Island Effect: Comply with criteria outlined in LEED v4/v4.1 SSc Heat Island Reduction
			SITE 8V	Light Pollution Reduction: Meet requirements for backlight, uplight and glare (BUG) rating
			SITE 9V	Learning Environment: Provide infrastructure for either a school garden or outdoor classroom.

NOTE: This scorecard is an appendix to 01 81 13 Sustainable Construction Requirements. Not all mandatory items are applicable to all project types. The AISD PM & AE are to meet with the EWAS team to review the scorecard to determine project specific goals. This scorecard is a summary of the project specific goals defined by the design team and AISD.

APPENDIX F
Sustainability Submittal Sheets

AISD SUSTAINABILITY SUBMITTAL SHEET

Aligning with LEED v4/v4.1 and AEGB 2022 page 1

PRODUCT INFORMATION

Include permanently installed products in Divisions 03-10, including built-in casework & millwork items, Sections 31.60.00 Foundations, 32.10.00 Paving, 32.30.00 Site Improvements, 32.90.00 Planting. Passive MEP products may be included. See below for Additional Information and Reference Standards.

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

Material Origin	✓	**Furthest Distance from Project Site (miles + location)**
Product extracted, manufactured and purchased within 100 miles of site?	☐	

☐ If yes, confirm that the map / letter from manufacturer illustrating distance from project site is attached to this submittal

ENVIRONMENTAL PRODUCT DECLARATIONS (EPDs)

Declaration Type	✓	**Declaration Type**	✓
Product-specific life-cycle assessment (LCA)	☐	Embodied Carbon/LCA Action Plan	☐
Product-specific Type III EPD - internally reviewed	☐	EPD with carbon reductions of <10% for GWP	☐
Industry-wide (generic) 3rd party certified EPD	☐	EPD with carbon reductions of 10%+ for GWP	☐
Product-specific Type III EPD - 3rd party certified	☐	EPD with carbon reductions of 20%+ for GWP & 5%+ in 2 additional impact categories	☐

☐ Confirm that the LCA, EPD, action plan, and/or optimization report is attached to this submittal

SOURCING OF RAW MATERIALS + CERTIFIED WOOD

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

☐ Confirm that the product data/letter from manufacturer/third-party certificate confirming the information above is attached to this submittal

MATERIAL INGREDIENTS + TRANSPARENCY PROGRAMS

Reporting Program	✓	**Reporting Program**	✓
Cradle to Cradle or C2C MHC - *Bronze or higher*	☐	Cradle to Cradle - *Material Health Certificate*	☐
Declare Label	☐	Declare Label - *Third Party Verified*	☐
Health Product Declaration (HPD)	☐	Health Product Declaration (HPD) - *Third Party Verified*	☐
Living Product Challenge	☐	Living Product Challenge - *Red List Free*	☐
Manufacturer Inventory of all ingredients + CASRN #	☐	Manufacturer Inventory of all ingredients + CASRN #	☐
UL Product Lens Certification	☐	Screening and Optimization Action Plan	☐

☐ Confirm that the reporting program doc(s) are attached

☐ Surface area sq ft (for flooring, insulation, ceiling and wall materials contributing to AEGB IEQ8)

ADDITIONAL INFORMATION + REFERENCE STANDARDS

MATERIAL ORIGIN - LEED MRc Environmental Product Declarations, Sourcing of Raw Materials and Material Ingredients: Products fully extracted, manufactured AND purchased within 100 miles of project site are valued at twice their base contributing value.

AEGB: N/A

ENVIRONMENTAL PRODUCT DECLARATIONS - LEED Options 1 & 2: Refer to LEED v4.1 Reference Guide for conformance, 3rd party verification, review, and scope criteria.

AEGB Options 1, 2, 3: Refer to AEGB Guidebook for measure requirements and pathway options. Note product-specific EPDs are required for all AEGB options.

SOURCING OF RAW MATERIALS - LEED: All percentages are calculated by weight. Bio-based material excludes wood. Certified wood documentation must include vendor invoices with chain of custody number.

CERTIFIED WOOD - AEGB MR3: Measure also requires to select alternatives to tropical hardwoods.

MATERIAL INGREDIENTS - LEED Option 1: Chemicals must be inventoried to at least 1,000 ppm. LEED Option 2: Chemicals must be inventoried to at least 100 ppm. Action plan must be prepared by the manufacturer and signed by company executive. All other documents require third party verification.

AEGB BR8 & IEQ8: Compliance may be met using CDPH Standard Method v1.2-2017, Declare LBC Red List Free, C2C Certified, and/or HPD inventoried to at least 1,000 ppm.

REVISED 10.24.24

AISD SUSTAINABILITY SUBMITTAL SHEET

Aligning with LEED v4/v4.1 and AEGB 2022 **page 2**

PRODUCT INFORMATION

This sheet applies to all products applied or installed within the waterproofing membrane. See page 3 for Additional Information and Reference Standards addressing product categories, data, standards and requirements. Documentation must confirm that standards / requirements are met for each applicable category.

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

☐ Is the product interior applied/installed? If not, product is N/A for LEED EQc Low-Emitting Materials and AEGB BR8 and IEQ8

PAINTS + COATINGS (for AEGB BR8, see also Material Ingredients on previous page)

			✓
VOC Content (g/L)		Is supporting documentation attached?	☐
Volume Used (Liters)		CDPH Standard Method v1.2-2017*	☐
		SCAQMD Rule 1113 *or* CARB 2007 SCM	☐

ADHESIVES + SEALANTS

			✓
VOC Content (g/L)		Is supporting documentation attached?	☐
Volume Used (Liters)		CDPH Standard Method v1.2-2017*	☐
		SCAQMD Rule 1168	☐

FLOORING (Provide all flooring-related adhesive & coating information above. For AEGB IEQ8, see also Material Ingredients on previous page)

			✓
Product Cost		Is supporting documentation attached?	☐
Surface Area (sq ft)		CDPH Standard Method v1.2-2017*	☐

COMPOSITE WOOD

			✓
Product Cost		Is supporting documentation attached?	☐
		No added formaldehyde (NAF) *or*	☐
		Ultra-low-emitting formaldehyde (ULEF) *or*	☐
		Meets structural panel/product criteria	☐

CEILINGS, WALLS, INSULATION** (For AEGB IEQ8, see also Material Ingredients on previous page)

			✓
Product Cost		Is supporting documentation attached?	☐
Surface Area (sq ft)		CDPH Standard Method v1.2-2017*	☐

FURNITURE

			✓
Product Cost		Is supporting documentation attached?	☐
ANSI/BIFMA e3 7.6.1,		ANSI/BIFMA Standard Method M7.1 & e3	☐
7.6.2 and/or 7.6.3?		*or* Salvaged/Reused	☐

*CDPH Standard Method v1.2-2017 or more current. v1.1-2010 no longer accepted.

** Under LEED v4.1 EQc Low-Emitting Materials, ceilings, walls and insulation are separate categories. Under AEGB IEQ8 Material Ingredients, ceilings and walls are combined.

REVISED 10.24.24

AISD SUSTAINABILITY SUBMITTAL SHEET

Aligning with LEED v4/v4.1 and AEGB 2022 page 3

ADDITIONAL INFORMATION + REFERENCE STANDARDS

- Complete separate Sustainability Submittal Sheet for EACH distinct product and include all applicable information.
- **Low-Emitting Materials requirements apply to all products applied or installed within the waterproofing membrane.**
- Inherently non-emitting sources (stone, ceramic, powder-coated metals, plated or anodized metal, glass, concrete, clay brick, and unfinished/untreated solid wood flooring) are considered fully compliant if they do not have organic-based binders/coatings/sealants.
- All information must be verified by manufacturer or supplier via Safety Data Sheet (SDS), Product Data Sheet, Letter from Manufacturer/Supplier, Information on Manufacturer/Supplier Website, and Approved 3rd Party Certifications, as applicable.
- *Note: LEED and AEGB define and categorize materials differently; reference most current LEED v4.1 Reference Guide and AEGB 2022 Commercial Guidebook.*

Product Categories	Definitions *based on LEED v4.1 Reference Guide dated July 2024*
Paints + Coatings	Interior paints and coatings wet-applied on site, specialized finishes, and plaster
Adhesives + Sealants	Interior adhesives and sealants wet-applied on site
Flooring	Hard and soft surface flooring (carpet, ceramic, vinyl, rubber, engineered, solid wood, laminates), raised flooring, wall base, transition strips/ stair nosing, grills, entryway systems, underlayments. Exclude poured concrete and subflooring
Wall Panels	Finish wall treatments (wall coverings, wall paneling, wall tile), gypsum, curtain walls, trim, interior and exterior doors, non-structural wall framing, interior and exterior windows, window film and treatments, countertops, laminate/veneer used for built-in cabinetry, non-structural sandwich panels, CMU. Exclude cabinetry and vertical structural elements, bathroom accessories, and door hardware
Ceilings	Ceiling panels, ceiling tile, surface ceiling structures such as gypsum or plaster, suspended systems (including canopies and clouds), skylights
Insulation	Thermal and acoustic boards, batts, rolls, blankets, sound attenuation fire blankets, foamed-in place, loose-fill, blown, and sprayed insulation. Exclude insulation for HVAC ducts (at the project team's discretion) and plumbing piping
Furniture	Seating, desks and tables, filing/storage, free-standing cabinetry, systems furniture, moveable/demountable partitions, bathroom/toilet partitions, shelving, lockers, specialty and custom fixtures and furniture, and furnishing items (such as area rugs, cubicle curtains, mattresses, and mirrors). Exclude office and bathroom accessories, art, recreational items, and planters
Composite Wood	Particleboard, fiberboard (both medium density and thin), hardwood plywood with veneer, composite or combination core, and wood structural panels or structural wood products

Data / Standards / Requirements	Additional Information
VOC Content (g/L)	Disclosure of VOC (Volatile Organic Compound) content must be made by the manufacturer in product data sheet, SDS, etc.
Volume Used (Liters)	Provide liters of product installed (1 gallon = 3.78541 liters) for wet-applied products
CDPH Standard Method	VOC emissions evaluation. TVOC range after 14 days must be reported. See Reference Standards, below
TVOC Content (mg/m3)	Total Volatile Organic Compounds ranges: 0.5 mg/m3 or less, between 0.5 and 5 mg/m3, or 5 mg/m3 or more
SCAQMD Rule 1113	VOC content evaluation for paints and coatings. See Reference Standards, below
CARB 2007 SCM	Alternative VOC content evaluation for paints and coatings. See Reference Standards, below
SCAQMD Rule 1168	VOC content evaluation for adhesives and sealants. See Reference Standards, below
Composite wood / Agrifiber Product Formaldehyde Requirements	- Certify as Ultra-Low-Emitting Formaldehyde (ULEF) product under EPA TSCA Title VI or CARB ATCM *or* - Certify as No Added Formaldehyde resins (NAF) product under EPA TSCA Title VI or CARB ATCM *or* - Manufacture according to PS 1-09 or PS 2-10 (or CARB equivalent) and labeled bond classification Exposure 1 or Exterior *or* - Manufacture according to ASTM D 5456, ANSI A190.1, ASTM D 5055, ANSI PRG 320, or PS 20-15 See Reference Standards, below
ANSI/BIFMA Standard Method	Testing protocol for new furniture and furnishings. See Reference Standards, below
ANSI/BIFMA e3	Furniture sustainability standard. See Reference Standards, below

REFERENCE STANDARDS

California Department of Public Health (CDPH) Standard Method v1.2-2017 or more current version: Total VOC (TVOC) range after 14 days must be reported (0.5 mg/m3 or less, between 0.5 and 5 mg/m3, or 5 mg/m3 or more). v1.1-2010 no longer accepted.

South Coast Air Quality Management District (SCAQMD) Rule 1113 effective February 5, 2016 or more current version: All paints and coatings applied on site and within the waterproofing membrane must meet this requirement (alt: CARB 2007 SCM for Architectural Coatings).

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

South Coast Air Quality Management District (SCAQMD) Rule 1168 effective October 6, 2017 or more current version: All adhesives and sealants applied on site and within the waterproofing membrane must meet this requirement.

EPA Toxic Substances Control Act, Formaldehyde Emission Standards for Composite Wood Products (EPA TSCA Title VI): Formaldehyde emissions evaluation.

California Air Resources Board (CARB) Airborne Toxic Control Measures (ATCM): Formaldehyde emissions evaluation.

ANSI/BIFMA Standard Method M7.1-2011 (R2016) or more current version: Testing protocol for new furniture and furnishings within the waterproofing membrane.

ANSI/BIFMA e3-2014e, e3-2019e or more current version: Furniture Sustainability Standard. Indicate compliance with section 7.6.1 (1/2 credit) or 7.6.2 (full credit) or 7.6.2 and 7.6.3 (1 1/4 credit). using appropriate scenario.

REVISED 10.24.24

END OF SECTION 018113

EXTERIOR ENCLOSURE COMMISSIONING

SECTION 01 91 19.43

PART 1 - GENERAL

1.1 SUMMARY

A. This project shall include Building Enclosure Commissioning (BECx) as part of the design and construction processes. The primary intent of BECx is to provide a process for independent, third-party verification that the performance of the building enclosure meets the requirements of, or exceeds, the minimum performance requirements that are determined in tandem with the design team. Materials, components, assemblies, and systems that comprise the building exterior enclosure shall be evaluated and tested as outlined in this Section.

B. The intent of the BECx program for the project is to meet the requirements of the scope of service set forth by the owner.

C. Materials and assemblies that are evaluated as part of the BECx process include:

1. Foundation walls and slab-on-grade: Horizontal and vertical waterproofing.

2. Exterior Wall components: thermal insulation, weather-resistive barrier, vapor barrier, formed metal wall panels, exterior fenestrations and doors, coatings, sealants, etc.

3. Roof components: steep-slope and low-slope roofing: roof deck, thermal insulation, waterproof underlayment, standing seam metal panels; vapor barrier, coverboard, single-ply membrane, integration of roof materials with surrounding walls

4. Interface conditions (integral flashing, expansion joints, etc.) between materials, components and systems that comprise the building exterior enclosure.

1.2 RELATED DOCUMENTS AND SECTIONS

A. All Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 and Division 03 – 09 Technical Specification Sections, related to the commissioning of and/or installation of the Building Envelope.

1.3 REFERENCE STANDARDS

A. ASHRAE Guideline 0-2013 – The Commissioning Process

B. NIBS Guideline 3-2012 – Exterior Enclosure Technical Requirements for the Commissioning Process

C. ASTM C 1060-11 – Standard Practice for Thermographic Inspection of Insulation Installations in Envelope Cavities of Frame Buildings

D. ASTM C 1153-10 – Standard Practice for Location of Wet Insulation in Roofing Systems Using Infrared Imaging

E. ASTM C 1193-13 – Standard Guide for Use of Joint Sealants

F. ASTM D 4541-09 – Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers

G. ASTM D 7877-14 – Standard Guide for Electronic Methods for Detecting and Locating Leaks in Waterproof Membranes

H. ASTM E 779-10 - Standard Test Method for Determining Air Leakage Rate by Fan Pressurization

I. ASTM E 783-02 – Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors

J. ASTM E 1105-00 – Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference

K. ASTM E 1186-03 – Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems

L. ASTM E 1827-11 – Standard Test Methods for Determining Airtightness of Buildings Using an Orifice Blower Door

M. AAMA 501.2-09 – Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems

1.4 DEFINITIONS

A. Building Enclosure: Materials, components, systems, and assemblies intended to provide shelter and environmental separation between interior and exterior, or between two or more environmentally distinct interior spaces in a building or structure. The building enclosure includes, but is not limited to, exterior walls, above and below grade, and roof assemblies.

B. BECx: Building Enclosure Commissioning, A process that endeavors to ensure that the exterior enclosure is constructed per project plans and specifications.

C. BECxA: Building Enclosure Commissioning Agent, The individual or firm retained by the Commissioning Authority (CxA). The BECxA develops, manages, and is responsible for the BECx process.

D. BECxP: Building Enclosure Commissioning Plan, Project-specific protocol developed by the BECxA, which outlines the BECx process for all related components and assemblies. This document shall identify the Commissioning Team and a general schedule of all tasks involved in the BECx process, including design reviews, construction observations, first installation construction and testing, and technical reports that shall be produced over the course of the Project.

E. Building Enclosure Commissioning Report: Final deliverable from the BECx process. Includes a full summary report with appropriate documentation including the following information: a narrative including a list of enclosure systems and components included as part of BECx, a description of non-conforming conditions noted during site observations with follow up documentation on the means and methods to resolve, and summary results of building performance testing.

F. Building Enclosure Commissioning Team: Owner, Contractor, Architect, Commissioning Agent, and Building Enclosure Commissioning Agent.

G. Cx: Commissioning, as defined in Section 01 65 00 "General Commissioning Requirements."

H. CxA: Commissioning Authority, as defined in Section 01 65 00 "General Commissioning Requirements."

I. First-Installation Mockups: Initial installation of specific enclosure materials, components, systems, and assemblies that are part of Work.

J. Integrated Exterior Mockups: Integrated mockups of the exterior enclosure erected separately from the building but on Project site, consisting of multiple products, assemblies, and subassemblies.

K. Laboratory Mockups: Full-size physical assemblies constructed at testing facility.

L. "Systems," "Assemblies," "Subsystems," "Equipment," and "Components": Where these terms are used together or separately, they shall mean "as-built" systems, assemblies, subsystems, equipment, and components.

M. Water Penetration: Visible evidence of uncontrolled water penetration on or adjacent to the test specimen in a location not intended to collect and drain water to the building exterior.

1.5 BUILDING ENCLOSURE COMMISSIONING AGENT SCOPE OF SERVICES / RESPONSIBILITIES

A. A qualified BECxA is to perform building enclosure-related consulting services including review of BECx specification and OPR, creation of BECx Plan, design reviews and collaborative meetings, submittal and shop drawing reviews, quality assurance observations, enclosure issues deficiency report and resolution record management, observation of field testing (by others), and development of the BECx closeout report language to integrate into the overall Cx report.

B. The services are further outlined as follows:

1. BECx Specification

a. Review of BECx specification for inclusion in the contract documents. The specification will include guidelines and criteria for the building enclosure related laboratory and field testing.

2. BECxP Development

a. During the Design phase of the project, review the design documents and develop a project-specific Building Envelope Commissioning Plan (BECxP) that outlines the BECx process for all related components and assemblies. The BECxP shall identify the Commissioning Team and general schedule of tasks involved in the BECx process. The BECxP will clearly assign responsibilities amongst the Commissioning Team for planning meetings, design reviews, construction observations, initial installation testing, in-situ testing, and technical reports produced over the course of the Project.

3. Design Reviews and Meetings:

a. Perform independent, third-party design reviews of the enclosure-related drawings and specifications. Prepare a written report for each review and participate in one post review meeting with the Commissioning Team after each review to discuss findings and recommendations from the design review. Reviews and meetings will occur at the following drawing phases:

1) Design Development (DD): 100% completion

2) Construction Document (CD): 50%, 90%, 100% completion

4. Submittal Reviews

a. Review and comment on submittals from the Contractor for compliance with the building enclosure requirements set forth in the Contract Documents.

b. The BECxA's submittal reviews will be in coordination with the design team's review.

c. Note that the BECxA shall not have the authority to accept or reject submittals.

5. Quality Assurance (QA) Observations and Reports

a. Conduct 15 on-site QA Observations. Site visits shall observe construction of building enclosure work and report progress and deficiencies. Provide a report for each observation that includes compliant construction installations, areas requiring corrective action or attention, recommendations for corrective action by the contractor, and recommendations for additional detailing by the design team.

b. BECx shall ensure that the required rate of site visits noted above is provide. Specific project requirements may exceed the above stated values.

c. Maintain an issues log that can be tracked and reviewed with the Commissioning Team.

6. Field Performance Testing

a. BECxA to review the building enclosure performance testing identified in item 3.2.B of this specification. The BECxA will review reports provided for each test that documents the procedure, description of test specimens, test results, and relevant equipment calibration records.

7. Verify that the Contractor provided occupant and operator and Contractor provided O&M documentation is effective and in accordance with the contract documents.

8. Provide BECx Report language to CxA for inclusion in the Final Cx Report. This report includes the following items at a minimum, as related to the building enclosure:

a. Executive summary describing the BECx program

b. Summary outline identifying unresolved/undocumented nonconforming work.

c. Paper or electronic copies of all documentation and correspondence prepared by the BECxA.

d. Results of building performance testing by others.

9. 10-Month Warranty Site Visit

a. Review performance of the building enclosure 10 months after substantial completion and update BECx Report with recommendations with respect of the findings of the review.

C. Building Enclosure Commissioning Agent is not authorized to:

1. Release, revoke, alter or expand requirements of Contract Documents

2. Approve or accept any portion of the work

3. Revise construction drawings and specifications

4. Perform any duties of the Contractor

1.6 CONTRACTOR RESPONSIBILITIES

A. Furnish copies of all submittals, shop drawings, manufacturer's literature, installation instructions, maintenance information, schedules, warranties, or other information as requested. Note that it is the Architect and Contractor's responsibility to approve or reject submittals and shop drawings.

B. Provide access to work, including scissor/boom lifts and/or scaffolding and coordinate scheduling with the BECxA to perform BECx tasks.

C. Provide qualified personnel for assistance in completing the commissioning tests for elements of the building envelope. Specifically:

1. Provide safe access to all testing locations as needed (Ladder, Scissor Lift, Scaffold, etc.)

2. Provide access to utilities as needed for testing (Power, Water, etc.)

D. Submit a copy of the General Contractor's project and site specific Quality Assurance program to be implemented for construction for review prior to beginning of construction.

E. Ensure all subcontractors utilized for work on the building enclosure participate in the Construction Phase Kick Off Meeting with the design and construction teams, Owner's representatives, and CxA.

1. Pre-installation Meetings: Coordinate envelope related pre-installation meetings as specified with Design Team, BECx, Owner's representative, and affected subcontractors present. Installation may not proceed until after this meeting has been held.

2. Pre-testing Meetings: Coordinate meetings with Design Team, BECxA, Owner's representative, and affected subcontractors present to discuss envelope related testing procedures and requirements.

F. Construction of early-installed assemblies including elements of the building exterior enclosure, as identified the Contract Documents.

G. Coordinate with BECxA to perform site visits prior to coverup of building envelope components. It is the responsibility of the Contractor to notify the BECxA when work has been completed, reviewed by the installer, and is ready for final observation by the BECxA.

H. Provide personnel and have a representative present from each trade and/or subcontractor associated with installing the systems during performance testing.

1. Personnel completing work in the field are to be utilized to participate in the construction of early-installation building enclosure assemblies as required by the Construction Documents, and to have a representative present during inspection and testing.

2. If deficiencies are observed, provide labor and materials to repair or reconstruct the assembly such that deficiencies do not exist.

I. Reimburse Owner for additional testing and inspections if building enclosure systems are not constructed per Construction Documents or do not pass testing.

J. Complete installation verification checklists, or similar approved Contractor created checklists, for building enclosure materials and assemblies. Provide daily reports as required by Contract Documents that include progress of construction.

K. Submit documentation to close all open issues log provided by BECxA. Contractor must submit photos or any other format acceptable by the BECxA. It is the responsibility of the Contractor to close all open items listed in the BECxA issues log.

L. Where indicated in each applicable specification, engage manufacturer's technical representative of materials / assemblies listed in 3.1.A to perform an inspection of the installed assemblies to verify that they are installed per manufacturer's requirements and Contract Documents. Inspections shall occur, at a minimum, at early installation and upon completion of the assembly.

M. Include systems manual requirements in construction documents to the CxA.

N. Include systems manual updates and deliver to CxA.

O. Coordinate operator and occupant training delivery and effectiveness if required by Owner.

1.7 ARCHITECT RESPONSIBILITIES

A. Provide electronic copies of project drawings and specifications to the BECxA as these documents are issued.

1. Ensure that exterior enclosure design submitted for interim and final review is in full compliance with all applicable requirements of AISD's Project Development Manual. If a variance to the PDM is submitted, the design documents cannot depict this variance until approval by AISD.

2. Illustrate the design intent of a continuous air barrier boundary on plan and section sheets, as required.

3. Define air and water barrier materials and assemblies for components on drawings and in related specifications.

4. Provide details illustrating integration of air and water barrier materials at detailed transitions (e.g., roof-to-wall, wall-to-floor, building expansion joints, exterior doors and windows, etc.). Details shall be provided prior to issuance of 100% Construction Documents.

5. Provide written responses to comments made by BECxA on drawings and specification sections in a timely manner after each review.

6. Promptly respond to requests for information or additional detailing needed from BECx and Contractor.

7. Coordinate comments by BECxA applicable to subconsultants to ensure timely response and action after each review.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 GENERAL

A. Systems to be commissioned: Refer to the Related Documents and Sections identified in 1.2 for specific requirements. The systems and elements to be commissioned include:

1. Roof systems (including parapets, penetrations, curbs, etc.)

2. Exterior wall systems (all types)

3. Curtain Walls and Storefronts

4. Doors

5. Sealants

6. Building expansion joint accessories (roof and wall)

7. Flashings

8. Any other special building enclosure system, equipment and controls.

2.2 GENERAL TESTING REQUIREMENTS

A. If tests cannot be completed because of a deficiency outside the scope of the building enclosure systems, document the deficiency and report it to Owner. After deficiencies are resolved, reschedule tests.

B. If seasonal testing is specified, complete appropriate initial performance tests and documentation and schedule seasonal tests.

C. Coordinate schedule with, and perform Cx activities at the direction of the CxA.

2.3 LABORATORY MOCKUP TESTING

A. Laboratory Mockup Testing Program: Perform the tests listed below in the following order.

1. Structural: ASTM E 330 at 50 percent of positive test load for not less than 10 seconds.

   a. No evidence of deflection exceeding specified limits.

2. Air Infiltration: ASTM E 283 at a static-air-pressure differential of 1.57 lbf/sq. ft. (75 Pa)

   a. Maximum air leakage of 0.06 cu ft/min/sq ft of assembly surface area.

3. Water Penetration under Static Pressure: ASTM E 331 at minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft. (300 Pa).

   a. No evidence of water penetration.

2.4 FIELD TESTING

A. General

1. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

2. Test methods listed below are excerpted from ASTM E 2813-12, Table A2.1 and the related enclosure specifications listed in Part 1 of this specification.

   a. The required number or frequency of each test below matches the number of frequency provided in the applicable enclosure specification. If the number of frequency does not match, then the specific enclosure specification controls.

   b. Where possible, performance requirements and pass/fail criteria have been defined for each test. If components or assemblies do not pass initial testing, Contractor shall provide labor and materials to repair assemblies until a successful test is accomplished where applicable and additional testing will be required as described below.

   c. Perform testing before installation of interior finishes unless otherwise indicated.

B. Air/Weather Barrier Adhesion Testing: ASTM D4541 Test Method for Pull-off Strength for Coatings Using Portable Adhesion Testers.

1. Perform Three (3) adhesion test on Mock-Up for Each Substrate

2. Perform Three (3) adhesion test on first 1,000 SF of air barrier installation for each Substrate Type

3. Perform Six (6) additional adhesion test every 100,000 SF for each Substrate Type

4. Refer to Section 07 2726 – Fluid Applied Air Barriers for testing requirements associated with unprotected/damaged weather barrier installations.

C. Sealant Pull Testing: ASTM C1521, *Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints*

1. Perform a minimum of two sealant pull tests on the building for each type of sealant joint and for each type of substrate on the building prior to commencing production work. Ensure proper primers are used for each substrate.

2. Pull test must be performed by the Manufacturer or third-party agency approved by Owner. Manufacturer and/or testing agency shall submit written report of testing procedures and results.

3. Sealant pull tabs must exhibit adhesion as required by the sealant manufacturer. If manufacturer requirements do not exist, then the sealant should tear cohesively within itself before releasing from the substrate. Sealants that fail in adhesion will be considered test failures.

4. In case of test failure, make repairs and retest after new sealant has been installed.

D. Water Penetration Testing (Aluminum-Framed Entrances and Storefronts): ASTM E 1105, *Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference.*

1. Perform one water penetration test at the on-site mockup and test 10% of the glazed wall area.

   a. Contractor to provide access to each test specimen from both the interior and exterior.

   b. Water source to be provided by the Contractor.

   c. Removal and reinstallation of interior finishes (ceiling grid, sheathing, decorative) and sealants within 6 inches of test locations will be provided by the Contractor.

2. If window configuration prevents isolation for chamber testing, AAMA 501.2, Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems testing will be required (see item F in this section).

3. The uniform or static air pressure differential for testing shall be equivalent to the laboratory test pressure per ASTM E331 for the submitted system, with a two-thirds reduction factor utilized for field testing.

4. Pass/Fail Criteria:

   a. No evidence of water penetration at a minimum uniform static-air-pressure differential equal to two-thirds (2/3) the manufacturer's tested pressure per ASTM E331 in laboratory conditions.

   b. Water penetration is defined as liquid water (droplets) observed at any of the below locations.

1) On the surface of the interior side of the glazing or frame elements.

2) On the top surface of the sill extrusion or gaskets.

3) Behind the exterior primary perimeter joint sealants around the frame.

4) Under the window system subsill extrusion where present.

5) Beyond the window at interior finish surfaces.

6) Below or above the sill pan flashing where present.

7) Moisture detected (dampness) that is not in the form of droplets shall be reviewed by the BECx, Architect, and the Owner.

5. Failure Retesting Requirements

a. In case of test failure, repair and retest until test area passes; test an additional area for each test failure.

6. In the event that additional test areas have a failure rate exceeding the following percentages, the Contractor shall perform repairs and/or replacement of all windows prior to additional testing at Contractor's expense.

a. Small Projects (less than or equal to 50 total windows or 5,000 total square feet of windows, whichever is less): 50% failure rate

b. All Other Projects: 20% failure rate

E. Air Leakage Testing, Aluminum-Framed Entrances and Storefronts: ASTM E 783, Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors

1. Perform one air leakage test at the on-site mockup and test 10% of the glazed wall area at the building. Test specimens will be the same specimens tested during Water Penetration Testing.

a. Contractor to provide access to each test specimen from both the interior and exterior.

b. Removal and reinstallation of interior finishes and sealants to be provided by the Contractor.

2. The uniform static air pressure differential for testing shall be equivalent to the laboratory test parameters. Test failure occurs if the air leakage rate measured during testing exceeds the allowable leakage rate.

3. Pass/Fail Criteria:

a. Maximum air leakage of 0.35 cfm/sq.ft. at a static-air-pressure differential of 1.57 lbf/sq. ft. (75 Pa).

4. Failure Retesting Requirements

a. In case of test failure, repair and retest until area passes; test an additional area for each test failure.

F. Water Spray Test, Aluminum Framed Curtainwalls/Storefronts and Expansion Joint Mockups: AAMA 501.2, Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems

1. This type of testing is permitted at expansion joint mockup locations and curtainwalls/storefronts where ASTM E1105 water penetration testing is not feasible due to window configuration (examples include ribbon type windows, glazing where exterior elements prevent use of a spray rack).

a. Contractor to provide access to each test specimen from both the interior and exterior.

b. Water source to be provided by the Contractor.

c. Removal and reinstallation of interior finishes and sealants to be provided by the Contractor.

2. Perform water spray testing at the on-site curtainwalls in accordance with AAMA 501.2.

a. Contractor to provide access to each test specimen from both the interior and exterior. Water source and hoses to be provided by the Contractor.

b. Specific test locations will be selected by the BECxA.

3. A Type B-25 brass nozzle manufactured by Monarch Manufacturing Works shall be utilized for each spray test.

a. The pressure at the water nozzle shall be between 30 and 35 psi. Water shall be applied at 12 inches from the test specimen, at a rate of 5 minutes per 5’-0” in accordance with the test standard.

4. Pass/Fail Criteria:

a. Test failure is defined as uncontrolled water that appears on any normally exposed interior surface, that is not contained or drained back to the exterior, or that can cause damage to adjacent materials and finished.

5. Failure Retesting Requirements

a. In case of test failure, repair and retest until test area passes; test an additional area for each test failure.

G. Moisture Testing at Roofing: ASTM C 1153, *Standard Practice for Location of Wet Insulation in Roofing Systems Using Infrared Imaging* and D7954, *Standard Practice for Moisture Surveying of Roofing and Waterproofing Systems Using Non-Destructive Electrical Impedance Scanners*

1. This type of testing is to be performed on all roofs at substantial completion, as part of the Project closeout process, to verify if the installed roof system has residual moisture present; or if leaks occur during construction from roofs with improperly sealed penetrations or temporary seals.

2. Pass/Fail Criteria:

   a. Moisture readings at a known “dry” location and suspected “wet” locations shall be verified through the use of minimally invasive test cuts to allow insertion of a capacitance based probe meter and visual observation of concealed roofing materials.

   b. Locations with elevated moisture levels (typically 30% or higher on a 0-100% scale) as compared with dry areas at test cuts will be considered “wet”. Once verification at selected “wet” locations has been confirmed, all suspect locations indicated with non-destructive moisture detection methods will be assumed “wet”.

3. Repair and Retesting Requirements

   a. In the event of confirmed “wet” substrate below installed roofing, the Contractor shall remove and replace wet materials at no cost to the Owner.

   b. Removal of wet substrate shall be coordinated to ensure that the BECxA is notified in advance of removal to ensure independent moisture measurements at locations where the Contractor plans to stop removal of materials.

   c. After completion of removal and installation of new roofing materials, the Contractor shall bear the cost of a full retest of the installed roof system by the BECxA to confirm no residual “wet” materials remain.

H. Moisture Testing at Waterproofing: ASTM D 7877, Standard Guide for Electronic Methods for Detecting and Locating Leaks in Waterproof Membranes

1. This type of testing is to be performed on all waterproof decks prior to installation of overburden, to verify if the installed system has breaches or moisture present below the membrane.

2. Pass/Fail Criteria:

   a. Locations indicating breaches during testing shall be considered as failures requiring repairs.

3. Repair and Retesting Requirements

   a. The Contractor shall provide full depth repairs of all breach locations in accordance with manufacturer requirements.

   b. The Contractor shall bear the cost of retesting after repairs are completed, to verify no breaches in the membrane remain prior to installation of overburden.

I. Whole Building Air Tightness Test (ASTM E 2813, Table A2.1)

1. This test shall be required only in the event that:

   a. The Owner has directed this testing be performed as part of the Project;

   b. The Project location/size triggers this requirement per applicable Code;

c. Lack of coordination during construction by the Contractor has prevented the BECxA from performing observations of air barrier installation prior to concealment at more than 25 percent of the area of building elevations.

1) NOTE: in this scenario, all costs associated with the whole building air leakage testing shall be borne by the Contractor.

2. Test the building envelope in accordance with ASTM E 779 and perform infrared or smoke diagnostics in accordance with ASTM E 1186.

3. Pass/Fail Criteria:

a. The allowable air leakage rate shall be 0.35 cfm/ft^2 (2.0 L/s × m^2) of the building thermal envelope area at a pressure differential of 0.3 inch water gauge (75 Pa). Test failure occurs if the measured air leakage exceeds the allowable.

b. Alternatively, portions of the building shall be tested and the measured air leakages shall be area weighted by the surface areas of the building envelope in each portion. The weighted average test results shall not exceed the whole building leakage limit.

c. In the alternative approach, the following portions of the building shall be tested:

1) The entire envelope area of all stories that have any spaces directly under a roof.

2) The entire envelope area of all stories that have a building entrance, exposed floor, or loading dock, or are below grade.

3) Representative above-grade sections of the building totaling at least 25 percent of the wall area enclosing the remaining conditioned space.

4. Failure Retesting Requirements

a. In the event of test failure, the Contractor shall locate and repair locations of air leakage and cover costs of retesting as required, until the measured air leakage rate is less than the allowable leakage rate.

b. Air leakage greater than 0.35 cfm/sf and less than 0.45 cfm/sf: provide a detailed report outlining location of leaks and repair. Retesting is not required.

c. Air leakage greater than 0.45 cfm/sf: provide a detailed report outlining location of leaks, repair, and retest to verify air leakage is less than 0.45 cfm/sf.

END OF SECTION

SECTION 035216 - LIGHTWEIGHT INSULATING CONCRETE

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Cast-in-place cellular foam lightweight insulating concrete (LWIC).

1.2 RELATED WORK

A. Section 018113 – Sustainable Construction Requirements

B. Section 053100 – Steel Decking

C. Section 061000 – Rough Carpentry

D. Section 075250 – Modified Bituminous Sheet Roofing

E. Section 075419 – Polyvinyl Chloride (PVC) Membrane Roofing

1.3 REFERNCE STANDARDS

A. ASTM – American Society of Testing Materials (ASTM)

B. FM – FM Global Group

C. NRCA – National Roofing Contractors Association

D. UL – Underwrites Laboratory

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference:
   1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing installer, roofing system manufacturer's representative, deck installer, and installers whose work interfaces with or affects lightweight insulated concrete system, including installers of roof accessories and roof-mounted equipment.
   2. Review methods and procedures related to LWIC installation, including manufacturer's written instructions.
   3. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   4. Examine steel deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
   5. Review structural loading limitations of steel deck during and after LWIC.

6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects LWIC system.
7. Review governing regulations and requirements for insurance and certificates if applicable.
8. Review temporary protection requirements for LWIC system during and after installation.
9. Review of testing requirements for LWIC system.

1.5 SYSTEM DESCRIPTION

A. Install lightweight insulating concrete system to achieve the required R-value and a complete and proper substrate for the roof membrane system.

1.6 SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For lightweight insulating concrete.
1. Include plans, sections, and details showing roof slopes, thicknesses, and embedded insulation board.
2. Indicate locations of penetrations, perimeter terminations and curbs, control and expansion joints, and drains.

C. Design Mixtures: For each lightweight insulating concrete mixture.

D. Qualification Data:
1. Certified applicator by the LWIC manufacturer for a minimum of 5 years.
2. Certified by the roofing manufacturer the LWIC is compatible with the roof system and will be included with the roof warranty.
3. Installers and supervisors certificates of qualification from the LWIC manufacturer.

E. Product Certificates: For the following:
1. Cementitious materials.
2. Lightweight aggregates.
3. Foaming agents.
4. Admixtures.
5. Molded-polystyrene insulation board.

F. Evaluation Reports:
1. For lightweight insulating concrete, from ICC-ES.
2. FM ratings confirming compliance with the FM uplift ratings shown in the Construction Documents.
3. UL ratings confirm compliance with fire ratings shown in the Construction Documents.

G. Field quality-control reports.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

B. NRDCA Installer Qualifications: A firm that has been evaluated by UL and found to comply with requirements of NRDCA's Lightweight Insulating Concrete Roof Deck Contractors Accreditation Program.

C. Testing Agency Qualifications: Qualified according to ASTM C1077 and ASTM E329 for testing indicated.

1.8 FIELD CONDITIONS

A. Do not place lightweight insulating concrete unless ambient temperature is at least 40 deg F and rising.

B. Do not place lightweight insulating concrete during rain or on surfaces covered with standing water, or ice.

1.9 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Materials shall be delivered in the suppliers original unopened packages, fully identified as to the manufacturer and brand.

B. Material must be stored at temperatures between 52ºF and 80ºF, or as required by the manufacturer. Expanded polystyrene boards shall not be stored in areas of standing water. Boards must be clean and free from foreign substances and physical damage.

1.10 WARRANTY

A. Roof System Guarantee: Upon successful completion of the project, and after all post installation procedures have been completed, furnish the Owner with the roof system manufacturer's 20 year labor and materials roof system guarantee. The roof system guarantee shall include both the roofing and flashing membranes, and the specified new lightweight insulating concrete system consisting of pre-generated foam, patented-pre-formed polystyrene panels, and base sheet fasteners. All repair or replacement costs covered under the guarantee shall be borne by the roofing membrane manufacturer. The guarantee shall be a term type, without deductibles or limitations on coverage amount. Specific items covered under the roof system guarantee include:

1. The roof insulation will remain in a reroofable condition should the roof membrane require replacement (excluding damage caused by fastener pullout during removal of the old membrane.).

2. The roof insulation material will not cause structural damage to the building as a result of expansion from thermal or chemical action.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance Ratings: Comply with ASTM E119; testing by a qualified testing agency.
   1. UL Construction Class 90.

B. FM Global Listing: Lightweight insulating concrete along with other roofing components shall comply with requirements in FM Global 4454 as part of a roof assembly, and shall be listed in FM Global's "RoofNav" for Class 1 or noncombustible construction, as applicable.

2.2 CELLULAR LIGHTWEIGHT INSULATING CONCRETE

A. Produce cellular lightweight insulating concrete with the following minimum physical properties using cementitious materials, air-producing liquid-foaming agents complying with ASTM C869/C869M, and the minimum amount of water necessary to produce a workable mix.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   1. Aerix Industries - Mearlcrete.
   2. Elastizell Corporation of America.
   3. Siplast - Insulcel.

C. As-Cast Unit Weight: 38 to 48 lb/cu. ft. at point of placement, when tested according to ASTM C138/C138M.

D. Oven-Dry Unit Weight: 26 to 32 lb/cu. ft.when tested according to ASTM C495.

E. Compressive Strength: Minimum 200 psi, when tested according to ASTM C495.

2.3 MATERIALS

A. Cementitious Material: Portland cement, ASTM C150/C150M, Type I, Type II, and Type III.

B. Water: Potable water that is clean and free of deleterious amounts of acid, alkali and organic materials.

C. Foam Concentrate: Foam concentrate conforming to ASTM C 869 and ASTM C 796.

D. Reinforcing: wire mesh or polyethylene/polypropylene fibers, as required for specified UL fire rating, manufactured by or approved in writing by lightweight manufacturer.

E. Joint Filler: ASTM C612, Class 2, glass-fiber type; compressing to one-half thickness under a load of 25 psi.

F. Molded-Polystyrene Insulation Board: ASTM C578, Type I, 0.90-lb/cu. ft. minimum density.

1. Provide units with manufacturer's standard keying slots or holes of 3 to 4 percent of board's gross surface area.

2.4 DESIGN MIXTURES

A. Mix Portland cement and pregenerated foam with water to achieve a wet density ranging from 38 to 48 pcf, resulting in a minimum dry density of 26 to 32 pcf and minimum compressive strength of 200 psi.

PART 3 - EXECUTION

3.1 PREPARATION

A. Control Joints: Install control joints at perimeter of roof deck and at junctures with vertical surfaces, including walls the full depth of lightweight insulating concrete, and as required by the manufacturer. Fill control joints with joint filler.

1. Provide 1-inch- wide control joints for roof dimensions up to 100 feet in length; 1-1/2-inch- wide control joints for roof dimensions exceeding 100 feet.

B. Expansion Joints: Maintain expansion joints in the LWIC system at all roof deck structural expansion joints.

C. Install plumbing vents, curbs, expansion joints, control joints, wood blocking, and any other roof penetrations prior to the installation of the lightweight insulated concrete system.

D. At primary roof drains block out 4-feet by 4-feet (or as noted in the drawings) sump areas. Slope at drain sumps shall be 1-inch per foot.

3.2 MIXING AND PLACING

A. Mix and place lightweight insulating concrete according to manufacturer's written instructions, using equipment and procedures to avoid segregation of mixture and loss of air content.

B. Remove water and any other substance that would interfere with bonding of the lightweight concrete system.

C. Install the specified lightweight insulating concrete system to provide a minimum thermal value of R-25 or as shown on the architectural details/drawings.

D. The roof membrane application must be coordinated with the insulating concrete roof system to avoid prolonged exposure of the deck to the weather. Deck applicator shall install no more insulating concrete than the amount that can be covered with finished roofing in three (3) working days after the minimum cure time required by the manufacturer.

E. Install the specified lightweight insulating concrete system to provide a minimum positive roof slope of 1/4 inch per foot (2 %). See the structural drawings for slope provided by the roof framing system.

F. Install insulation board according to lightweight insulating concrete manufacturer's written instructions. Place insulation board in wet, lightweight insulating concrete slurry poured a minimum of 1/8 inch over the structural substrate or above the top flute of steel decks. Ensure full contact of insulation board with slurry. Stagger joints and tightly butt insulation boards and hold boards a minimum of 3-inches from edges. Allow slurry coat to set prior to placing remaining thickness of lightweight insulating concrete.

1. Install insulation board in a stair-step configuration with a maximum step-down of 1 inch.

2. Fill the holes in the insulation boards and place a 2-inch minimum thickness of insulating concrete over the top of the insulation boards.

G. Deposit and screed lightweight insulating concrete in a continuous operation until an entire panel or section of roof area is completed. Do not vibrate or work mix except for screeding or floating. Place to depths and slopes indicated.

H. Finish top surface smooth, free of ridges and depressions, and maintain surface in condition to receive subsequent roofing system.

I. Begin curing operations immediately after placement, and air cure for not less than three days, according to manufacturer's written instructions.

J. If ambient temperature falls below 32 deg F, protect lightweight insulating concrete from freezing and maintain temperature recommended by manufacturer for 72 hours after placement.

3.3 FIELD QUALITY CONTROL

A. Avoid foot traffic over the roof insulating concrete system until cured and can walk over the surface without creating surface damage.

B. Monitor the thickness and wet density of the lightweight insulating concrete at the time of placement to determine conformance to the manufacturer’s requirements. Monitor the placement of proper thickness of polystyrene insulation board in accordance with the contract documents

C. Testing Agency: Engage a qualified testing agency to sample materials and perform tests and inspections.

D. Contractor shall obtain a minimum of two (2) samples of lightweight insulating concrete for each day of active pouring, according to ASTM C172/C172M, except as modified by ASTM C495. Testing shall be performed by lightweight manufacturer according to the following requirements:
1. Determine as-cast unit weight during each hour of placement, according to ASTM C138/C138M.

2. Determine oven-dry unit weight and compressive strength according to ASTM C495. Make a set of at least six molds for each day's placement. Obtain material for testing at point of placement and or discharge.
3. Perform additional tests when test results indicate that as-cast unit weight, oven-dry unit weight, compressive strength, or other requirements have not been met.

E. Manufacturer or Contractor shall conduct a base ply fastener pull test 3 or more days following the application of the lightweight insulating concrete to ensure a minimum withdrawal resistance of 40 pounds (18 kg) per fastener. Refer to Section 072200 for base sheet fastener material and installation requirements.

1. Fastener pull test shall be performed by the fastener manufacturer or Owner approved independent testing agency.

F. Prepare test and inspection reports. All reports shall be provided to the Owner and Architect.

G. Installation of mechanically fastened base sheet and insulation per Section 072200 and roof membrane per applicable Division 07 Sections shall not occur until base ply fastener testing is performed.

H. If rainfall occurs after installation of lightweight system, prior to installation of mechanically fastened base sheet, deck shall be allowed to dry sufficiently in accordance with roof manufacturer requirements and industry standards.
1. Surface moisture shall be tested by Contractor in accordance with ASTM D4263 by the plastic sheet method, for a minimum of 24 hours.
2. In the event that condensation is visible on the sheet after testing, the deck must be allowed to dry and be retested with no visible condensation prior to installation of roofing.

END OF SECTION 035216

SECTION 070150 - PREPARATION FOR REROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Demolish designated insulation, roofing, sheet metal, and roofing accessories.
   2. Preparation of roof system for recover applications.
   3. Remove materials from site, except roof penetration equipment and materials reserved by Owner, and items to be reinstalled. Owner will remove reserved items from site.
   4. Contractor shall dispose of all materials in a licensed land-fill and provide the Owner with signed documentation of all materials disposed.

B. Related Requirements:
   1. Section 011000 "Summary" for use of the premises and phasing requirements.
   2. Section 015000 "Temporary Facilities and Controls" for temporary construction and environmental-protection measures for reroofing preparation.

1.3 SUBMITTALS

A. Submit demolition and removal procedures and schedule under provisions of Division 1.

B. Product Information: Submit product data sheets for all materials.

C. Fastener pull-out test report. Contractor to submit fastener pull-out test report from the fastener manufacturer or third-party testing agency for all proposed fasteners to be used on the project.

D. Moisture survey report. Contractor to submit a moisture survey report from the Roof Engineer or third-party testing agency at all roof areas proposed to be recovered. Moisture surveys are not required for roof systems to be removed and replaced with new materials.

E. Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including exterior and interior finish surfaces that might be misconstrued as having been damaged by reroofing operations. Submit before Work begins.

F. Landfill Records: Indicate receipt and acceptance of demolished roofing materials, by a landfill facility licensed to accept them.

1.4 FIELD CONDITIONS

A. Existing Roofing System: Refer to system description in the Drawings.

B. Owner will occupy portions of building immediately below reroofing area. Conduct reroofing so Owner's operations are not disrupted. Provide Owner with not less than 72 hours' notice of activities that may affect Owner's operations.

1.Coordinate work activities daily with Owner so Owner can place protective dust and water-leakage covers over sensitive equipment and furnishings, shut down HVAC and fire-alarm or -detection equipment if needed, and evacuate occupants from below work area.

2. Before working over structurally impaired areas of deck, notify Owner to evacuate occupants from below affected area. Verify that occupants below work area have been evacuated before proceeding with work over impaired deck area.

C. Protect building to be reroofed, adjacent buildings, walkways, site improvements, exterior plantings, and landscaping from damage or soiling from reroofing operations.

D. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Provide overhead protection as required to protect the public from falling debris, tools, and materials and/or as required by the Owner. At a minimum all entrances and sidewalks within 25 feet from work areas will require to have overhead protection up to 25 feet, unless otherwise noted or shown in the drawings.

E. Conditions existing at time of inspection for bidding are maintained by Owner as far as practical.

1. The results of an analysis of test cores from existing roofing system are available for Contractor's reference.
2. Construction Drawings and Project Manual for existing roofing system are provided for Contractor's convenience and information, but are not a warranty of existing conditions. They are intended to supplement rather than serve in lieu of Contractor's own investigations. Contractor is responsible for conclusions derived from existing documents.

F. Weather Limitations: Proceed with reroofing preparation only when existing and forecasted weather conditions permit Work to proceed without water entering existing roofing system or building.

1. Do not proceed with removal of existing roofing on days where the chance of precipitation is equal to or exceeds thirty percent (30%). Document inclement weather days in Time Extension Request submitted with Pay Applications.

2. Remove only as much roofing in one day as can be made watertight in the same day.

G. Hazardous Materials: Obtain and review the AISD record of asbestos containing materials prior to performing any demolition of existing roof related materials. Refer any requirements for the abatement of asbestos containing material to the AISD Project Manager who will notify the AISD Service Center to perform the abatement.

1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Engineer and Owner. Hazardous materials will be removed by Owner under a separate contract.

1.5 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during reroofing, by methods and with materials so as not to void existing roofing system warranty. Notify warrantor before proceeding.

1. Notify warrantor of existing roofing system on completion of reroofing, and obtain documentation verifying that existing roofing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

PART 2 - PRODUCTS

2.1 TEMPORARY PROTECTION MATERIALS

A. Expanded Polystyrene (EPS) Insulation: ASTM C 578

B. Plywood: DOC PS1, Grade CD Exposure 1.

C. OSB: DOC PS2, Exposure 1.

2.2 STRUCTURAL CONCRETE DECK REPAIR MATERIALS

A. Quikrete Non-Shrink Precision Grout; The Quikrete Companies

B. Approved equal

2.3 LIGHTWEIGHT INSULATED CONCRETE DECK REPAIR MATERIALS

A. Quikrete Non-Shrink Precision Grout; The Quikrete Companies

B. Zono-Patch; Siplast

C. Approved equal

2.4 STEEL DECK REPAIR MATERIALS

A. 16-gauge galvanized steel.

B. 22-gauge galvanized, or primer painted galvanized steel decking, to match existing profile; Vulcraft Inc or approved equal.

C. Rust inhibitor primer; Rust-Oleum, Sherwin Williams, or approved equal.

D. Steel deck fasteners; Teks 3 410SS steel to steel drilling screws, ITW Buildex.

2.5 WOOD DECK REPAIR MATERIALS

A. Plywood; 48/24, 5-ply, exterior grade.

B. Plywood deck fasteners; #10 305 stainless steel screws.

C. Plywood deck adhesives; Loctite PL 400 VOC Subfloor & Deck Adhesive, Henkel Corporation, or approved equal.

2.6 CEMENTITIOUS FIBER DECK REPAIR MATERIALS

A. Tectum I structural acoustic roof deck to match existing thickness and size, Armstrong Ceiling and Wall Solutions, or approved equal.

B. Grout; as recommended by manufacturer.

2.7 AUXILIARY REROOFING MATERIALS

A. General: Use auxiliary reroofing preparation materials recommended by roofing system manufacturer for intended use and compatible with components of new roofing system.

PART 3 - EXECUTION

3.1 PREPARATION

A. Perform fastener pull-out tests according to ANSI/SPRI FX-1 – *Standard Field Test Procedure for Determining the Withdrawal Resistance of Roofing Fasteners* and submit test report to Engineer before installing new roofing system. Obtain Engineer's approval to proceed with specified fastening pattern. Engineer may furnish revised fastening pattern commensurate with pull-out test results.

B. For roof recover applications a full moisture scan shall be performed by the Roof Engineer or third-party testing agency. Moisture survey report shall be submitted to the project A/E and Owner for review. Obtain Engineer's approval to proceed with recover applications.

C. Shut off rooftop utilities and service piping before beginning the Work.

D. Test existing roof drains to verify that they are not blocked or restricted. Immediately notify Engineer of any blockages or restrictions.

E. Protect existing roofing system that is not to be reroofed.

1. Loosely lay 1-inch- minimum thick, expanded polystyrene (EPS) insulation over existing roofing in areas indicated. Loosely lay 15/32-inch plywood or OSB panels over EPS. Extend EPS past edges of plywood or OSB panels a minimum of 1 inch.
2. Limit traffic and material storage to areas of existing roofing that have been protected.
3. Maintain temporary protection and leave in place until replacement roofing has been completed. Remove temporary protection on completion of reroofing.

F. Coordinate with Owner to shut down air-intake equipment in the vicinity of the Work. Cover air-intake louvers before proceeding with reroofing work that could affect indoor air quality or activate smoke detectors in the ductwork.

G. During removal operations, have sufficient and suitable materials on-site to facilitate rapid installation of temporary protection in the event of unexpected rain.

H. Maintain roof drains in functioning condition to ensure roof drainage at end of each workday. Prevent debris from entering or blocking roof drains and conductors. Use roof-drain plugs specifically designed for this purpose. Remove roof-drain plugs at end of each workday, when no work is taking place, or when rain is forecast.

1. If roof drains are temporarily blocked or unserviceable due to roofing system removal or partial installation of new roofing system, provide alternative drainage method to remove water and eliminate ponding. Do not permit water to enter into or under existing roofing system components that are to remain.

3.2 ROOF RECOVERS

A. Cut and remove all blisters, damaged, and/or wet materials identified during the moisture survey. Install new materials to match existing thicknesses and composition.

B. Remove base flashings and counterflashing's as required for the installation of the recover roof system and required by the manufacturer.

1. Replace fasteners at removable counterflashing's with new stainless-steel fasteners with bonded neoprene washers. Contractor to provide oversize fasteners as required to properly reinstall sheet metal flashings, if required to be reused.

C. Clean surface of roof membrane as required by the manufacturer. Install tapered insulation at locations that show evidence of ponding water. Manufacturer and A/E to properly inspect the roof prior to the installation of recover roof system.

D. Replace flashing components at roof drains, plumbing vents, and scuppers.

3.3 ROOF TEAR-OFF

A. General: Notify Owner each day of extent of roof tear-off proposed for that day.

B. Ballasted Roofs: Prior to commencement of roof tear-off, power sweep, and vacuum all loose gravel from the roof to prevent tracking and contamination of gravel over the new roof system.

C. Steel Decks: Back out screws during the removal of the existing roof system. Do not pull or force out fasteners through the deck. Scrape all residual insulation adhered to the metal deck flutes and sweep and/or blow all loose materials from the flutes.

D. Concrete Decks: Seal joints/cracks in the concrete deck that may allow falling debris into the building interior.

E. Remove loose aggregate from aggregate-surfaced built-up bituminous roofing using a power broom.

F. Full Roof Tear-Off: Where indicated, remove existing roofing and other roofing system components down to the deck.

1. Remove existing roof insulation.
2. Remove wood blocking, curbs, and nailers.
3. Bitumen and felts that are firmly bonded to concrete decks are permitted to remain if felts are dry. Remove unadhered bitumen, unadhered felts, and wet felts.

3.4 DECK PREPARATION

A. Inspect deck after tear-off of roofing system. Repair existing deck as detailed.

B. Repair existing decks in accordance with the Drawings and applicable manufacturer requirements.

C. Verify that substrate is visibly dry and free of moisture.

D. If broken or loose fasteners that secure deck panels to one another or to structure are observed, or if deck appears or feels inadequately attached, immediately notify Engineer. Do not proceed with installation until directed by Engineer.

E. If deck surface is unsuitable for receiving new roofing or if structural integrity of deck is suspect, immediately notify Engineer. Do not proceed with installation until directed by Engineer.

F. Provide additional deck securement as indicated on Drawings.

3.5 BASE FLASHING REMOVAL

A. Remove existing base flashings. Clean substrates of contaminants, such as asphalt, sheet materials, dirt, and debris.

B. Do not damage metal counterflashings that are to remain. Replace metal counterflashings damaged during removal with counterflashings of same metal, weight or thickness, and finish.

C. Inspect parapet sheathing, wood blocking, curbs, and nailers for deterioration and damage. If parapet sheathing, wood blocking, curbs, or nailers have deteriorated, immediately notify Engineer.

D. Remove existing parapet sheathing and replace with new parapet sheathing to comply with Division 6 Section "Sheathing." If parapet framing, wood blocking, curbs, or nailers have deteriorated, immediately notify Engineer.

E. When directed by Engineer, replace parapet framing, wood blocking, curbs, and nailers to comply with Division 6 Section "Rough Carpentry."

3.6 FASTENER PULL-OUT TESTING

A. Engineer will provide results of fastener pull-out tests performed during design according to ANSI/SPRI FX-1 for Contractor review. Coordinate proposed fastening pattern with test results to ensure compliance of new roof system with all applicable Code requirements regarding wind uplift resistance.

3.7 DISPOSAL

A. Collect demolished materials and place in containers. Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site. Storage or sale of demolished items or materials on-site is not permitted.

B. Transport and legally dispose of demolished materials off Owner's property.

END OF SECTION

SECTION 071413 - HOT FLUID-APPLIED RUBBERIZED ASPHALT WATERPROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Rubberized-asphalt waterproofing membrane, reinforced.
2. Installation and testing of membrane leak detection system.
3. Molded-sheet drainage panels.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product. Include manufacturer's written instructions for evaluating, preparing, and treating substrate, technical data, and tested physical and performance properties of waterproofing.

B. Shop Drawings:

1. Waterproofing: Show locations and extent of waterproofing. Include details for substrate joints and cracks, sheet flashings, penetrations, inside and outside corners, tie-ins to adjoining waterproofing, and other termination conditions.

2. Leak Detection System: Diagram of proposed system showing complete test area, rooftop structures and equipment, and roof penetrations for building utilities and services. Show location of the leak detection system test conductor cable, measurement grid, and connection boxes.

1.3 INFORMATIONAL SUBMITTALS

A. Qualifications:

1. Leak Detection System: For manufacturer and installing/testing firm.

a. Manufacturer's Qualifications: Manufacturer of membrane leak detection systems with minimum ten year record of satisfactory manufacturing and support of installed systems comparable to system required as Work of this Section.
b. Installing and Testing Firm Qualifications: Approved or certified by membrane leak detection system manufacturer, with minimum five year record of satisfactory experience.

2. Waterproofing Installer Certifications:

a. Subcontractor’s approval by Manufacturer: Submit document stating manufacturer's acceptance of subcontractor as an Approved Applicator for the specified materials.

b. Submit list of proposed project personnel, including Subcontractor’s Project Manager, Supervisor, and Foreman, with a list of completed waterproofing projects for each. Indicate date of each project with a general description of the type of waterproofing installed and the facility size and use.

B. Field Quality Control Reports
1. Leak Detection: Digital drawings, digital photographic documentation, and written report detailing location and nature of membrane breaches, defects found, and verification of corrective actions taken.
2. Waterproofing: Provide daily report documenting installation and quality control procedures performed in accordance with these specifications.

C. Warranty: Submit a sample warranty identifying the terms and conditions stated in this Section.

1.4 CLOSEOUT SUBMITTALS

A. Record Drawings:

1. Leak Detection System: Drawings, photographic documentation, and written report detailing installed location of components of membrane integrity test system.

1.5 QUALITY ASSURANCE

A. Coordination:

1. Integrate layout of membrane leak detection test system with surrounding structure and penetrations for building utilities and services.

B. Applicator Qualifications:

1. Applicator shall be experienced in applying the same or similar materials and shall be specifically approved in writing by the membrane system manufacturer for a minimum of five (5) years prior to the bid date.

2. Applicator shall provide a full time supervisor at all times that the work of this Section is in progress. Supervisor shall have a minimum of three (3) years of successful project experience supervising projects of similar materials and scope, and shall be an employee of the Applicator.

C. Pre-Application Conference:

1. Prior to beginning work, Contractor shall convene a conference to review project conditions with Architect and Waterproofing Consultant.

2. Agenda will include discussion of:

a. Installation procedures

b. Quality assurance documentation

c. Schedules

d. Coordination with other work

e. Protection of installed waterproofing.

3. Applicator shall continuously monitor the thickness of waterproofing application throughout the project and document wet mil thickness readings in daily reports to Architect.

4. Applicator will repair dry mil thickness readings taken by Consultant at a minimum of four (4) locations per area of waterproofing.

5. If dry mil thickness readings do not comply with the minimum 120 mils specified, Applicator shall prepare and install additional waterproofing to achieve the minimum thickness and provide repairs at additional dry mil thickness test cut locations to verify compliance.

6. NOTE: If additional site visits are required by Architect's Consultant as a result of noncompliant waterproofing system thickness, these shall be provided at Contractor's expense.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by waterproofing manufacturer.

B. Remove and replace liquid materials that cannot be applied within their stated shelf life.

C. Protect stored materials from direct sunlight.

1.7 FIELD CONDITIONS

A. Weather Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended by waterproofing manufacturer. Do not apply waterproofing to a damp or wet substrate, or when temperature is below zero deg F (minus 18 deg C).

1. Do not apply waterproofing in snow, rain, fog, or mist.

B. Coordinate waterproofing work with other trades to ensure adequate illumination, ventilation, and dust-free environment during application and curing of membrane. The applicator shall have sole right of access to the specified areas for the time needed to complete the application and allow the membrane to cure adequately.

C. Protect adjoining surfaces not to be coated against damage or soiling.

D. Applicator shall provide applicable protective clothing and respiratory protection gear.

E. Maintain work area in a neat and orderly condition, removing empty containers, rags, and rubbish daily from the site.

1.8 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace waterproofing and sheet flashings that do not comply with requirements or that fail to remain watertight within specified warranty period.

1. Warranty includes removing and reinstalling protection board, drainage panels, and insulation/paver materials specified by other Sections.

2. Warranty Period: Twenty (20) years from date of Substantial Completion.

B. Special Installer's Warranty: Specified form, signed by Installer, covering Work of this Section, for warranty period of two years.

1. Warranty includes removing and reinstalling protection board, drainage panels, insulation, pedestals, and pedestal-mounted pavers on plaza decks.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain waterproofing materials, sheet flashings, protection course, molded-sheet drainage panels, and insulation from a single source manufacturer, or provide written approval of materials from other manufacturers by membrane waterproofing manufacturer.

2.2 WATERPROOFING MEMBRANE

A. Hot Fluid-Applied, Rubberized-Asphalt Waterproofing Membrane: Single component; 100 percent solids; hot fluid-applied, rubberized asphalt.

1. Products: Subject to compliance with requirements, provide one of the following:

a. American Hydrotech, Inc; Monolithic Membrane 6125.
b. Carlisle Coatings & Waterproofing Inc; CCW-500R.

c. Henry Company; 790-11.
d. Soprema, Inc.
e. Tremco Incorporated; Tremproof 150.

2.3 AUXILIARY MATERIALS

A. General: Auxiliary materials recommended by waterproofing manufacturer for intended use and compatible with waterproofing.

B. Primer: ASTM D 41/D 41M, asphaltic primer.

C. Elastomeric Sheet: 50-mil- (1.3-mm-) minimum, uncured sheet neoprene with manufacturer's recommended contact adhesives as follows:

1. Tensile Strength: 1400 psi (9.6 MPa) minimum; ASTM D 412, Die C.
2. Elongation: 300 percent minimum; ASTM D 412.
3. Tear Resistance: 125 psi (860 kPa) minimum; ASTM D 624, Die C.
4. Brittleness: Does not break at minus 30 deg F (34 deg C); ASTM D 2137.

D. Two-component, liquid applied poly methyl-methacrylate (PMMA) resin membrane flashing system.

E. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum termination bars; approximately 1 by 1/8 inch (25 by 3 mm) thick; with stainless-steel anchors.

F. Sealants and Accessories: Manufacturer's recommended sealants and accessories.

G. Reinforcing Fabric: Manufacturer's recommended, spun-bonded polyester fabric.

H. Protection Course: ASTM D 6506, semi-rigid sheets of fiberglass or mineral-reinforced-asphaltic core, pressure laminated between two asphalt-saturated fibrous liners and as follows:

1. Thickness: 1/8 inch (3 mm), nominal, for vertical applications; 1/4 inch (6 mm), nominal, elsewhere.

I. Filter Fabric: Nonwoven, needle-punched geotextile made of 100% polypropylene staple filaments; US Fabrics, 100NW or approved equivalent.

2.4 MEMBRANE LEAK DETECTION SYSTEM

A. Description:

1. Conductor cable, placed on top of membrane, delivering direct current tension to membrane surface, enabling inspection and isolation of points of moisture infiltration through membrane to conductive substrate under membrane.

B. Products:

1. Conductor Cable: Nine strands of 0.06 inch (1.5 mm) diameter highly-conductive stainless steel wire interwoven with braided polyethylene strands, placed on weather side of membrane:

a. Basis of Design Product: International Leak Detection, Vector-9 Conductor Wire.

2. Conductor Wire Assembly: Provide grounding plate for connection to measurement grid, suitable for connection to terminals at connection box.

3. Connection Box: Weatherproof, corrosion-resistant electrical enclosure with permanent terminal connections for connecting diagnostic and testing equipment, NEMA 4X with the following characteristics:

a. Permanent connections for attachment of diagnostic and testing equipment without opening contact box.
b. Weatherproof cover to seal terminals when membrane integrity test system is not in use.
c. Hardware, brackets, and fittings required to permanently mount contact box to building structure.
d. Basis of Design Product: International Leak Detection, EFVM Connection Box.

4. Accessories:

a. Provide corrosion-resistant fasteners and hardware, electrical terminations, sealants, and other items required to provide complete installation.
b. Lap Joint Tape: Provide self adhesive aluminum tape, minimum 2 inch (50 mm) wide.

2.5 MOLDED-SHEET DRAINAGE PANELS

A. Woven-Geotextile-Faced, Molded-Sheet Drainage Panel: Manufactured composite subsurface drainage panels consisting of a woven-geotextile facing with an apparent opening size not exceeding No. 40 (0.43-mm) sieve, laminated to one side with a polymeric film bonded to the other side of a studded, nonbiodegradable, molded-plastic-sheet drainage core, with a horizontal flow rate not less than 2.8 gpm/ft. (35 L/min. per m).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. Verify that concrete has cured and aged for minimum time period recommended by waterproofing manufacturer.
2. Verify that substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
3. Verify that a minimum 12” clearance is provided around all penetrations and that a minimum flashing height of 6” is provided.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean and prepare substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for waterproofing application.

B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting other construction.

C. Close off deck drains and other deck penetrations to prevent spillage and migration of waterproofing fluids.

D. Remove grease, oil, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.

1. Abrasive blast clean concrete surfaces uniformly to expose top surface of fine aggregate according to ASTM D 4259 with a self-contained, recirculating, blast-cleaning apparatus. Remove material to provide a sound surface free of laitance, glaze, efflorescence, curing compounds, concrete hardeners, or form-release agents. Remove remaining loose material and clean surfaces according to ASTM D 4258.

E. Remove fins, ridges, and other projections, and fill honeycomb, aggregate pockets, and other voids.

3.3 JOINTS, CRACKS, AND TERMINATIONS

A. Prepare and treat substrates to receive waterproofing membrane, including joints and cracks, deck drains, corners, and penetrations according to manufacturer's written instructions.

1. Rout and fill joints and cracks in substrate. Before filling, remove dust and dirt according to ASTM D 4258.

2. Adhere strip of elastomeric sheet to substrate in a layer of hot rubberized asphalt. Extend elastomeric sheet a minimum of 6 inches (150 mm) on each side of moving joints and cracks or joints and cracks exceeding 1/8 inch (3 mm) thick, and beyond deck drains and penetrations. Apply second layer of hot fluid-applied, rubberized asphalt over elastomeric sheet.

3. Embed strip of reinforcing fabric into a layer of hot rubberized asphalt. Extend reinforcing fabric a minimum of 6 inches (150 mm) on each side of nonmoving joints and cracks not exceeding 1/8 inch (3 mm) thick, and beyond roof drains and penetrations.

a. Apply second layer of hot fluid-applied, rubberized asphalt over reinforcing fabric.

B. At expansion joints and discontinuous deck-to-wall or deck-to-deck joints, bridge joints with elastomeric sheet extended a minimum of 6 inches (150 mm) on each side of joints and adhere to substrates in a layer of hot rubberized asphalt. Apply second layer of hot fluid-applied, rubberized asphalt over elastomeric sheet.

3.4 FLASHING INSTALLATION

A. Install elastomeric sheets at terminations of waterproofing membrane according to manufacturer's written instructions.

B. Prime substrate with asphalt primer.

C. Install elastomeric sheet and adhere to deck and wall substrates in a layer of hot rubberized asphalt.

D. Extend elastomeric sheet up walls or parapets a minimum of 8 inches (200 mm) above plaza-deck pavers and 6 inches (150 mm) onto deck to be waterproofed.

E. Install termination bars and mechanically fasten to top of elastomeric flashing sheet at terminations and perimeter of waterproofing.

3.5 MEMBRANE APPLICATION

A. Apply primer, at manufacturer's recommended rate, over prepared substrate and allow it to dry.

B. Heat and apply rubberized asphalt according to manufacturer's written instructions.

1. Heat rubberized asphalt in an oil- or air-jacketed melter with mechanical agitator specifically designed for heating rubberized asphalt.

C. Start application with manufacturer's authorized representative present.

D. Reinforced Membrane: Apply hot rubberized asphalt to substrates and adjoining surfaces indicated. Spread to a thickness of 90 mils (2.3 mm); embed reinforcing fabric, overlapping sheets 2 inches (50 mm); spread another 125-mil- (3.2-mm-) thick layer to provide a uniform, reinforced, seamless membrane 215 mils (5.5 mm) thick.

E. Apply waterproofing over prepared joints and up wall terminations and vertical surfaces to heights indicated or required by manufacturer.

F. Cover waterproofing with protection course with overlapped joints before membrane is subject to construction traffic.

3.6 LEAK DETECTION SYSTEM

A. Conductor Wire: Install conductor wire at spacing and layout indicated on approved shop drawings.

1. Secure conductor wire using method recommended by manufacturer.

B. Installation Testing: Verify continuity and functioning of conductor wire and measurement grid upon completion of installation.

3.7 MOLDED-SHEET DRAINAGE PANEL INSTALLATION

A. Place and secure molded-sheet drainage panels, with geotextile facing away from wall or deck substrate according to manufacturer's written instructions. Use methods that do not penetrate waterproofing. Lap edges and ends of geotextile to maintain continuity. Protect installed molded-sheet drainage panels during subsequent construction.

1. For vertical applications, install protection course before installing drainage panels.

3.8 FIELD QUALITY CONTROL

A. Manufacturer Inspection:

1. Provide a minimum of one (1) site visit by waterproofing manufacturer's technical field inspector during waterproofing installation, and one (1) site visit at completion of waterproofing installation.
2. Submit written reports by manufacturer's field inspector to Architect for review.

B. Membrane Integrity Testing:

1. Contractor shall engage qualified Installation and Testing Firm to perform membrane integrity testing. Perform testing in accordance with membrane integrity test system manufacturer's recommendations.
   a. Perform testing following adequate precipitation or wet membrane adequately to enable accurate testing.
   b. Identify locations of membrane leaks; record locations and document with photographs. Submit test reports to Architect.
   c. Confirm completed repair of identified leaks and retest to verify water tightness of membrane.
2. Initial Membrane Test: Perform initial membrane integrity test. Test upon completion of membrane and integrity test system installation, and prior to installation of above-membrane components.
3. Final Testing: Repeat membrane integrity test if waterproofing assembly is exposed to traffic or construction operations prior to Substantial Completion.

3.9 CLEANING AND PROTECTION

A. Protect waterproofing from damage and wear during remainder of construction period.

B. Protect installed board insulation from damage due to UV light, harmful weather exposures, physical abuse, and other causes. Provide temporary coverings where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

C. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 071413

SECTION 072200 - ROOF AND DECK INSULATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Roof and Deck Insulation

1.2 RELATED WORK

A. Section 018113 – Sustainable Construction Requirements

B. Section 061000 - Rough Carpentry

C. Section 070150 – Preparation for Reroofing (if applicable)

D. Section 075250 - Modified Bituminous Sheet Roofing

E. Section 075419 – Polyvinyl Chloride (PVC) Membrane Roofing

F. Section 076000 - Flashing and Sheet Metal

1.3 SYSTEM DESCRIPTION

A. Install board insulation as required to achieve a complete and proper substrate for the roof membrane system.

B. Insulation installed within the weatherproofed building interior shall contain No Added Urea Formaldehyde.

C. All sealants, adhesives, coatings and sealant primers shall comply with SCAQMD rules 113 and 1168 as consistent with performance and warranty requirements.

1.4 SUBMITTALS

A. Submit manufacturer's installation instructions, samples and product data, in accordance with the provisions of Section 013300, Submittals.

B. Submit two full size samples of each insulation board type and thickness.

C. Submit tapered insulation plan:

1. Indicate all crickets, sumps, and field taper boards with thicknesses calculated for full depth at low and high points.

2. Indicate dimensions of crickets and sumps on plan.
   a. Crickets
      1) Minimum width of all crickets shall be 1/3 of cricket length.
      2) Minimum slope of valleys along crickets: 1/8-inch per foot.
      3) Regardless of information indicated in the approved shop drawings, dimensions of crickets indicated in the Drawings where greater than those in the shop drawings shall be provided.
      4) Install tapered insulation crickets to achieve a minimum 1/4" per foot ABOVE LEVEL along the up-slope side of all curbed penetrations wider than 12" perpendicular to the roof slope and between roof drainage elements. Note that for roof deck slopes greater than 1/4" per foot, insulation must be installed to bring cricket area to level prior to installing 1/4" per foot tapered insulation.
      5) Crickets shall be installed directly under the coverboard and during the installation of the roof system, removing the roof membrane and coverboard after installation will not be acceptable.
   b. Sumps
      1) Primary Scupper Sumps: Provide 2-feet by 4-feet tapered insulation sumps at all primary roof scuppers where shown on plans, slope sumps ½" per foot.
      2) Primary Drain Sumps: Provide 4-feet by 4-feet tapered insulation sumps at all primary roof drains where shown on plans, slope sumps ½" per foot.
      3) DO NOT SUMP OVERFLOW DRAINAGE COMPONENTS.

3. Indicate all slopes of tapered insulation boards to be used on project.

D. Submit Results of Third-Party Vapor Barrier Bond Strength Testing.

1. Prior to installation of insulation, provide load testing to confirm in-place vapor retarder bond strength at a minimum of three (3) locations, 12"x12" minimum test sample size.
2. Adhere piece of structural plywood to the test sample in a full bed of low-rise adhesive, cut vapor barrier around plywood.
3. Attach a load cell to the plywood in a manner to ensure failure does not occur at this location. Test to failure, document results in a report submitted to A/E.
4. Minimum bond strength constituting a "passing" test is the lesser of:
   a. 600 pounds per square foot (psf)
   b. Two-thirds (2/3) the laboratory tested bond strength of the vapor barrier product
   b. Two (2) times the required design uplift pressure for the zone

E. Submit fastening pattern and adhesive bead spacing plan:

1. Plan shall be based on manufacturer test data for new construction, or on fastener pullout tests performed on existing decks to be reroofed that have been performed in accordance with Section 070150.

2. Indicate all field, perimeter, and corner zone widths on plan with number and layout of fasteners and adhesive in each zone.
3. Proposed fastening/adhesive patterns and distribution of zones shall comply with wind loads calculated in accordance with ASCE 7, as referenced by applicable Codes, or FM Data Sheet 1-28, latest edition.

F. Submit manufacturer's certificate, in accordance with the provisions of Section 013300, Submittals, that products meet or exceed specified requirements.

G. Submit certification from roof membrane manufacturer that board insulation materials are acceptable for use with roof membrane materials.

H. Prior to installation, all roof insulation materials shall be reviewed by the roof consultant and the Austin Independent School District Roofing Department.

I. Submit product data from manufacturer showing insulation contains no added urea-formaldehyde.

J. Submit product data and MSDS for all sealants, adhesives, coatings and sealants primers indicating the VOC content in g/l.

1.5 REGULATORY REQUIREMENTS

Conform to applicable local building codes for roof assembly requirements.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.

1. Inspect for damage. Water stains and/or damage to facers or foam core are considered damaged and shall be removed from the project site.
2. Store products in weather protected environment, clear of ground and moisture.
3. Deliver materials in quantities to allow continuity of application throughout the Project.
4. Coordinate shipment receipt as necessary to cause Owner least amount of interference in Owner’s operations. Owner will not take responsibility for product deliveries.

B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.

1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling and other sources.

1. Store materials subject to water damage in fully enclosed, watertight storage trailers.
2. Do not store insulation materials on the roof overnight.
3. Store materials on the roof surfaces only on the morning they will be installed. Do not store more materials on roof overnight unless approved by the Architect.
4. Maximum Allowable Loading on Roof: 20 pounds per square foot.

D. Handle materials in a manner precluding damage and contamination by moisture or other harmful/foreign matter.

E. Promptly mark, remove from the site, and discard any materials contaminated by moisture.

1.7 SEQUENCING AND SCHEDULING

A. Coordinate work under provisions of Section 013113, Project Coordination.

B. Coordinate the work of installing roof membrane and flashing as the work of this Section proceeds.

PART 2 - PRODUCTS

2.1 VAPOR BARRIER

A. Provide one of the following types of sheet vapor barrier at all structural concrete decks:

1. Heat-Welded Vapor Barrier: Smooth asphalt impregnated fiber glass heat-welded SBS modified bitumen sheet vapor barrier, ASTM D 6163, Type I, Grade S.

2. Adhered Vapor Barrier: Smooth asphalt impregnated fiber glass standard SBS modified bitumen sheet vapor barrier set in cold adhesive, or self-adhered SBS modified bitumen sheet vapor barrier, ASTM D 4601, Type II, and ASTM D 1970.

B. Asphalt Primer: ASTM D 41. Asphalt Primer shall comply with SCAQMD rule 1168 as consistent with performance and warranty requirements.

2.2 BASE SHEETS

A. Fiberglass Base Sheet (Wood and Tectum Decks): Asphalt impregnated glass fiber base sheet, ASTM D 4601 Type II, required for all applications, regardless of the presence of board materials above base sheet as specified in this Section.

B. Venting Base Sheet (Lightweight Fill Decks): Asphalt impregnated glass fiber venting base sheet, ASTM D 4897, Type II, required for all applications, regardless of the presence of board materials above base sheet as specified in this Section.

2.3 INSULATION MATERIALS

A. Insulation Board: Insulation shall consist of one of the following approved types:
   1. Polyisocyanurate, complying with ASTM C1289, Type II, Class 1. Size 4- feet by 4-feet maximum for adhered applications, 4-feet by 8-feet maximum for mechanically fastened applications. Minimum two layers, maximum layer thickness (each) 2.6 inches.

B. Cover Board: 4'x8' board dimension, 5/8" thickness, approved for use in Factory Mutual Very Severe Hail (VSH) approved assemblies
   1. Dexcell FA VSH Glass Mat Roof Board
   2. Densdeck StormX Prime
   3. Pre-proposal approved equivalent

C. Thickness of insulation and cover board system: To meet "R" value as specified, and in compliance with all applicable Codes. Provide a minimum of two layers of insulation and coverboard, regardless of required thickness for "R" value.

D. Tapered Perlite Edge Strips: Slope to match that of adjacent tapered insulation, provide material complying with ASTM C728.

E. Fiber Cant: Fiber cant shall have a 5-3/8-inch face, with the same characteristics as insulation board above. Fiber cant shall comply with ASTM C728.

F. Batt Insulation For Expansion Joint: Glass fiber unfaced batt insulation.

G. Insulation shall contain no added urea-formaldehyde.

2.5 FASTENERS

A. General: Provide fasteners approved by insulation manufacturer, meeting wind uplift requirements as specified.

B. Metal Decks: No. 12 hex-head fastener with coating which exceeds F.M. Specification No. 4470; with Galvalume metal plates, minimum 3-inch by 3-inch, as recommended by insulation board manufacturer.

C. Structural Concrete Decks: FM approved concrete screw, OMG CD-10 Heavy Duty Roofing Screw, or approved equivalent.

D. Lightweight Insulating Fill (Cementitious or Gypsum):
   1. A Factory Mutual approved sheet metal base ply fastener to secure fastening

ply to lightweight insulation fill, equal to the Trufast FM-90, OMG CR Base Sheet Fastener, or approved equivalent.

2. A Factory Mutual approved, deep\coarse thread metal fasteners such as OMG Lite - Deck fastener and 3" dia. Metal plate, OMG Polymer Gyptec fastener and 3" dia. Metal plate, or approved equivalent.

E. Wood Decks: Factory Mutual approved ring shank or annular thread fasteners with minimum one inch diameter head, sufficient length to penetrate substrate approximately one inch. Base ply fastener to secure glass fiber fastening ply and slip sheet to the wood deck.

F. Cementitious Wood Fiber Decks: FM approved fastener, Trufast Twin-Loc Nail, OMG Olylock Locking Impact Nail, or approved equivalent.

G. Adhesives: Insulation manufacturer's recommended adhesive formulated to attach roof insulation to substrate or to another insulation layer as follows:

1. Modified asphaltic, asbestos-free, cold-applied adhesive.
2. Bead-applied, low-rise, one-component or multicomponent urethane adhesive.
3. Full-spread spray-applied, low-rise, two-component urethane adhesive.

PART 3 - EXECUTION

3.1 PREPARATION

A. Verify that:
1. Roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set and comply with AISD minimum height requirements;
2. Wood nailing strips at perimeter edges and parapet walls are in place and are fastened in accordance with applicable codes.
3. Under deck conditions are clear for fastener installation.
4. Insulation strips are installed according to acoustical roof deck manufacturer's written instructions.

B. Installation of roofing means acceptance of conditions of substrate.

3.2 INSTALLATION

A. General: Install base sheet, insulation board, coverboards to deck in the pattern recommended by the manufacturer to achieve a wind uplift resistances in the field, perimeter, and corner zones, calculated in accordance with ASCE 7 (edition as adopted by applicable Code) with applicable factors of safety applied.

B. Attachment Schedule: Comply with approved fastening patterns and zone widths.

1. Metal Decks with Membrane Roofing:
   a. Fasten first layer of insulation board in staggered pattern as specified with approved fasteners and patterns.
   b. Adhere subsequent layers in in ribbons of low rise adhesive.

2. Cementitious Wood Fiber and Lightweight Fill Decks with Membrane Roofing:
   a. Install base sheet mechanically fastened to lightweight fill. For reroofing applications, install base sheet after performing repairs per Section 070150.
   b. Adhere first layer of insulation board and subsequent layers in in ribbons of low rise adhesive to mechanically fastened base sheet.
   c. Mechanically attached base sheet is required for all roofs over these deck types, regardless of the presence of insulation or coverboard.

3. Metal Decks with Metal Roofing:
   a. Mechanically fasten all layers of insulation to substrate, with boards laid in staggered pattern.

4. Concrete Decks with Membrane Roofing:
   a. Install self-adhered or heat-welded vapor barrier to clean, primed, and dry concrete deck and heat weld all laps. Vapor barrier not fully adhered will be required to be cut out, removed, and patched as required by the manufacturer.
   b. Adhere first and subsequent layers in ribbons of low rise adhesive.

C. Mechanically Fastened Installation:
   1. Mechanically fasten boards with approved fasteners and plates.
   2. Ensure that fasteners penetrate top flange of deck ¾-inch, do not penetrate bottom flange of deck. Reinstall fasteners that do not engage top flute of deck.
   3. Provide fasteners in location per the approved fastening pattern and layout provided by the manufacturer. Provide 6” edge distance between fasteners and edge of boards.

D. Adhesive Installation:
   1. General:
      a. Apply insulation board in adhesive in weather conditions recommended by insulation manufacturer.
      b. Apply adhesive in a manner to provide proper mixture and setup as recommended by manufacturer.
      c. Verify string time and proper mixing procedures in accordance with manufacturer’s instructions throughout installation, and at a minimum, prior to each mobilization of adhesive application.
   2. Install adhesive in “picture frame” pattern in addition to ribbons required to achieve Code required resistance to wind uplift in field, perimeter, and corner zones. “Picture frame” pattern shall consist of a single bead of adhesive applied within 4” of board perimeter.
   3. Firmly press each insulation board into adhesive by “walking-in” each board immediately after placement. Provide a minimum of five (5) weighted five (5) gallon buckets per board at corners and center of each board.
   4. Stagger end joints in adjacent boards 12” minimum horizontally and vertically, and between layers.
   5. Butt edges for snug contact. Fill all gaps greater than 1/4-inch width.

END OF SECTION 072200

SECTION 075250 - MODIFIED BITUMINOUS SHEET ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Qualifications, Standards and Materials for new roof assembly
2. Modified bitumen sheet roofing.
3. Flashings.
4. Traffic pads

B. Related Requirements:

1. Section 013200 – Construction Progress Documentation
2. Section 013546 - Indoor Air Quality Management
3. Section 018113 – Sustainable Construction Requirements
4. Section 061050 - Rough Carpentry
5. Section 070150 - Preparation for Re-Roofing
6. Section 072200 - Roof and Deck Insulation
7. Section 076200 - Sheet Metal Flashing and Trim

1.3 SYSTEM DESCRIPTION

A. Modified Membrane roofing system; smooth surface modified base ply and white reflective granule surface modified top ply, approved and listed by Underwriter’s Laboratories (UL) as a Class A fire rated system.

B. Membrane and insulation assembly to qualify for Membrane Manufacturer’s 20- year No Dollar Limit (NDL) warranty, including wind speed coverages up to 90 miles per hour (mph).

C. All sealants, adhesives, coatings and sealant primers shall comply with current VOC limits of SCAQMD rules 1113 and 1168 as consistent with performance and warranty requirements.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Roofing Conference:

1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects

roofing, including installers of roof accessories and roof-mounted equipment.

2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.

3. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.

5. Review structural loading limitations of roof deck during and after roofing.

6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.

7. Review governing regulations and requirements for insurance and certificates if applicable.

8. Review temporary protection requirements for roofing system during and after installation.

9. Review roof observation and repair procedures after roofing installation.

1.5 SUBMITTALS

A. Submit product data and shop drawings under provisions of appropriate Division 01 Section - Submittals.

B. Product Data: for each item specified, to be used on the Project.

1. Shop Drawings: For roofing system
2. Plans:
   a. Provide a roof plan indicating tapered insulation, fastening pattern zones, and locations of proposed details in the shop drawings.
   b. Coordinate roof plan with the Drawings, ensuring that a minimum clearance of 2’-0” is provided around all structural, mechanical, electrical, or plumbing penetrations.
3. Details:
   a. Provide shop drawings indicating typical and standard roofing details (subject to contract document requirements), including:
      1) Base flashings, penetrations, and membrane terminations.
      2) Fastening patterns for field, perimeter, and corners.

   b. Contractor shall coordinate the AISD minimum flashing height requirement of 12 inches above finished roof with all curbs and penetrations through the roof system provided by structural, mechanical, electrical, or plumbing scopes of work. The minimum height of curbs and penetrations required to comply with this requirement shall be provided regardless of less stringent requirements in other specification sections.

C. Qualification Data: For Installer and manufacturer, complying with the requirements set forth in the “Quality Assurance” item of this section.

E. Manufacturer Certificate:

Provide project specific system letter, signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article. Include evidence of compliance, including:

1. Compliance with performance requirements.
2. Roofing system components are listed for the project.
3. Components are physically and chemically compatible for installation as designed.
4. All proposed materials, including those by other manufacturer, are acceptable to membrane manufacturer for use in system.
5. Proposed system meets all criteria for issuance of required manufacturer's warranty
6. Identify fastening patterns to be used in field, perimeter, and corner.
7. Specifically identify and define any deviations.

F. Product Test Reports: For components of roofing system, for tests performed by manufacturer and witnessed by a qualified testing agency.

G. Research/Evaluation Reports: For components of roofing system, from ICC-ES.

H. Laboratory Test Reports:

1. For each adhesive used, provide documentation indicating that the adhesive contains no urea formaldehyde.
2. For each adhesive used, provide documentation of VOC content.
3. Submit Product Data and MSDS for all sealants, adhesives and sealant primers, indicating the VOC content in g/l of each project.

I. Sample Warranties: Manufacturer's special warranties.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For roofing system to include in maintenance manuals.

B. Manufacturer’s and Installer’s Warranties

C. As built drawings.

1.7 QUALITY ASSURANCE

A. General: Competition shall be maintained at every level of the project, including the following:

1. Architect/Engineer shall not be affiliated with or be employed by a Manufacturer or Contractor.

2. Manufacturer shall not be affiliated with or provide compensation to Architect/Engineer. Selection of manufacturer shall be open and based on product

performance meeting or exceeding the requirements of this Section.

3. Contractor shall be selected on a competitive basis, in a manner that reviews submitted cost, qualifications, and previous project experience.

B. Roof Consultant:

1. All projects or parts of projects that include roof top equipment, conduits, duct work, penetrations, and plumbing need to be reviewed by a roofing consultant. The roofing consultant shall be involved early in the design phase, prior to issuance of the 50% Construction Document set for AISD review. Refer to the AISD list of approved roof consultants.

C. Manufacturer:

1. Company specializing in manufacturing the products specified in this Section with a minimum of five years documented experience.

2. Obtain primary products, including roof membrane, base flashings, membrane adhesives and adhesives products from a single manufacturer. Provide secondary products recommended by the manufacturer of primary products for use with roofing system provided.

3. The roofing systems manufacturer shall provide non-sales related field auditors for the purpose of performing quality assurance inspections, both in-progress and final inspections. Provide copies of the manufacturer's field auditor inspection report to the contractor, roof consultant, and building owner.

D. Contractor:

1. Be currently approved and certified to install low slope roof systems that qualify for the primary roofing material manufacturer's 20-Year No Dollar Limit (NDL) Guarantee; and use only skilled roofers completely familiar with the products and the manufacturer's current recommended methods of installation.

2. Contractor shall maintain a permanent office for conduct of business and shall operate its own full-service sheet metal shop.

3. Submit a letter from the roofing material manufacturer proposed for the project, stating that your company has been an approved and certified applicator for a minimum of three (3) years prior to the bid date, and that your company is approved to install that manufacturer's Twenty (20) Year No Dollar Limit (NDL) Guarantee.

4. Successful completion of minimum three (3) similar projects during that time. Project experience submitted must include those projects performed with proposed subcontract labor (if applicable). Contractor to provide project reference contact names, phone numbers, and emails as part of submittal process.

5. All torching operations must be performed by CERTA (Certified Roofing Torch Applicator) trained applicators with up to date certifications.

6. Evidence of Contractor's qualification to do business in the State of Texas where the project is located or covenant to obtain such qualification prior to award of the contract.

7. Workers:

   a. Project Manager and Superintendent: Minimum five years roofing experience and employed by Contractor for a minimum one year prior to Bid Date.

   b. Non-working Full Time Superintendent: Able to communicate effectively with School staff and Applicator's workers and employed by Contractor for a minimum one year prior to Bid Date. PROVIDE A FULL TIME SUPERINTENDENT AT ALL TIMES ROOFING WORK IS IN PROGRESS. Failure to provide full time supervision of the work will result in immediate stoppage of the work by A/E until specified supervision is provided by the Contractor.

   c. Designate a responsible Project Manager or Superintendent to inspect all installed Work, particularly tie-ins and temporary flashings, at end of each working day and as otherwise required to ensure water-tightness.

      1) Verify Inspection by signature on approved Daily Inspection Form signifying installation is in accordance with specified requirements.

E. Work of this Section shall conform to the National Roofing Contractor's Association (NRCA) Manual of Roof Maintenance and Roof repair, the NRCA Roofing and Waterproofing Manual, and the primary roofing materials manufacturer's instructions.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle materials in accordance with manufacturer's printed instructions. Deliver materials in manufacturer's original wrappers, dry, and undamaged with seals and labels intact.

B. Overnight rooftop storage of materials is prohibited unless approved by AISD. All materials shall be stored in a secure manner to avoid damage, danger to occupants, or theft.

1. If inside storage is not available at the job site, protect materials by covering with breathable tarpaulins. Polyethylene covers are not acceptable field storage coverings.

2. Store rolled goods on end on raised platforms, and protected from the weather until installed in the roofing system.

C. Damaged materials (moisture, fire, or other) resulting from noncompliant storage practices shall be removed and replaced at Contractor's expense.

D. Adhesives, flashing cements, and pail goods must be stored inside lockable trailers and in original containers with lids tightly in place.

1.8 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1. Do not apply roofing membrane during inclement weather.

2. Do not apply roofing membrane to damp or frozen substrates.

3. Observe wind chill and other cold weather conditions for proper application.

4. The Contractor shall have the final decision as to whether to chance roofing operations in the event wet conditions threaten,

5. The Contractor shall suspend Work, if in his/her opinion, wind speed will impede the proper installation of the roofing Work, or cause a danger to its personnel, or the Owner's property.

1.9 WARRANTY

A. Installer: Provide a two-year Installer's warranty covering defects in the roofing materials and labor, on the form provided at the end of this Section. Contractor shall provide a warranty walk with the district's roof consultant prior to expiration of this warranty to identify items requiring repair under the terms of the warranty.

B. Manufacturer: Provide manufacturer's twenty-year (no-dollar limit) Guarantee for roofing materials and installation at no cost to Owner, including wind speed coverages up to 90 miles per hour (mph). Commence all warranties on the Date of Substantial Completion for the overall project.

C. Provide Roof Warranty Signs at the completion of the project, a minimum of one (1) sign is required at each distinct roof area. Signs shall be placed on roof at locations determined by the Owner. Provide stainless steel screws for attachment of signage.

1. Warranty Signs: 24" x 24" x .080 aluminum with a baked enamel background and black lettering, in a non-penetrating manner, to read as follows:

WARNING:
ROOF AREA: (Roof designation)
WARRANTY NO.: (warranty number)
THIS ROOF IS UNDER WARRANTY UNTIL (Date)
(MANUFACTURER) (Manufacturer's Phone No.)

DO NOT MAKE ALTERATIONS OR REPAIRS

TO THIS ROOF WITHOUT APPROVAL FROM AISD

CONTACT
AISD DEPARTMENT OF CONSTRUCTION MANAGEMENT HELP DESK

(512)-414-8324
FOR APPROVAL AND/OR TO REPORT DAMAGE REQUIRING REPAIRS

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS AND PRODUCTS

A. Performance Roof Systems

1. Base Ply: Derbigum GP, Derbigum XPS
2. Top Ply: Derbicolor P-FR-CR or Derbicolor GP-FR-CR

B. Siplast

1. Base Ply: Paradiene 20 or Paradiene 20 TG
2. Top Ply: Paradeine 30 FR BW or Paradiene 30 FR TG BW

Soprema

1. Base Ply: Elastophene or Sopralene Flam HS
2. Top Ply: Elastophene Flam FR (SG) or Sopralene Flam 180 FR GR (SG)

C. Elevate (formerly Firestone)

1. Base Ply: SBS Poly Torch Base, SBS Glass Torch Base, SBS Premium Poly Base
2. Top Ply: SBS Glass FR (Ultrawhite), SBS Glass FR Torch (Ultrawhite), SBS Premium FR (Ultrawhite), SBS Premium FR Torch (Ultrawhite)

D. GAF

1. Base Ply: Ruberoid HW Smooth, Ruberoid Torch Smooth

2. Top Ply: Ruberoid EnergyCap 30 Granule FR, Ruberoid EnergyCap HW Plus Granule FR, Ruberoid EnergyCap HW30 Granule FR

E. CertainTeed

1. Base Ply: Flintlastic Ultra Poly SMS, Flintlastic Base 20 T
2. Top Ply: Flintlastic GTA FR Coolstar, Flintlastic Premium FR-P Coolstar, Flintlastic SA Cap FR Coolstar, Flintlastic GTS-FR Coolstar

F. Pre-bid approved equivalent.

2.2 PERFORMANCE REQUIREMENTS

A. General Performance: Installed roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roofing and base flashings shall remain watertight.

B. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience.

C. Roof System Design: Provide a roofing system that meets or exceeds the more stringent of the following designations:

1. Provide a roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist wind uplift pressures calculated according to ASCE 7, edition as adopted by the current City of Austin Building Code.
2. Wind Uplift Resistance Values: A minimum of two (2.0) times the wind uplift pressures. Contractor shall submit the calculated wind uplift resistance values for the selected roof membrane, as well as the actual calculations performed by the roof membrane manufacturer.
3. Provide perimeter roof edge securement configurations matching tested assemblies per ANSI/SPRI ES-1 that meet the minimum specified wind uplift requirements.

D. Approval Standards: Meet testing standards of FM 4450 and FM 4470.

E. Solar Reflectance Index: Minimum three-year aged solar reflectance index of 64 or higher.

F. Exterior Fire-Test Exposure: ASTM E 108 or UL 790, Class A; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

G. Fire-Resistance Ratings: Comply with fire-resistance-rated assembly designs indicated. Identify products with appropriate markings of applicable testing agency.

H. Hail Resistance: Provide a roof system that qualifies for FM Approval's RoofNav Listing for Severe Hail "SH".

2.3 SHEET MATERIALS

A. Membrane Materials:

1. Base Ply - Glass fiber or polyester reinforcing mat coated with SBS or APP modified asphalt on both sides, smooth surface. Provide torch grade ply for torch-applied roof systems.

Required properties (as tested per ASTM D 5147):

a. Thickness: 110 mils minimum.
b. Tensile Strength at 0 deg F: 75 lbs/in minimum c. Elongation at 0 deg F: 3% minimum
d. Tear Strength, lowest of both directions: 40 lbf minimum e. Dimensional Stability: 0.5% maximum

2. Top Ply - A polymer (SBS or APP) modified asphalt, white reflective granule surfaced sheet, with a glass fiber or polyester reinforcing mat - fire rated. Provide torch grade ply for torch-applied roof systems.

   Required properties (as tested per ASTM D 5147):
   a. Thickness: 135 mils minimum.
   b. Tensile Strength at 0 deg F: 75 lbs/in minimum c. Elongation at 0 deg F: 3% minimum
   d. Tear Strength, lowest of both directions: 40 lbf minimum e. Dimensional Stability: 0.5% maximum
   f. Granule Loss: 1.0 grams maximum

3. Glass Fabric - Asphalt coated woven glass fiber membrane, ASTM D1668. B.

4. Flashing: Reinforced polymer (SBS or APP) modified asphalt sheet as approved by membrane manufacturer.

5. Mechanically fastened base sheet at lightweight insulated decks: refer to Section 072200, required regardless of presence of rigid insulation or coverboard materials in roof membrane system.

2.4 BITUMINOUS MATERIALS

A. Asphalt Primer: ASTM D 41, as approved by membrane manufacturer. Asphalt Primer shall comply with current VOC limits of SCAQMD rule 1168 as consistent with performance and warranty requirements.

B. Asphalt Roof Cement: ASTM D 4586, non-asbestos, as approved by membrane manufacturer. Asphalt Roof Cement shall comply with current VOC limits of SCAQMD rule 1168 as consistent with performance and warranty requirements.

C. Modified Adhesive: modified asphalt adhesive as approved by membrane manufacturer. Modified Adhesive shall comply with current VOC limits of SCAQMD rule 1168 as consistent with performance and warranty requirements.

2.5 CANTS, TAPERED INSULATION, EDGE STRIPS

A. Fiber cants and tapered edge strips: As specified in Section 072200.

B. Wood Cants: Specified in Division 6 Section, Rough Carpentry.

C. Rigid Insulation: As specified in Section 072200.

2.6 FASTENERS

A. General:

1. Exposed fasteners shall be hex head stainless steel self-tapping screws with stainless steel-jacketed neoprene washers.
2. Fasteners shall be compatible with all materials with which they come in contact so that dielectric corrosion does not occur.

B. Insulation Fasteners: Fasteners as specified in Section 072200.

C. Base Flashing Nails:
1. Ring shank nails or screws with 1" diameter metal caps, minimum size 8d.
2. Provide stainless steel nails where fastening into treated wood, and minimum G90 hot dipped galvanized nails where fastening into untreated wood.

2.7 ACCESSORIES

A. Protection Pad: Cut section of membrane top ply material or product approved by membrane manufacturer.

B. Sealant: One component gun-grade sealant, ASTM C-920-87, Federal Specification TT-S-00230-C. Sealant shall comply with current VOC limits of SCAQMD rule 1168 as consistent with performance and warranty requirements.

C. Mineral Granules: Ceramic granules as recommended by primary roofing membrane manufacturer, color to match surface color of top ply.

D. Liquid-Applied Reinforced Flashing System: Single-component, poly-methyl-methacrylate (PMMA) resin with polyester reinforcing fleece fabric fully embedded into the resin to form roof system flashings, provided by primary roof membrane manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that substrate surfaces and site conditions are ready to receive work.

B. Beginning of installation means installer accepts existing surfaces.

C. Verify under deck conditions are clear for fastener installation.

3.2 MEMBRANE APPLICATION - GENERAL

A. Membrane system installation to be performed in accordance with the manufacturer's published recommendations unless modified by these specifications. The manufacturer's current published catalog will be considered a part of this specification.

B. At the end of each day's work, install watertight night seals to protect the new roof system from moisture and to prevent water leaks into the building. Remove night seals prior to starting the next day's work.

C. Plan the flow of work, equipment, materials, and personnel to eliminate traffic across the completed new roof system. Provide plywood walkways for the movement of personnel, equipment, and materials to avoid damage to the existing roof system that is yet to be removed.

D. The roofing contractor is responsible for the disconnection and reconnection of any HVAC

and electrical required to complete the roofing project. Coordinate the disconnect and reconnect of equipment with the building owner so the operation of the building is not interrupted.

D. Where roof slope exceeds 1/2 inch per 12 inches (1:24), install roofing membrane sheets parallel with slope. Backnail roofing sheets to nailer strips according to roofing system manufacturer's written instructions.

E. Mechanically fastened base sheet at lightweight insulated decks: Install as specified in Section 072200, required regardless of presence of rigid insulation or coverboard materials in roof membrane system.

3.3 MEMBRANE APPLICATION – COLD ADHESIVE

A. Application of Adhesive: Application shall be continuous and applied at the rate recommended by the primary roofing membrane manufacturer. Do not apply adhesive when temperatures are outside of manufacturer’s recommended range or when wind speeds are in excess of the maximum speed recommended by the manufacturer.

B. Application of Plies: Embed first ply sheet into adhesive over the installed rigid insulation board, starting at the low point, laying plies at a right angle to the slope of the deck. Lap membrane sides and ends a minimum of three inches and heat weld all laps. Extend adhesive application no more than four feet in front of the roll.

C. Application of Top Ply: Embed top ply into uniform application of adhesive over the first ply. Start at the low point, laying plies at a right angle to the slope of the deck, lapping sides and ends a minimum of three inches. Stagger laps between plies. Extend adhesive application no more than four feet in front of the roll.

1. Squeegee plies promptly to eliminate air pockets and wrinkles creases and fishmouths, and to insure proper adhesion.

2. Install water cutoffs at the end of the day's operation. Remove prior to resuming additional work. Seal perimeters into watertight condition.

3. Prevent foot or vehicle traffic from crossing newly laid plies until cure time recommended by adhesive manufacturer has elapsed.

4. Extend plies up 2” minimum above cant strips as shown in details. Lap end joints at least three inches.

5. Install plies continuously in one direction from the field of the roof to the top of the cant.

6. Fully bond first ply to base sheet and fully bond top ply to first ply.

7. Heat weld all side and end laps.

8. Broadcast mineral granules over all adhesive overruns to ensure a monolithic surface color.

3.4 MEMBRANE APPLICATION: TORCHED SYSTEMS

A. Apply roof system in strict accordance with manufacturer's published recommendations. Do not use membrane roll hooks in a manner that damages roof ply during torching operations.

B. Base Ply Membrane Application: Over the specified insulation system, embed the base ply, starting at the low point, laying sheets at a right angle to the slope of the deck, heat welding to the specified substrate, lapping sides and ends a minimum of 3 inches. Ensure sufficient “bleed out” along laps to provide full adhesion without damaging membrane.

1. Perform light rolling or brooming promptly to eliminate air pockets, wrinkles, creases, and fishmouths, and to insure proper adhesion.

2. Extend base ply up cant strips, extending two inches (2”) minimum above cant. Lap end joints at least 3 inches.

3. Install base ply continuously in one direction from the field of the roof to the top of the cant.

4. At end laps, cut the under ply side lap 45 degrees as recommended by the membrane Manufacturer.

5. Prevent foot or vehicle traffic from crossing newly laid base ply sheets until bitumen cools to below softening point.

6. Install water cutoffs at the end of the day's operation. Remove prior to resuming additional work. Seal perimeters into watertight condition.

C. Application of modified bitumen cap sheet:

1. Offset side laps and end laps from those of the base ply.

2. Embed cap sheet, starting at the low point, laying plies at a right angle, heat welding to the top face of the interply sheets, lapping sides minimum of 3 inches and end laps a minimum of 6 inches. Ensure sufficient “bleed out” along laps to provide full adhesion without damaging membrane.

3. Stagger laps between plies. Heat granule surface at top surface end laps to aid adhesion.

4. At end laps, cut the under ply side lap 45 degrees as recommended by the membrane Manufacturer.

5. Perform light rolling or brooming promptly to eliminate air pockets, wrinkles, creases, and fishmouths, and to insure proper adhesion.

6. Extend top ply up cant strips, extending two inches (2”) minimum above cant. Lap end joints at least 3 inches.

7. Install top ply continuously in one direction from the field of the roof to the top of the cant.

8. Broadcast mineral granules over all bitumen overruns to ensure a monolithic surface

color.

9. Install water cutoffs at the end of the day's operation. Remove prior to resuming additional work. Seal perimeters into watertight condition.

3.5 FLASHING APPLICATION

A. Base flashing installation is to be performed in accordance with the manufacturer's recommendations unless modified by these specifications.

B. Curb and Corner Flashings:

1. Contractor shall verify that existing or new curbs are constructed of sufficient height to provide a minimum of 12" base flashing height above the finished roof surface.

2. All corners, inside and out, require a boot to provide positive weather protection at the lap joint. Boot size must be a minimum of 1-1/2 inches radius beyond all intersecting surfaces, and have a minimum of 1/4 inch follow of modified bitumen beyond all edges. Install boots at the inside and outside corners (underneath) prior to installing the membrane.

C. Base Flashing Application.

1. After field sheets of the top and base plies have been installed to extend 2 inches above the top of the cant, install the two plies of sheet flashing in uniform mopping of cold adhesive or torch applied to the vertical substrate, cant and roof level.

2. Lap each adjacent sheet 3 inches and extend first flashing ply a minimum of 6 inches beyond the cant onto the roof surface. Extend the top flashing ply inches beyond the termination of the first flashing ply.

3. Mechanically fasten the top of all vertical base flashing membranes. Fasteners shall be installed at a spacing of 8 inches on center. Choose fasteners appropriate for the substrate, based on the General Guide to Fasteners in the current edition of the NRCA Roofing & Waterproofing Manual.

4. The top edges of all base flashings shall be sealed with 3 course membrane and mastic, with self-adhered rubberized asphalt membrane to provide protection until metal counter flashing is installed.

5. When flashing vertical surfaces above 14 inches high, it is required that the membrane be installed the width of the roll and pre-cut to the desired height required. The maximum flashing length is 10 ft. when the membrane flashings are between 8- and 14-inches high.

6. When flashing vertical surfaces above 24 inches high, terminate base flashing and secure with specified capped fasteners at 8 inches on center maximum. Lap subsequent base flashing layers over the top of these fasteners 6 inches minimum, heat weld all laps.

D. Metal Edge Application: Prime metal edge completely and allow to dry prior to

installation. After base ply field sheet has been applied, install metal edge according to Division 7 Section, "Flashing and Sheet Metal". Strip flange with nine-inch wide strips of first ply. Apply top ply and terminate at the rise in the metal edge.

E. Pipe Sleeves: After field sheet of base ply has been applied, install pipe sleeves according to Division 7 Section, "Flashing and Sheet Metal". Strip in flanges with nine- inch wide strips of base ply. Install field sheet of top ply terminating at the flange/throat juncture.

F. Liquid-Applied, Single-Component, PMMA Flashing System Application:

1. Refer to manufacturer's details drawings, product data sheets and published general requirements for application rates and specific installation instructions
2. Pre-cut polyester reinforcing fleece to conform to roof terminations, transitions and penetrations being flashed. Ensure a minimum 2 in overlap of fleece at side and end-laps. Ensure the completed liquid-applied flashing membrane is fully reinforced.
3. Apply the base coat of liquid-applied flashing resin onto the substrate using a brush or roller, working the material into the surface for complete coverage and full adhesion at 2.0 gallons per square.
4. Immediately apply the reinforcing into the wet base coat of resin. Using a brush or roller, work the into the wet resin while applying the second coat of resin to completely encapsulate the fleece at 2.0 gallons per square, and extend the liquid resin 1 inch beyond the fleece.
5. Allow the liquid membrane to sufficiently cure for then apply the finish coat of resin.

G. Roof Drains:

1. The roof drain sump shall be clean and free of all rust and dirt.
2. Install the base ply and cut so that the base ply stops short of the clamping ring.
3. Install a 36 inch square piece of smooth modified bitumen base sheet, set in adhesive, over the drain opening, and cut a hole to the inside edge of the drain base.
4. The drain bowl flange is to be thoroughly cleaned, wire brushed (if necessary), and primed to receive the new membrane.
5. Apply adhesive to the clamping ring area.
6. Install a 30-inch square, 4-lb. lead flashing over the membrane into a bed of flashing cement.
7. Install the top layer of field membrane extending to the inside edge of the drain bowl.
8. The field membrane, drain lead, and stripping membrane are to extend under the properly secured and tightened compression clamping ring assembly. Cut holes in the membrane to align with the clamping bolts, install the clamping ring and tighten the bolts to provide uniform compression of the flashing membrane at the drain.
9. Install liquid flashing system at all roof surfaces within 3'-0" of primary roof drains.

H. Scupper Installation

1. Scupper widths shall be calculated by the designer of record, using the hydraulic method described in Appendix G of the SMACNA Manual, latest edition, with rainfall rates as required by the City of Austin Plumbing Code. Scuppers shall be sized in a manner to provide flow rates that prevent buildup of water depths above the maximum live load, as specified by the structural engineer for the project.
2. Coordinate scupper elevations to ensure positive drainage at primary scuppers over

flashings and to comply with elevation requirements at overflow scuppers. Ponding at primary scuppers is basis for rejection and reinstallation of scupper at a lower elevation.

3. Install stainless steel scupper sleeves flashed with membrane and liquid flashing, according to roofing system manufacturer's written instructions. Provide liquid flashing at all primary scupper sumps, minimum 4’-0” width by 2’-0”, centered at the scupper.
4. Provide compatible sealants between scupper sleeve and exterior wall surfaces:
   a. Air Seal: provide continuous seal behind cladding at air barrier plane.
   b. Weather Seal: provide seal at top and sides of scupper at exterior face of cladding for cavity wall construction where a continuous air seal has already been provided. For non-cavity wall construction, provide continuous air/weather seal at exterior face of wall.

I. All fans, ducts, and other metal penetration covers shall be lifted off the curb prior to application of the base flashing membrane. After application of the base flashing membrane, reset the penetration cover.

J. Sealant: All top ply edges exposed at gravel stops, waste stacks, vent stacks, etc., shall be caulked with a smooth continuous bead of neoprene-based sealant.

3.6 WALKWAY INSTALLATION

A. Walkway Cap-Sheet Strips: Install walkway cap-sheet strips over roofing membrane, using same application method as used for roofing cap sheet. Provide 3 inch minimum gap between walkway sections for drainage and provide pad dimensions no greater or less than 3’-0” x 3’-0”.

B. Contractor shall provide all walkway pads indicated on the Drawings. Where walkways are not indicated in the Drawings, Contractor shall provide walkways sufficient to provide pathways from all roof access points and around all roof top mechanical units.

3.7 FIELD QUALITY CONTROL

A. A/E will periodically observe the Work for Owner to determine if the Contractor’s work is in conformance with the Contract Documents. Provide access to Owner and A/E throughout all phases of the Work.

B. Correct defects and irregularities.

3.8 CLEANING

A. Remove bituminous markings from finished surfaces.

B. In areas where finished surfaces are soiled by bitumen or any other source of soiling caused by work of these Specifications, consult manufacturer of surfaces for cleaning advice and conform to their documented instructions.

C. Repair or replace defaced or disfigured caused by work of these Specifications.

3.9 PROTECTION

A. Expedite installation to ensure that work started in any particular areas on any day will result in a fully completed and protected roof system on that day. Water cutoff flashing, sealing, and lap jointing must be completed on a daily basis.

B. Provide necessary protective measures for inclement weather and to ensure the normal function of the building during the repair operations. Coordinate parking spaces adjacent to the Work area to ensure that vehicles and people are protected.

C. Protect all roof penetrations (vents, drains, pipes, etc.) from entry of foreign matter such as debris during re-roofing operations.

D. Do not store materials on newly completed roof areas without protection. Acceptable protection for light to medium weight materials or foot traffic shall include a minimum 1" thickness insulation board with a minimum 1/2" plywood board on polyethylene sheeting. All temporary protection shall be strapped together and/or weighted to resist wind uplift while in use.

3.10 MANUFACTURER'S FIELD SERVICES

A. The Contractor shall coordinate with the primary roofing material manufacturer's representative to provide the following:

1. Attendance at the pre-roofing conference;
2. Manufacturer shall provide a minimum of four (4) site visits for roof projects, one at commencement of construction, during construction, and at substantial completion.
3. The Contractor shall obtain written reports of the visits and shall submit to the Owner and A/E, in accordance with Section 013300, Submittals.

3.11 FIELD QUALITY CONTROL

A. Test Cuts for Field Verifications:

1. Roof Membrane: In the event that deficiencies are observed during quality-assurance inspections of roofing membrane, remove test specimens to evaluate problems as follows:
   a. Determine approximate quantities of components within roofing membrane according to ASTM D 3617.
   b. Examine test specimens for interply voids according to ASTM D 3617 and to comply with criteria established in Appendix 3 of ARMA/NRCA's "Quality Control Guidelines for the Application of Polymer Modified Bitumen Roofing."
   c. Repair areas where test cuts were made according to roofing system manufacturer's written instructions.

B. Moisture Scan: In the event that the Contractor does not provide adequate daily seals during completion of the work and rainfall occurs, the Owner has the right to require a full moisture scan of all roofs with suspected moisture present under the membrane. Contractor shall replace wet roofing at their own expense identified during this moisture scan, prior to release of final payment by the Owner. Moisture scan shall be performed by either of the

following test methods, within the recommended project ambient conditions:

1. ASTM D7954, Standard Practice for Moisture Surveying of Roofing and Waterproofing Systems Using Non-Destructive Electrical Impedance Scanners
2. ASTM C1153, Standard Practice for Location of Wet Insulation in Roofing Systems Using Infrared Imaging

C. Roofing system will be considered defective if it does not pass tests and inspections. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

CONTRACTOR'S ROOFING WARRANTY

WHEREAS _____

of (Address) _____

herein called the "Contractor", has performed roofing and associated work on the following project.

Owner: _____

Address: _____

Number and Type of Building: _____

Address: _____

Area of Work: _____ Date of Acceptance_____

Warranty Period: TWO YEARS Date of Expiration _____

AND WHEREAS the Contractor has contracted with Owner to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period.

NOW THEREFORE the Contractor hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work, and as are necessary to maintain said work in watertight condition.

This Warranty is made subject to the following terms and conditions:

1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by: (a) lightning, windstorm, hailstorm, and other unusual phenomena of the elements; (b) fire; (c) failure of roofing system substrate including cracking, settlement, excessive deflection, deterioration, and decomposition; (d) faulty construction of vents, equipment supports, and other penetrations of the work; (e) repeated vapor condensation on bottom of roofing; and (f) activity on roofing by other persons including construction contractors and maintenance personnel, whether authorized or unauthorized by Owner. When work has been damaged by any of the foregoing causes, Warranty shall be null and void until such damage has been repaired by the Contractor, and until cost and expense thereof has been paid by the Owner or by another responsible party so designated.

2. The Contractor is responsible for work covered by this Warranty, but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.

3. The Contractor shall be responsible for repairing any defect attributable to Contractor's method or manner of installation of the roof membrane during the two-year period at Contractor's sole cost and expense.

a. During the twenty-third (23rd) month following the Contractor's date of substantial completion, the Contractor shall have thirty days to coordinate and perform a roof inspection with the Roof Consultant, roof material manufacturer's representative and the Owner's representative.
b. Contractor shall coordinate a roof inspection with the Roof Consultant, roof material manufacturer's representative and the Owner's representative during the ninety-day period preceding the expiration date of the Two-Year Contractor's Warranty.
c. Failure to perform inspections specified in 3.a. and 3.b. and repair defects (if any) will be cause to consider the Contractor in default. The Owner will then submit written notice of default to the Contractor's bonding company.

4. During Warranty Period, if the Owner allows alterations of work by anyone other than the Contractor, including cutting, patching and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, the Warranty shall become null and void upon date of said alterations, but only to extent said alterations affect work covered by this Warranty. If the Owner engages the Contractor to perform said alterations, warranty shall not become null and void, unless the Contractor, prior to proceeding with said work, shall have notified the Owner in writing that said alterations would likely damage or deteriorate the work, thereby reasonably justifying a limitation or termination of this Warranty.

5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray cooled surface, flooded basin, or other use or service more sever than originally specified, this Warranty shall become null and void upon date of said change, but only to extent said changes affect work covered by this Warranty.

6. The Owner shall promptly notify the Contractor of observed, known, or suspected leaks, defect or deterioration, and shall afford reasonable opportunity for the Contractor to inspect the work, and to examine evidence of such leaks, defects or deterioration.

7. This Warranty is recognized to be the only Warranty of the Contractor on said work, and shall not operate to restrict or cut off the Owner from other remedies and resources lawfully available to him in cases of roofing failure. Specifically, this Warranty shall not operate to relieve the Contractor of responsibility for performance of original work.

IN WITNESS THEREOF, this instrument has been duly executed this ____ DAY of _____, 20___.

_____	_____
Signature	Firm Name
_____	_____
Typed Name and Title	Address
_____	_____
Telephone Number	City/State/Zip

END OF SECTION 075250

SECTION 075419 - POLYVINYL-CHLORIDE (PVC) ROOFING

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Qualifications, Standards and Materials for new roof assembly
2. Adhered polyvinyl-chloride (PVC) with ketone ethylene ester (KEE) additives or full KEE membrane roofing system, smooth type and fleeceback type.
3. Roofing accessory materials
4. Traffic pads

B. Related Requirements:

1. Section 013200 – Construction Progress Documentation
2. Section 013546 - Indoor Air Quality Management
3. Section 018113 – Sustainable Construction Requirements
4. Section 061050 - Rough Carpentry
5. Section 070150 - Preparation for Re-Roofing
6. Section 072200 - Roof and Deck Insulation
7. Section 076200 - Sheet Metal Flashing and Trim

1.3 DEFINITIONS

A. Roofing Terminology: Definitions in ASTM D 1079 and glossary in NRCA's "The NRCA Roofing and Waterproofing Manual" apply to work of this Section.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Roofing Conference:

1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
3. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
5. Review structural loading limitations of roof deck during and after roofing.
6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
7. Review governing regulations and requirements for insurance and certificates if applicable.
8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

1.5 SUBMITTALS

A. Submit product data and shop drawings under provisions of appropriate Division 01 Section - Submittals.

B. Product Data: For each type of product.

C. Shop Drawings: For roofing system.

1. Plans:
   a. Provide a roof plan indicating tapered insulation, fastening pattern zones, and locations of proposed details in the shop drawings.
   b. Coordinate roof plan with the Drawings, ensuring that a minimum clearance of 2'-0" is provided around all structural, mechanical, electrical, or plumbing penetrations.
2. Details:
   a. Provide shop drawings indicating typical and standard roofing details (subject to contract document requirements), including:
      1) Base flashings, penetrations, and membrane terminations.
      2) Fastening patterns for field, perimeter, and corners.
   b. Contractor shall coordinate the AISD minimum flashing height requirement of 12 inches above finished roof with all curbs and penetrations through the roof system provided by structural, mechanical, electrical, or plumbing scopes of work. The minimum height of curbs and penetrations required to comply with this requirement shall be provided regardless of less stringent requirements in other specification sections.

D. Qualification Data: For Installer and manufacturer, complying with the requirements set forth in the "Quality Assurance" item of this section.

E. Manufacturer Certificate:

Provide project specific system letter, signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article. Include evidence of compliance, including:

1. Compliance with performance requirements.
2. Roofing system components are listed for the project.
3. Components are physically and chemically compatible for installation as designed.
4. All proposed materials, including those by other manufacturer, are acceptable to

membrane manufacturer for use in system.

5. Proposed system meets all criteria for issuance of required manufacturer's warranty
6. Identify fastening patterns to be used in field, perimeter, and corner.
7. Specifically identify and define any deviations.

F. Product Test Reports: For components of roofing system, for tests performed by manufacturer and witnessed by a qualified testing agency.

G. Research/Evaluation Reports: For components of roofing system, from ICC-ES.

H. Laboratory Test Reports:

1. For each adhesive used, provide documentation indicating that the adhesive contains no urea formaldehyde.
2. For each adhesive used, provide documentation of VOC content.

I. Plan for protecting installed materials during construction and staged materials.

J. Sample Warranties: Manufacturer's special warranties.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For roofing system to include in maintenance manuals.

B. Manufacturer’s and Installer’s Warranties

C. As built drawings.

1.7 QUALITY ASSURANCE

A. General: Competition shall be maintained at every level of the project, including the following:

1. Architect/Engineer shall not be affiliated with or be employed by a Manufacturer or Contractor.
2. Manufacturer shall not be affiliated with or provide compensation to Architect/Engineer. Selection of manufacturer shall be open and based on product performance meeting or exceeding the requirements of this Section.
3. Contractor shall be selected on a competitive basis, in a manner that reviews submitted cost, qualifications, and previous project experience.

B. Roof Consultant:

1. All projects or parts of projects that include roof top equipment, conduits, duct work, penetrations, and plumbing need to be reviewed by a roofing consultant. The roofing consultant shall be involved early in the design phase, prior to issuance of the 50% Construction Document set for AISD review. Refer to the AISD list of approved roof consultants.

C. Manufacturer:

1. Company specializing in manufacturing the products specified in this Section with a minimum of five years documented experience.

2. Obtain primary products, including roof membrane, base flashings, membrane adhesives and adhesives products from a single manufacturer. Provide secondary products recommended by the manufacturer of primary products for use with roofing system provided.

3. The roofing systems manufacturer shall provide non-sales related field auditors for the purpose of performing quality assurance inspections, both in-progress and final inspections. Provide copies of the manufacturer's field auditor inspection report to the contractor, roof consultant, and building owner.

D. Contractor:

1. Be currently approved and certified to install low slope roof systems that qualify for the primary roofing material manufacturer's 20-Year No Dollar Limit (NDL) Guarantee; and use only skilled roofers completely familiar with the products and the manufacturer's current recommended methods of installation.

2. Contractor shall maintain a permanent office for conduct of business and shall operate its own full-service sheet metal shop.

3. Submit a letter from the roofing material manufacturer proposed for the project, stating that your company has been an approved and certified applicator for a minimum of three (3) years prior to the bid date, and that your company is approved to install that manufacturer's Twenty (20) Year No Dollar Limit (NDL) Guarantee.

4. Successful completion of minimum three (3) similar projects during that time. Project experience submitted must include those projects performed with proposed subcontract labor (if applicable). Contractor to provide project reference contact names, phone numbers, and emails as part of submittal process.

5. Evidence of Contractor's qualification to do business in the State of Texas where the project is located or covenant to obtain such qualification prior to award of the contract.

6. Workers:

a. Project Manager and Superintendent: Minimum five years roofing experience and employed by Contractor for a minimum one year prior to Bid Date.

b. Non-working Full Time Superintendent: Able to communicate effectively with School staff and Applicator's workers and employed by Contractor for a minimum one year prior to Bid Date. PROVIDE A FULL TIME SUPERINTENDENT AT ALL TIMES ROOFING WORK IS IN PROGRESS. Failure to provide full time supervision of the work will result in immediate stoppage of the work by A/E until specified supervision is provided by the Contractor.

c. Designate a responsible Project Manager or Superintendent to inspect all installed Work, particularly tie-ins and temporary flashings, at end of each working day and as otherwise required to ensure water-tightness.

1) Verify Inspection by signature on approved Daily Inspection Form signifying installation is in accordance with specified requirements.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle materials in accordance with manufacturer's printed instructions. Deliver materials in manufacturer's original wrappers, dry, and undamaged with seals and labels intact.

B. Overnight rooftop storage of materials is prohibited unless approved by AISD. All

materials shall be stored in a secure manner to avoid damage, danger to occupants, or theft.

1. If inside storage is not available at the job site, protect materials by covering with breathable tarpaulins. Polyethylene covers are not acceptable field storage coverings.
2. Store rolled goods on end on raised platforms and protected from the weather until installed in the roofing system.

C. Damaged materials (moisture, fire, or other) resulting from noncompliant storage practices shall be removed and replaced at Contractor's expense.

D. Adhesives, flashing cements, and pail goods must be stored inside lockable trailers and in original containers with lids tightly in place.

1.9 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1. Do not apply roofing membrane during inclement weather.
2. Do not apply roofing membrane to damp or frozen substrates.
3. Observe wind chill and other cold weather conditions for proper application.
4. The Contractor shall have the final decision as to whether to chance roofing operations in the event wet conditions threaten,
5. The Contractor shall suspend Work, if in his/her opinion, wind speed will impede the proper installation of the roofing Work, or cause a danger to its personnel, or the Owner's property.

1.10 WARRANTY

A. Installer: Provide a two-year Installer's warranty covering defects in the roofing materials and labor, on the form provided at the end of this Section. Contractor shall provide a warranty walk with the district's roof consultant prior to expiration of this warranty to identify items requiring repair under the terms of the warranty.

B. Manufacturer: Provide manufacturer's twenty (20) year "non-prorated, no dollar limit" system warranty shall cover product quality, performance and workmanship, including roofing and membrane flashings.
1. Warranty shall include insulation, coverboard, and roof membrane from roof surface up into parapet cap without exclusions.
2. Warranty shall include full cost of repair and replacement of all damaged roof assembly components.
3. The manufacturer's warranty shall commence upon the project's date of substantial completion.

C. Wind Rider
1. Warranty shall provide coverage for 3-second wind gusts of up to 90 miles per hour.
2. Warranty pricing shall include inspections as required by the Manufacturer after wind events exceeding 55 mph or major storm events.

D. Hail Rider: Warranty shall include coverage for damage up to 2" diameter hail.

E. Provide Roof Warranty Signs at the completion of the project, a minimum of one (1) sign is required at each distinct roof area. Signs shall be placed on roof at locations determined by the

Owner. Provide stainless steel screws for attachment of signage.

1. Warranty Signs: 24" x 24" x .080 aluminum with a baked enamel background and black lettering, in a non-penetrating manner, to read as follows:

WARNING:
ROOF AREA: (Roof designation)
WARRANTY NO.: (warranty number)
THIS ROOF IS UNDER WARRANTY UNTIL (Date)
(MANUFACTURER) (Manufacturer's Phone No.)

DO NOT MAKE ALTERATIONS OR REPAIRS
TO THIS ROOF WITHOUT APPROVAL FROM AISD

CONTACT
AISD DEPARTMENT OF CONSTRUCTION MANAGEMENT HELP DESK

(512)-414-8324
FOR APPROVAL AND/OR TO REPORT DAMAGE REQUIRING REPAIRS

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. FiberTite
B. Carlisle-Syntec Inc.
C. IB Roof Systems, Inc.
D. GAF
E. Siplast
F. Pre-bid approved equivalent.

2.2 PERFORMANCE REQUIREMENTS

A. General Performance: Installed roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roofing and base flashings shall remain watertight.

1. Accelerated Weathering: Roofing system shall withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.
2. Impact Resistance: Roofing system shall resist impact damage when tested according to ASTM D 3746 or ASTM D 4272.

B. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience.

C. Roof System Design: Provide a roofing system that meets or exceeds the more stringent of the following designations:

1. Provide a roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist wind uplift pressures calculated according

to ASCE 7, edition as adopted by the current City of Austin Building Code.

2. Wind Uplift Resistance Values: A minimum of two (2.0) times the wind uplift pressures. Contractor shall submit the calculated wind uplift resistance values for the selected roof membrane, as well as the actual calculations performed by the roof membrane manufacturer.

D. Approval Standards: Meet testing standards of FM 4450 and FM 4470.

E. Solar Reflectance Index: Minimum three-year aged solar reflectance index of 64 or higher.

F. Exterior Fire-Test Exposure: ASTM E 108 or UL 790, Class A; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

G. Fire-Resistance Ratings: Comply with fire-resistance-rated assembly designs indicated. Identify products with appropriate markings of applicable testing agency.

2.3 ROOF MEMBRANE

A. Smooth PVC with KEE or KEE membrane

1. Fibertite, 50 mil XT
2. Carlisle-Syntec Inc., 80 mil Sureflex PVC KEE HP
3. IB Roof Systems, Inc., IB PVC Single ChemGuard 80
4. GAF, 80 MIL PVC XK
5. Siplast, 80 mil Parasolo PVC KEE

B. Fleeceback PVC with KEE or KEE membrane

1. Fibertite, 50 mil XT Fleeceback
2. Carlisle-Syntec Inc., 80 mil Sureflex PVC KEE HP Fleeceback
3. IB Roof Systems Inc., IB PVC Single-Ply ChemGuard 80-FB
4. GAF, 80 mil Single Ply PVC XK Fleeceback
5. Siplast, 80 mil Parasolo PVC KEE Fleeceback

2.4 AUXILIARY ROOFING MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with roofing. NOTE: pourable sealer pockets are prohibited.

B. Mechanically fastened base sheet at lightweight insulated decks: refer to Section 072200, required regardless of presence of rigid insulation or coverboard materials in roof membrane system.

C. Sheet flashing:

1. PVC with KEE: Provide 60 mil thick flashing membrane for use with 80 mil PVC roof membranes with KEE.
2. KEE: Provide 50 mil thick flashing membrane for use with 50 mil KEE roof membrane.

D. Bonding Adhesive: Manufacturer's standard.

E. Metal Termination Bars: Manufacturer's standard, pre-drilled with holes at 6” o.c. maximum, stainless-steel or aluminum bars, approximately 1 by 1/8-inch thick; with anchors.

F. Metal Battens: Manufacturer's standard, aluminum-zinc-alloy-coated or zinc-coated steel sheet, approximately 1-inch wide by 0.05 inch thick, prepunched.

G. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Global 4470, designed for fastening roofing to substrate, and acceptable to roofing system manufacturer.

H. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

I. Membrane Coated Metal: Manufacturer's standard 24-gauge, G-90 galvanized metal sheet, color selection by Owner.

J. Walk pads: Manufacturer’s standard walkway roll, cut to 3’-0” x 3’-0” pads.

K. PVC Self-Adhered Membrane Flashings: Manufacturers pressure sensitive cover strips or standard self-adhered PVC membrane.

L. Liquid Flashings: Manufacturer’s cold applied two-component flashings system with reinforcing fleece and compatible with the roof membrane.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Ensure that surfaces and site conditions are ready to receive Work and are acceptable to membrane manufacturer for required warranty.

B. Ensure existing roof surface is clean and smooth, free of depressions, waves or projections and is properly sloped to drains or eaves.

C. Ensure that roof surfaces are dry and free of snow or ice. Confirm dryness in the field by moisture meter; maximum allowable: 12-percent.

D. Ensure that roof openings, curbs, pipes, sleeves, ducts and vents through roof are solidly set, and any required wood nailing strips are in place.

E. Beginning of installation means installer accepts existing surfaces.

3.2 PREPARATION

A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.

B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is

taking place or when rain is forecast.

C. Maintain roof drains in functioning condition to ensure roof drainage at end of each workday. Prevent debris from entering or blocking roof drains and conductors. Use roof-drain plugs specifically designed for this purpose. Remove roof-drain plugs at end of each workday, when no work is taking place, or when rain is forecast.

1. If roof drains are temporarily blocked or unserviceable, provide alternative drainage method to remove water and eliminate ponding. Do not permit water to enter into or under roofing system components that are to remain.

3.3 ROOFING INSTALLATION, GENERAL

A. Install roofing system according to roofing system manufacturer's written instructions, except when more stringent requirements are specified.

B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at end of workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

C. Install roofing and auxiliary materials to tie into existing roofing to maintain weathertightness of transition and to prevent voiding of manufacturer’s warranty for existing roofing system.

D. Mechanically fastened base sheet at lightweight insulated decks: Install as specified in Section 072200, required regardless of presence of rigid insulation or coverboard materials in roof membrane system.

3.4 ADHERED ROOFING INSTALLATION

A. Membrane Attachment:

1. Non-Fleece back Membrane:

a. Apply bonding adhesive in accordance with the manufacturer's published instructions, to the exposed underside of the membrane and the corresponding coverboard or lightweight insulating concrete substrate installed per Section 072200.

b. Do not apply bonding adhesive along the splice edge of the membrane to be hot air welded over the adjoining sheet. Allow the adhesive to dry until it is tacky but will not string or stick to a dry finger touch.

2. Fleeceback Membrane:

a. Apply low rise foam adhesive to substrate as a continuous spray or in ribbons spaced no greater than 4” o.c., dispensing adhesive at rate required by manufacturer.

b. Allowing foam to rise in accordance with manufacturer’s instructions before installing roofing.

3. Membrane Adhesion: Non-Fleeceback and Fleeceback Membranes

a. Roll the membrane into the substrate while avoiding wrinkles. Roll the bonded section of the membrane sheet immediately after rolling the membrane into the adhesive with a 150 lb., 24” diameter roller to achieve maximum contact.

b. Fold back the un-bonded half of the sheet lengthwise and repeat the bonding

procedures.

4. Mechanical Fasteners: In addition to adhering, mechanically fasten roofing securely at terminations, penetrations, and perimeter of roofing in accordance with manufacturer requirements.

B. Membrane Placement:

1. Apply roofing with side laps shingled with slope of roof deck where possible. Position adjoining sheets to allow a minimum overlap of 2 inches.
2. Continue to install adjoining membrane sheets in the same manner, overlapping edges a minimum of 2 inches and complete the bonding procedures as stated previously, in accordance with the manufacturer's specifications.

C. Apply roofing with side laps shingled with slope of roof deck where possible.

D. Seams: Clean seam areas, overlap roofing, and hot-air weld side and end laps of roofing and sheet flashings according to manufacturer's written instructions, to ensure a watertight seam installation.

1. Equipment: Use an Automatic Hot Air Welding Machine for all field seams. Hot Air Hand Welders are acceptable at flashings only.
2. Quality Control:

a. Probe all seams once the hot air welds have thoroughly cooled (approximately 30 minutes). Include name of person performing daily probing and evidence that probing was performed in Contractor’s Daily Report. Repair all seam deficiencies the same day they are discovered.

b. Seam Testing: Verify strength of seams on sample material a minimum of twice daily and provide samples or photographs of samples with Contractor’s Daily Report.

NOTE: failure to provide evidence of daily seam testing for both automatic and hand welding for review by A/E will result in seam testing performed on installed roofing at substantial completion.

Contractor shall provide repairs at all samples removed for seam testing. If seams do not comply with the minimum width specified, Contractor shall provide repair patches along all seams at all roof areas within 10,000 square feet of the noncompliant seam.

E. Roof Drains: Spread sealant bed over deck-drain flange at roof drains, and securely seal roofing in place with clamping ring.

F. Walk pads: Install walkpads at all roof access points, to and around all mechanical equipment requiring maintenance. Pads shall be heat welded on all sides, with minimum 3” space between pads for drainage.

3.5 FLASHING INSTALLATION

A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to roofing system manufacturer's written instructions.

B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.

E. Terminate, anchor and seal top of sheet flashings per manufacturer requirements.

3.6 SCUPPER INSTALLATION

A. Scupper widths shall be calculated by the designer of record, using the hydraulic method described in Appendix G of the SMACNA Manual, latest edition, with rainfall rates as required by the City of Austin Plumbing Code. Scuppers shall be sized in a manner to provide flow rates that prevent buildup of water depths above the maximum live load, as specified by the structural engineer for the project.

B. Coordinate scupper elevations to ensure positive drainage at primary scuppers over flashings and to comply with elevation requirements at overflow scuppers. Ponding at primary scuppers is basis for rejection and reinstallation of scupper at a lower elevation.

C. Install coated metal scupper sleeves according to roofing system manufacturer's written instructions.

D. Provide compatible sealants between scupper sleeve and exterior wall surfaces:
1. Air Seal: provide continuous seal behind cladding at air barrier plane.
2. Weather Seal: provide seal at top and sides of scupper at exterior face of cladding for cavity wall construction where a continuous air seal has already been provided. For non-cavity wall construction, provide continuous air/weather seal at exterior face of wall.

3.7 FIELD QUALITY CONTROL

A. Manufacturer’s Field Services:
1. The Contractor shall coordinate with the primary roofing material manufacturer’s representative to provide the following:
    a. Attendance at the pre-roofing conference;
    b. A minimum of four (4) site visits, one at commencement of construction, two during construction, and at substantial completion.
2. The Contractor shall obtain written reports of the visits and shall submit to the Owner and A/E, in accordance with Section 013300, Submittals.

B. Moisture Scan: In the event that the Contractor does not provide adequate daily seals during completion of the work and rainfall occurs, the Owner has the right to require a full moisture scan of all roofs with suspected moisture present under the membrane. Contractor shall replace wet roofing at their own expense identified during this moisture scan, prior to release of final payment by the Owner. Moisture scan shall be performed by either of the following test methods, within the recommended project ambient conditions:
1. ASTM D7954, Standard Practice for Moisture Surveying of Roofing and Waterproofing Systems Using Non-Destructive Electrical Impedance Scanners
2. ASTM C1153, Standard Practice for Location of Wet Insulation in Roofing Systems Using Infrared Imaging

C. Roofing system will be considered defective if it does not pass tests and inspections. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

3.8 PROTECTING AND CLEANING

A. Protect new and existing roofing systems from damage and wear during construction.

1. Loosely lay 1-inch- minimum thick, expanded polystyrene (EPS) insulation over existing roofing in areas indicated. Loosely lay 15/32-inch plywood or OSB panels over EPS. Extend EPS past edges of plywood or OSB panels a minimum of 1 inch.

2. Limit traffic and material storage to areas of existing roofing that have been protected.

3. Maintain temporary protection and leave in place until replacement roofing has been completed. When remaining construction does not affect or endanger roofing, remove protection and inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

C. Daily Cleaning:

1. Perform daily clean-up to collect all wrappings, empty containers, paper, and other debris from the project site. Upon completion, all debris must be disposed of in a legally acceptable manner.

2. Inspect all roof drainage components for blockage, immediately remove blockages found.

CONTRACTOR'S ROOFING WARRANTY

WHEREAS _____

of (Address) _____

herein called the "Contractor", has performed roofing and associated work on the following project.

Owner: _____

Address: _____

Number and Type of Building: _____

Address: _____

Area of Work: _____ Date of Acceptance_____

Warranty Period: TWO YEARS Date of Expiration _____

AND WHEREAS the Contractor has contracted with Owner to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period.

NOW THEREFORE the Contractor hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work, and as are necessary to maintain said work in watertight condition.

This Warranty is made subject to the following terms and conditions:

1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by: (a) lightning, windstorm, hailstorm, and other unusual phenomena of the elements; (b) fire; (c) failure of roofing system substrate including cracking, settlement, excessive deflection, deterioration, and decomposition; (d) faulty construction of vents, equipment supports, and other penetrations of the work; (e) repeated vapor condensation on bottom of roofing; and (f) activity on roofing by other persons including construction contractors and maintenance personnel, whether authorized or unauthorized by Owner. When work has been damaged by any of the foregoing causes, Warranty shall be null and void until such damage has been repaired by the Contractor, and until cost and expense thereof has been paid by the Owner or by another responsible party so designated.

2. The Contractor is responsible for work covered by this Warranty, but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.

3. The Contractor shall be responsible for repairing any defect attributable to Contractor's method or manner of installation of the roof membrane during the two-year period at Contractor's sole cost and expense.

    a. During the twenty-third (23rd) month following the Contractor's date of substantial completion, the Contractor shall have thirty days to coordinate and perform a roof inspection with the Roof Consultant, roof material manufacturer's representative and the Owner's representative.
    b. Contractor shall coordinate a roof inspection with the Roof Consultant, roof material manufacturer's representative and the Owner's representative during the ninety-day period preceding the expiration date of the Two-Year Contractor's Warranty.
    c. Failure to perform inspections specified in 3.a. and 3.b. and repair defects (if any) will be cause to consider the Contractor in default. The Owner will then submit written notice of default to the Contractor's bonding company.

4. During Warranty Period, if the Owner allows alterations of work by anyone other than the Contractor, including cutting, patching and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, the Warranty shall become null and void upon date of said alterations, but only to extent said alterations affect work covered by this Warranty. If the Owner engages the Contractor to perform said alterations, warranty shall not become null and void, unless the Contractor, prior to proceeding with said work, shall have notified the Owner in writing that said alterations would likely damage or deteriorate the work, thereby reasonably justifying a limitation or termination of this Warranty.

5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray cooled surface, flooded basin, or other use or service more sever than originally specified, this Warranty shall become null and void upon date of said change, but only to extent said changes affect work covered by this Warranty.

6. The Owner shall promptly notify the Contractor of observed, known, or suspected leaks, defect or deterioration, and shall afford reasonable opportunity for the Contractor to inspect the work, and to examine evidence of such leaks, defects or deterioration.

7. This Warranty is recognized to be the only Warranty of the Contractor on said work, and shall not operate to restrict or cut off the Owner from other remedies and resources lawfully available to him in cases of roofing failure. Specifically, this Warranty shall not operate to relieve the Contractor of responsibility for performance of original work.

IN WITNESS THEREOF, this instrument has been duly executed this ____ DAY of _____, 20___.

_____	_____
Signature	Firm Name
_____	_____
Typed Name and Title	Address
_____	_____
Telephone Number	City/State/Zip

END OF SECTION 075419

SECTION 075420 – HYBRID POLYVINYL-CHLORIDE (PVC) ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Qualifications, Standards and Materials for new roof assembly
2. Adhered 2-ply hybrid polyvinyl-chloride (PVC) or ketone ethylene ester (KEE) roofing system, smooth type.
3. Roofing accessory materials
4. Traffic pads

B. Related Requirements:

1. Section 061053 – Miscellaneous Rough Carpentry
2. Section 070150 - Preparation for Re-Roofing
3. Section 072200 - Roof and Deck Insulation
4. Section 076200 - Sheet Metal Flashing and Trim

1.3 DEFINITIONS

A. Roofing Terminology: Definitions in ASTM D 1079 and glossary in NRCA's "The NRCA Roofing and Waterproofing Manual" apply to work of this Section.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Roofing Conference:

1. After approval and review of all submittals by the Engineer, meet with Owner, Engineer, Owner's insurer if applicable, testing and inspecting agency representative, roofing installer, roofing system manufacturer's representative, and installers whose work interfaces with or affects roofing, including installers of roof accessories, masonry flashings, MEP contractor, and roof-mounted equipment.
2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
3. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review structural loading limitations of roof deck during and after roofing.
5. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.

6. Review governing regulations and requirements for insurance and certificates if applicable.
7. Review temporary protection requirements for roofing system during and after installation.
8. Review roof observation and repair procedures after roofing installation.

1.5 SUBMITTALS

A. Submit product data and shop drawings under provisions of appropriate Division 01 Section - Submittals.

B. Product Data: For each type of product.

C. Shop Drawings: For roofing system.
   1. Plans:
      a. Provide a roof plan indicating tapered insulation, fastening pattern zones, and locations of proposed details in the shop drawings.
      b. Coordinate roof plan with the Drawings, ensuring that a minimum clearance of 2’-0” is provided around all structural, mechanical, electrical, or plumbing penetrations.
   2. Details:
      a. Provide shop drawings indicating typical and standard roofing details (subject to contract document requirements), including:
         1) Base flashings, penetrations, and membrane terminations.
         2) Fastening patterns for field, perimeter, and corners.
      b. Contractor shall coordinate the AISD minimum flashing height requirement of 12 inches above finished roof with all curbs and penetrations through the roof system provided by structural, mechanical, electrical, or plumbing scopes of work. The minimum height of curbs and penetrations required to comply with this requirement shall be provided regardless of less stringent requirements in other specification sections.

D. Qualification Data: For Installer and manufacturer, complying with the requirements set forth in the “Quality Assurance” item of this section.

E. Manufacturer Certificate:

Provide project specific system letter, signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article. Include evidence of compliance, including:

1. Compliance with performance requirements.
2. Roofing system components are listed for the project.
3. Components are physically and chemically compatible for installation as designed.
4. All proposed materials, including those by other manufacturer, are acceptable to membrane manufacturer for use in system.
5. Proposed system meets all criteria for issuance of required manufacturer's warranty
6. Identify fastening patterns to be used in field, perimeter, and corner, based on third party test data.
7. Specifically identify and define any deviations.

F. Product Test Reports: For components of roofing system, for tests performed by manufacturer and witnessed by a qualified testing agency. Test reports must indicate they meet or exceed the uplift pressures shown in the Drawings.

G. Research/Evaluation Reports: For components of roofing system, from ICC-ES.

H. Laboratory Test Reports:

1. For each adhesive used, provide documentation indicating that the adhesive contains no urea formaldehyde.
2. For each adhesive used, provide documentation of VOC content.

I. Plan for protecting installed materials during construction and staged materials..

J. Sample Warranties: Manufacturer's special warranties.

K. All torching operations must be performed by CERTA (Certified Roofing Torch Applicator) trained applicators with up to date certifications. Submit copies of certifications for all torch operators.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For roofing system to include in maintenance manuals.

B. Manufacturer’s and Installer’s Warranties

C. As built drawings.

1.7 QUALITY ASSURANCE

A. General: Competition shall be maintained at every level of the project, including the following:

1. Architect/Engineer shall not be affiliated with or be employed by a Manufacturer or Contractor.
2. Manufacturer shall not be affiliated with or provide compensation to Architect/Engineer. Selection of manufacturer shall be open and based on product performance meeting or exceeding the requirements of this Section.
3. Contractor shall be selected on a competitive basis, in a manner that reviews submitted cost, qualifications, and previous project experience.

B. Roof Consultant:

1. All projects or parts of projects that include roof top equipment, conduits, duct work, penetrations, and plumbing need to be reviewed by a roofing consultant. The roofing consultant shall be involved early in the design phase, prior to issuance of the 50% Construction Document set for AISD review. Refer to the AISD list of approved roof consultants.

C. Manufacturer:

1. Company specializing in manufacturing the products specified in this Section with a minimum of five years documented experience.

2. Obtain primary products, including roof membrane, base flashings, membrane adhesives and adhesives products from a single manufacturer. Provide secondary products recommended by the manufacturer of primary products for use with roofing system provided.

3. The roofing systems manufacturer shall provide non-sales related field auditors for the purpose of performing quality assurance inspections, both in-progress and final inspections. Provide copies of the manufacturer's field auditor inspection report to the contractor, roof consultant, and building owner.

D. Contractor:

1. Be currently approved and certified to install low slope roof systems that qualify for the primary roofing material manufacturer's 20-Year No Dollar Limit (NDL) Guarantee; and use only skilled roofers completely familiar with the products and the manufacturer's current recommended methods of installation.

2. Contractor shall maintain a permanent office for conduct of business and shall operate its own full-service sheet metal shop.

3. Submit a letter from the roofing material manufacturer proposed for the project, stating that your company has been an approved and certified applicator for a minimum of three (3) years prior to the bid date, and that your company is approved to install that manufacturer's Twenty (20) Year No Dollar Limit (NDL) Guarantee.

4. Successful completion of minimum three (3) similar projects during that time. Project experience submitted must include those projects performed with proposed subcontract labor (if applicable). Contractor to provide project reference contact names, phone numbers, and emails as part of submittal process.

5. Evidence of Contractor's qualification to do business in the State of Texas where the project is located or covenant to obtain such qualification prior to award of the contract.

6. All torching operations must be performed by CERTA (Certified Roofing Torch Applicator) trained applicators with up to date certifications.

7. Workers:

   a. Project Manager and Superintendent: Minimum five years roofing experience and employed by Contractor for a minimum one year prior to Bid Date.
   b. Non-working Full Time Superintendent: Able to communicate effectively with School staff and Applicator's workers and employed by Contractor for a minimum one year prior to Bid Date. PROVIDE A FULL TIME SUPERINTENDENT AT ALL TIMES ROOFING WORK IS IN PROGRESS. Failure to provide full time supervision of the work will result in immediate stoppage of the work by A/E until specified supervision is provided by the Contractor.
   c. Designate a responsible Project Manager or Superintendent to inspect all installed Work, particularly tie-ins and temporary flashings, at end of each working day and as otherwise required to ensure water-tightness.

      1) Verify Inspection by signature on approved Daily Inspection Form signifying installation is in accordance with specified requirements.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle materials in accordance with manufacturer's printed instructions. Deliver materials in manufacturer's original wrappers, dry, and undamaged with seals and labels intact.

B. Overnight rooftop storage of materials is prohibited unless approved by AISD. All materials shall be stored in a secure manner to avoid damage, danger to occupants, or theft.

1. If inside storage is not available at the job site, protect materials by covering with breathable tarpaulins. Polyethylene covers are not acceptable field storage coverings.
2. Store rolled goods on end on raised platforms, and protected from the weather until installed in the roofing system.

C. Damaged materials (moisture, fire, or other) resulting from noncompliant storage practices shall be removed and replaced at Contractor's expense. Water stains on insulation facers will be deemed as damaged and require to be removed from the project.

D. Adhesives, flashing cements, and pail goods must be stored inside lockable trailers and in original containers with lids tightly in place.

1.9 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1. Do not apply roofing membrane during inclement weather.
2. Do not apply roofing membrane to damp or frozen substrates.
3. Observe wind chill and other cold weather conditions for proper application.
4. The Contractor shall have the final decision as to whether to chance roofing operations in the event wet conditions threaten,
5. The Contractor shall suspend Work, if in his/her opinion, wind speed will impede the proper installation of the roofing Work, or cause a danger to its personnel, or the Owner's property.

1.10 WARRANTY

A. Installer: Provide a two-year Installer's warranty covering defects in the roofing materials and labor, on the form provided at the end of this Section. Contractor shall provide a warranty walk with the district's roof consultant prior to expiration of this warranty to identify items requiring repair under the terms of the warranty.

B. Manufacturer's Warranty:

1. Provide manufacturer's twenty (20) year "non-prorated, no dollar limit" system warranty shall cover product quality, performance and workmanship, including roofing and membrane flashings. ~~Provide the roofing materials manufacturer's 20-year no-dollar-limit type warranty covering repair of defects in the insulation, roofing and flashings. Commence all warranties on the Date of Substantial Completion for the overall project.~~
2. Warranty shall include insulation, coverboard, and roof membrane from roof surface up into parapet cap without exclusions.

3. Warranty shall include full cost of repair and replacement of all damaged roof assembly components.
4. The manufacturer's warranty shall commence upon the project's date of substantial completion.

C. Wind Rider:
1. Warranty shall provide coverage for 3-second wind gusts of up to 90 miles per hour. ~~Manufacturer's warranty to include wind speed coverages up to 90 mph.~~
2. Warranty pricing shall include inspections as required by the Manufacturer after wind events exceeding 55 mph or major storm events

D. Hail Rider: Warranty shall include coverage for damage up to 2" diameter hail.

E. Provide Roof Warranty Signs at the completion of the project, a minimum of one (1) sign is required at each distinct roof area. Signs shall be placed on roof at locations determined by the Owner. Provide stainless steel screws for attachment of signage.
1. Warranty Signs: 24" x 24" x .080 aluminum with a baked enamel background and black lettering, in a non-penetrating manner, to read as follows:

WARNING:
ROOF AREA: (Roof designation)
ROOF WARRANTY NO.: (Warranty number)
THIS ROOF IS UNDER WARRANTY UNTIL
(Date)
(MANUFACTURER)
(Manufacturer's Phone No.)

DO NOT MAKE ALTERATIONS OR REPAIRS
TO THIS ROOF WITHOUT APPROVAL FROM AISD

CONTACT
AISD DEPARTMENT OF CONSTRUCTION MANAGEMENT Help Desk
512-414-8940
FOR APPROVAL AND/OR TO REPORT DAMAGE REQUIRING REPAIRS

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. FiberTite
B. Carlisle-Syntec Inc.
C. IB Roof Systems, Inc.
D. GAF
E. Siplast
F. Pre-bid approved equivalent.

2.2 PERFORMANCE REQUIREMENTS

A. General Performance: Installed roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roofing and base flashings shall remain watertight.

1. Accelerated Weathering: Roofing system shall withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.
2. Impact Resistance: Roofing system shall resist impact damage when tested according to ASTM D 3746 or ASTM D 4272.

B. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience.

C. Roof System Design: Provide a roofing system that meets or exceeds the more stringent of the following designations:

1. Provide a roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist wind uplift pressures calculated according to ASCE 7, edition as adopted by the current City of Austin Building Code.
2. Wind Uplift Resistance Values: A minimum of two (2.0) times the wind uplift pressures. Contractor shall submit the calculated wind uplift resistance values for the selected roof membrane, as well as the actual calculations performed by the roof membrane manufacturer.

D. Approval Standards: Meet testing standards of FM 4450 and FM 4470.

E. Solar Reflectance Index: Minimum initial solar reflectance of 0.70 and initial thermal emittance of 0.75, OR minimum initial solar reflectance index of 82.

F. Energy Performance: Refer to Section 018113, Sustainable Construction Requirements.

G. Exterior Fire-Test Exposure: ASTM E 108 or UL 790, Class A; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

H. Fire-Resistance Ratings: Comply with fire-resistance-rated assembly designs indicated. Identify products with appropriate markings of applicable testing agency.

2.3 ROOF MEMBRANE

A. PVC with KEE Fleeceback membrane

1. Fibertite, 50 mil XT-FB
2. Carlisle-Syntec Inc., 60 mil FleeceBACK KEE HP
3. IB Roof Systems, Inc., IB PVC Single-Ply ChemGuard80-FB
4. GAF, 80 MIL PVC XK Fleeceback
5. Siplast, 60 mil Parasolo PVC KEE Fleeceback

B. Modified Base Ply

1. SBS modified base ply, torch-grade, 120 mils minimum thickness, and meets ASTM D6164, or approved equivalent.

2.4 AUXILIARY ROOFING MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with roofing.

B. Mechanically fastened base sheet at lightweight insulated decks: refer to Section 072200, required regardless of presence of rigid insulation or coverboard materials in roof membrane system.

C. Sheet flashing:

1. PVC: Provide 60 mil thick flashing membrane for use with 80 mil PVC roof membranes with KEE.
2. KEE: Provide 50 mil thick flashing membrane for use with 50 mil KEE roof membrane.

C. Bonding Adhesive: Manufacturer's standard.

D. Slip Sheet: Manufacturer's standard, of thickness required for application.

E. Metal Termination Bars: Manufacturer's standard, pre-drilled stainless-steel or aluminum bars, approximately 1 by 1/8-inch thick, pre-punched at 6” o.c.; with anchors.

F. Metal Battens: Manufacturer's standard, aluminum-zinc-alloy-coated or zinc-coated steel sheet, approximately 1-inch wide by 0.05 inch thick, pre-punched.

G. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Global 4470, designed for fastening roofing to substrate, and acceptable to roofing system manufacturer.

H. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

I. Membrane Coated Metal: Manufacturer's standard 24 gauge, G-90 galvanized metal sheet, coated with PVC membrane coating.

J. Color: As selected by Owner.

K. PVC Self-Adhered Membrane Flashings: Manufacturers pressure sensitive cover strips or standard self-adhered PVC membrane.

L. Liquid Flashings: Manufacturer’s cold applied two-component flashings system with reinforcing fleece and compatible with the roof membrane.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Ensure that surfaces and site conditions are ready to receive Work and are acceptable to membrane manufacturer for required warranty.

B. Ensure existing roof surface is clean and smooth, free of depressions, waves or projections and is properly sloped to drains or eaves.

C. Ensure that roof surfaces are dry and free of snow or ice. Confirm dryness in the field by moisture meter; maximum allowable: 12-percent.

D. Ensure that roof openings, curbs, pipes, sleeves, ducts and vents through roof are solidly set, and any required wood nailing strips are in place.

E. Beginning of installation means installer accepts existing surfaces.

3.2 PREPARATION

A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.

B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

C. Install insulation strips according to acoustical roof deck manufacturer's written instructions.

3.3 ROOFING INSTALLATION, GENERAL

A. Install roofing system according to roofing system manufacturer's written instructions.

B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at end of workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

C. Install roofing and auxiliary materials to tie in to existing roofing to maintain weathertightness of transition and to prevent voiding of manufacturer’s warranty for existing roofing system.

D. Mechanically fastened base sheet at lightweight insulated decks: Install as specified in Section 072200, required regardless of presence of rigid insulation or coverboard materials in roof membrane system.

3.4 ADHERED ROOFING INSTALLATION

A. Base Ply Installation:

1. Apply roof system in strict accordance with manufacturer's published recommendations. Do not use membrane roll hooks in a manner that damages roof ply during torching operations.
2. Heat weld SBS base ply membrane in accordance with the manufacturer's published instructions.
3. Base Ply Membrane Application: Over the specified insulation system, embed the base ply, starting at the low point, laying sheets at a right angle to the slope of the deck, heat welding to the specified substrate, lapping sides and ends a minimum of 3 inches. Ensure sufficient "bleed out" along laps to provide full adhesion without damaging membrane.
4. Perform light rolling or brooming promptly to eliminate air pockets, wrinkles, creases, and fishmouths, and to insure proper adhesion.
5. Extend base ply up cant strips, extending two inches (2") minimum above cant. Lap end joints at least 3 inches.
6. Install base ply continuously in one direction from the field of the roof to the top of the cant.
7. At end laps, cut the under ply side lap 45 degrees as recommended by the membrane Manufacturer.
8. Prevent foot or vehicle traffic from crossing newly laid base ply sheets until bitumen cools to below softening point.
9. Install water cutoffs at the end of the day's operation. Remove prior to resuming additional work. Seal perimeters into watertight condition.

B. PVC Fleeceback Membrane Adhesive:
1. Apply bonding adhesive as a continuous spray, or in ribbons spaced no more than 4" o.c. and dispensing adhesive at the rate in accordance with the manufacturer's published instructions, to the exposed underside of the membrane and the corresponding substrate area.
2. Do not apply bonding adhesive along the splice edge of the membrane to be hot air welded over the adjoining sheet. Allow the adhesive to dry until it is tacky but will not string or stick to a dry finger touch.

C. PVC Fleeceback Membrane Installation:
1. Roll the membrane into the substrate while avoiding wrinkles. Roll the bonded section of the membrane sheet immediately after rolling the membrane into the adhesive with a 150 lb, 24" diameter roller to achieve maximum contact.
2. Fold back the un-bonded half of the sheet lengthwise and repeat the bonding procedures.

D. Mechanical Fasteners: In addition to adhering, mechanically fasten roofing securely at terminations, penetrations, and perimeter of roofing in accordance with manufacturer requirements.

E. PVC Fleeceback Membrane Placement:
1. Apply roofing with side laps shingled with slope of roof deck where possible. Position adjoining sheets to allow a minimum overlap of 2 inches.
2. Continue to install adjoining membrane sheets in the same manner, overlapping edges a minimum of 2 inches and complete the bonding procedures as stated previously, in accordance with the manufacturer's specifications.

F. Apply roofing with side laps shingled with slope of roof deck where possible.

G. Seams: Clean seam areas, overlap roofing, and hot-air weld side and end laps of roofing and sheet flashings according to manufacturer's written instructions, to ensure a watertight seam installation.

1. Equipment: Use an Automatic Hot Air Welding Machine for all field seams. Hot Air Hand Welders are acceptable at flashings only.

2. Quality Control:

a. Probe all seams once the hot air welds have thoroughly cooled (approximately 30 minutes). Repair all seam deficiencies the same day they are discovered.

b. Seam Testing: Verify strength of seams on sample material a minimum of twice daily, and provide samples or photographs of samples with Contractor's Daily Report. NOTE: failure to provide evidence of daily seam testing for both automatic and hand welding for review by A/E will result in seam testing performed on installed roofing at substantial completion. Seam welds require to be a minimum of 1-1/2 inch.

Contractor shall provide repairs at all samples removed for seam testing. If seams do not comply with the minimum width specified, Contractor shall provide repair patches along all seams at all roof areas within 10,000 square feet of the noncompliant seam.

H. Roof Drains: Spread sealant bed over deck-drain flange at roof drains, and securely seal roofing in place with clamping ring.

I. Cut Edge Sealant: Apply manufacturer's sealant to all cut edges of reinforced membrane.

3.5 SCUPPER INSTALLATION

A. Scupper widths shall be calculated by the designer of record, using the hydraulic method described in Appendix G of the SMACNA Manual, latest edition, with rainfall rates as required by the City of Austin Plumbing Code. Scuppers shall be sized in a manner to provide flow rates that prevent buildup of water depths above the maximum live load, as specified by the structural engineer for the project.

B. Coordinate scupper elevations to ensure positive drainage at primary scuppers over flashings and to comply with elevation requirements at overflow scuppers. Ponding at primary scuppers is basis for rejection and reinstallation of scupper at a lower elevation.

C. Install coated metal scupper sleeves according to roofing system manufacturer's written instructions.

D. Provide compatible sealants between scupper sleeve and exterior wall surfaces:
1. Air Seal: provide continuous seal behind cladding at air barrier plane.
2. Weather Seal: provide seal at top and sides of scupper at exterior face of cladding for cavity wall construction where a continuous air seal has already been provided. For non-cavity wall construction, provide continuous air/weather seal at exterior face of wall.

3.6 SCUPPER INSTALLATION

A. Scupper widths shall be calculated by the designer of record, using the hydraulic method described in Appendix G of the SMACNA Manual, latest edition, with rainfall rates as required by the City of Austin Plumbing Code. Scuppers shall be sized in a manner to provide flow rates that prevent buildup of water depths above the maximum live load, as specified by the structural engineer for the project

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   1. Air Seal: provide continuous seal behind cladding at air barrier plane.
   2. Weather Seal: provide seal at top and sides of scupper at exterior face of cladding for cavity wall construction where a continuous air seal has already been provided. For non-cavity wall construction, provide continuous air/weather seal at exterior face of wall.

3.7 FLASHING INSTALLATION

A. After SBS base ply field sheet has been applied to the top of the cant, install the sheet flashing in uniform cold adhesive to the vertical substrate, cant and roof level. Lap each adjacent sheet three inches and extend the cant onto the roof surface by six (6) inches. Mechanically fasten sheet flashing eight inches on-center to vertical surface. At torch-welded flashings, install the sheet flashing in accordance with the primary membrane manufacturer's published recommendations and details.

B. After installation of PVC membrane install sheet flashings and preformed flashing accessories, and adhere to substrates according to roofing system manufacturer's written instructions. Heat weld all edge flashings to coated metal edge fascia, ensuring that strip in membrane fully covers all horizontal portions of edge fascia.

C. Apply bonding adhesive to substrate and underside of sheet flashing at required rate, and allow to partially dry. Do not apply to seam area of flashing.

D. Flash penetrations per manufacturer requirements and the Drawings.

E. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.

F. Terminate, anchor and seal top of sheet flashings per manufacturer requirements, incorporating any additional requirements indicated in the Drawings.

3.8 FIELD QUALITY CONTROL

A. Manufacturer’s Field Services:

1. The Contractor shall coordinate with the primary roofing material manufacturer's representative to provide the following:
   a. Attendance at the pre-roofing conference;
   b. A minimum of four (4) site visits, one at commencement of construction, two during construction, and at substantial completion.
2. The Contractor shall obtain written reports of the visits and shall submit to the Owner and A/E, in accordance with Section 013300, Submittals.

B. Moisture Scan: In the event that the Contractor does not provide adequate daily seals during completion of the work and rainfall occurs, the Owner has the right to require a full moisture scan of all roofs with suspected moisture present under the membrane. Contractor shall replace wet roofing at their own expense identified during this moisture scan, prior to release of final payment by the Owner. Moisture scan shall be performed by either of the following test methods, within the recommended project ambient conditions:
1. ASTM D7954, Standard Practice for Moisture Surveying of Roofing and Waterproofing Systems Using Non-Destructive Electrical Impedance Scanners
2. ASTM C1153, Standard Practice for Location of Wet Insulation in Roofing Systems Using Infrared Imaging

C. Roofing system will be considered defective if it does not pass tests and inspections. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

3.9 PROTECTING AND CLEANING

A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

C. Daily Cleaning:
1. Perform daily clean-up to collect all wrappings, empty containers, paper, and other debris from the project site. Upon completion, all debris must be disposed of in a legally acceptable manner.
2. Inspect all roof drainage components for blockage, immediately remove blockages found.

CONTRACTOR'S ROOFING WARRANTY

WHEREAS _____

of (Address) _____

herein called the "Contractor", has performed roofing and associated work on the following project.

Owner: _____

Address: _____

___

Number and Type of Building: _____

Address: _____

Area of Work: _____ Date of Acceptance_____

Warranty Period: TWO YEARS Date of Expiration _____

AND WHEREAS the Contractor has contracted with Owner to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period.

NOW THEREFORE the Contractor hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work, and as are necessary to maintain said work in watertight condition.

This Warranty is made subject to the following terms and conditions:

1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by: (a) lightning, windstorm, hailstorm, and other unusual phenomena of the elements; (b) fire; (c) failure of roofing system substrate including cracking, settlement, excessive deflection, deterioration, and decomposition; (d) faulty construction of vents, equipment supports, and other penetrations of the work; (e) repeated vapor condensation on bottom of roofing; and (f) activity on roofing by other persons including construction contractors and maintenance personnel, whether authorized or unauthorized by Owner. When work has been damaged by any of the foregoing causes, Warranty shall be null and void until such damage has been repaired by the Contractor, and until cost and expense thereof has been paid by the Owner or by another responsible party so designated.

2. The Contractor is responsible for work covered by this Warranty, but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.

3. The Contractor shall be responsible for repairing any defect attributable to Contractor's method or manner of installation of the roof membrane during the two-year period at Contractor's sole cost and expense.

    a. During the twenty-third (23rd) month following the Contractor's date of substantial completion, the Contractor shall have thirty days to coordinate and perform a roof inspection with the Roof Consultant, roof material manufacturer's representative and the Owner's representative.
    b. Contractor shall coordinate a roof inspection with the Roof Consultant, roof material manufacturer's representative and the Owner's representative during the ninety-day period preceding the expiration date of the Two-Year Contractor's Warranty.

c. Failure to perform inspections specified in 3.a. and 3.b. and repair defects (if any) will be cause to consider the Contractor in default. The Owner will then submit written notice of default to the Contractor's bonding company.

4. During Warranty Period, if the Owner allows alterations of work by anyone other than the Contractor, including cutting, patching and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, the Warranty shall become null and void upon date of said alterations, but only to extent said alterations affect work covered by this Warranty. If the Owner engages the Contractor to perform said alterations, warranty shall not become null and void, unless the Contractor, prior to proceeding with said work, shall have notified the Owner in writing that said alterations would likely damage or deteriorate the work, thereby reasonably justifying a limitation or termination of this Warranty.

5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray cooled surface, flooded basin, or other use or service more sever than originally specified, this Warranty shall become null and void upon date of said change, but only to extent said changes affect work covered by this Warranty.

6. The Owner shall promptly notify the Contractor of observed, known, or suspected leaks, defect or deterioration, and shall afford reasonable opportunity for the Contractor to inspect the work, and to examine evidence of such leaks, defects or deterioration.

7. This Warranty is recognized to be the only Warranty of the Contractor on said work, and shall not operate to restrict or cut off the Owner from other remedies and resources lawfully available to him in cases of roofing failure. Specifically, this Warranty shall not operate to relieve the Contractor of responsibility for performance of original work.

IN WITNESS THEREOF, this instrument has been duly executed this _ DAY of _____, 20___.

Signature	Firm Name
Typed Name and Title	Address
Telephone Number	City/State/Zip

END OF SECTION

ROOF ACCESSORIES
SECTION 077200

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Furnishing and installing non-penetrating condensing unit platform with supports for electrical disconnects on roof surfaces.

B. Installation of rooftop supports for equipment, pipe/conduit, and ductwork as required for the Project.

1.2 SUBMITTALS

A. Product Data: Submit for all products proposed for use, describing physical characteristics and method of installation.

B. Shop Drawings: Dimensioned Shop Drawings: Before beginning fabrication of equipment submit scaled, project specific shop drawings showing layout, profiles and product components, including fastener types, spacing, accessories and component finishes, along with general arrangement of the equipment and their working positions.

C. Contract Closeout: Provide applicable manufacturer’s warranties prior to the contract closeout.

1.3 QUALITY ASSURANCE

A. Manufacturer's standard warranty: Materials shall be free of defects in material and workmanship for a period of five years from the date of purchase. Should a part fail to function in normal use within this period, manufacturer shall furnish a new part at no charge. Electrical motors, special finishes, and other special equipment (if applicable) shall be warranted separately by the manufacturers of those products.

B. Manufacturer Qualifications: Company specializing in manufacturing specified systems, with a minimum of eight years of documented experience.

C. Installer Qualifications: Company approved by manufacturer with not less than five years of experience in installation of specified systems.

D. Source Limitations: Obtain all accessories from the same manufacturer as the specified products.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Packing and Shipping: Deliver all components in Manufacturer's pre-bundled protective wrapping, clearly labeled for type and location in building.

B. Storage and Protection: Store components above ground, protected from exposure to the elements and from physical damage caused by other construction activities. Rusted, bent, warped or otherwise damaged units will not be accepted.

PART 2 – PRODUCTS

2.1 EQUIPMENT PLATFORMS AND PIPE/CONDUIT SUPPORTS:

A. Manufacturer:
1. Acceptable Manufacturer: PHP Systems/Design i.e. Portable Pipe Hangers; 5534 Harvey Wilson Drive, Houston, Texas 77020. ASD. Tel: (800) 797-6585. Fax: (713) 672-1170. www.phpsd.com. Email:info@phpsd.com.
2. Pre-bid approved equivalent.

B. APPLICATIONS
1. Equipment Platform Supports: Portable Pipe Hanger Model number RTU-20 or pre-bid approved equivalent. Custom design system to fit equipment to be installed and actual conditions of service and loading.
2. Pipe/Conduit Supports:
   a. Support pipes, conduit, cable trays, and ducting, a minimum of 8 inches (203 mm) above roof surface.
   b. Support Spacing: 10 feet MAXIMUM.
   c. For Electrical and Gas Lines 2-1/2 inches (64 mm) in diameter or less, up to 10 inches (254 mm) above roof; Portable Pipe Hanger Model number SS8.
   d. For Electrical and Gas Lines 3-1/2 inches (89 mm) in diameter or less, up to 16 inches (406 mm) above roof; Portable Pipe Hanger Model number PP10.
   e. For Gas Lines 4 to 6 inches (100-150 mm) in diameter, up to 12 inches (305 mm) above roof; Portable Pipe Hanger Model number RB18.
   f. For single Electrical and Gas Lines 3 to 8 inches (80-200 mm) in diameter; Portable Pipe Hanger Model number PS 1-2.
   g. For Multiple Lines: Portable Pipe Hanger Model number PSE custom.
   h. Accessories for PSE Custom and Other Applications when required.
      i. Un-insulated Piping: Roller support or clevis hanger.
      ii. Insulated Piping: Band hanger supported from horizontal channel or clevis hanger with Insulation Protection Shield.
      iii. Conduit: Band hanger supported from horizontal channel.
      iv. Bracing required when using base with swivel; when pipe exceeds 24 inches (610 mm) above roof, or when thermal expansion of pipe is great.

C. Portable Support System: Engineered, portable system specifically designed for installation without the need for roof penetrations, or flashings, and without causing damage to the roofing membrane.
1. Design system using high density, high impact polypropylene bases with carbon black, anti-oxidants for UV protection, and stainless steel framing of 1-5/8 inch (41 mm) B22TH or 1-7/8 inch (48 mm) BTS22TH for support.
2. Custom design system to fit piping, conduits, equipment to be installed and actual conditions of service and loading.
3. Piping Supports: Provide suitable hangers and supports.
4. Equipment Supports: Factory fabricated to support exact duct sizes and equipment to be installed.

D. Bases: Injection molded high density, high impact polypropylene with UV-inhibitors and anti-oxidants, conforming to the following:

1. Moisture Content: Negligible.
2. Shrinkage/Swelling Due to Moisture: Negligible.
3. Density: 55.8 lb/cu ft (894 kg/cu m).
4. Insect Resistance: No known insect damage potential.
5. Chemical Resistance (oil, brake fluid, gasoline, diesel, antifreeze, battery acid, and sulfuric acid) No visual or physical change apparent.
6. Flammability: No ignition after 10 minutes, 25 kW/m, when tested in accordance with ASTM D 1929.
7. Sized as required by loading conditions and as indicated on the drawings.
8. Shop fabricated with inserts for square tubing or threaded rods as required.
9. Color: Integral black color as molded.
10. Bases for Mechanical Attachment: Sealant chamber around penetration point, with injection port for sealing after fastening; beveled lip for sealant bead around entire diameter.
11. Do not use bases containing carbonated plastics, press molded recycled rubber and plastics, steel, stainless steel, or any injection molded threaded receivers.

E. Pipe Supports and Hangers: Conform to MSS SP-58 and MSS SP-69 and as follows:
1. Fabricated of stainless steel; finished same as framing.
2. Sizes 2-1/2 inch (63 mm) and smaller: Single roller supports for piping subject to expansion and contraction; 3-sided channels and pipe clamps.
3. Sizes 3 inch (76 mm) and larger: Rollers, clevis hangers, or band hangers, to allow for expansion and contraction without movement of the bases or framing.

F. Stainless Steel Framing:
1. Channel Types: 1-5/8 inch (41.3 mm) or 1-7/8 inch (47.6 mm), as required for loading conditions.
2. Thickness: 12 gage (2.7 mm).
3. Form: Roll-formed 3-sided or tubular channel.
4. Finish: Mill finish.
5. Do not use tubing or tube steel.
6. Fasteners: stainless steel.

G. Accessories: Clamps, bolts, nuts, washers, and other devices as required for a complete system.
1. Stainless Steel: Mill finish.
2. Welded Steel Grating:
   a. Metal Bar Grating Standards: Comply with NAAMM MBG 531, "Metal Bar Grating Manual" and NAAMM MBG 532, "Heavy-Duty Metal Bar Grating Manual."
   b. Bearing Bar Spacing: 15/16 inch (24 mm) o.c.
   c. Bearing Bar Depth: As required to comply with structural performance requirements.
   d. Bearing Bar Thickness: As required to comply with structural performance requirements.
   e. Crossbar Spacing: 4 inches (102 mm) o.c.
   f. Grating Mark: As indicated.
   g. Traffic Surface: Applied abrasive finish consisting of aluminum-oxide aggregate in an epoxy-resin adhesive.
   h. Steel Finish: Hot-dip galvanized with a coating weight of not less than 1.8 oz./sq. ft. (550 g/sq. m) of coated surface.

3. Ballast:
   i. Hanover Architectural Products, Standard Walkway & Ballast Paver, or equivalent concrete paver with a minimum weight of 23 psf.
   j. Provide one (1) paver on each side of condensing unit secured to welded steel grating, for a total of two (2) pavers. Provide stainless steel straps to secure pavers to grating.

PART 3 - EXECUTION

3.1 INSTALLATION – SUPPORTS

A. Install in accordance with manufacturer's instructions.

B. Clean surfaces of roof in areas to receive portable support bases.

C. Remove dirt, dust, oils, and other foreign materials.

D. Use care in handling portable support system components during installation, to avoid damage to roofing, flashing, equipment, or related materials.

E. Pipe, Cable, and Equipment Support Systems
1. Locate bases and support framing as indicated on drawings and as specified herein. Provide complete and adequate support of all piping, ducting, and conduit; whether or not all required devices are shown.
2. The use of wood for supporting piping is not permitted.
3. Provide support spacing so deflection of piping does not exceed 1/240 of span.
4. Install framing at spacing indicated, but in no case at greater than 10 feet (3 m) on center.
   a. Accurately locate and align bases.
   b. Consult manufacturer of existing or new roofing system as to the type of protection pads required between the roof and base.
   c. Adhere bases to protection pads.
5. Set framing posts into bases and assemble framing structure as indicated.

F. Equipment Supports
1. Locate bases and support framing as indicated on drawings and as specified herein. Provide complete and adequate support of all structures.
2. Accurately locate and align bases.
   a. Consult manufacturer of existing or new roofing system as to the type of isolation pads required between the roof and base.
   b. Adhere bases to roof membrane manufacturer approved protection pads in accordance with roof membrane manufacturer’s installation requirements.
3. Set legs of substructures into bases as indicated.
4. Secure equipment and ballast to welded steel grating with stainless steel fasteners. Provide additional framing secured to platform for electrical disconnect boxes.

3.2 CLEANING AND PROTECTION

A. Remove all packaging, unused fasteners, adhesive and other installation materials from the project site.

B. Remove adhesive from exposed surfaces of supports and bases, and leave the work area in clean condition.

C. Provide protection as required, leaving the work area in undamaged condition at the time of completion of work.

END OF SECTION

DOOR HARDWARE
SECTION 087100

PART 1 - GENERAL

1.1 SCOPE

A. Work under this section is comprised of furnishing and installing door hardware specified herein and noted on the drawings, for a complete and operational system, including any electrified hardware components, systems and controls.

B. Product and hardware schedule submittals.

C. Installation and services for all permanent keyed cores and key cabinet setup specified shall be included per the pre-authorized locksmith allowance, as outlined herein.

1.2 RELATED DOCUMENTS

A. Drawings and general conditions of contract, including general and supplementary conditions, and Division 1-specification sections, apply to this section.

1.3 RELATED WORK

A. Specified elsewhere that should be examined for its effect upon this section:

1. Section 062000 – Finish Carpentry

2. Section 081100 – Standard Steel Doors & Frames

3. Section 081400 – Wood Doors

4. Section 084113 – Aluminum Framed Entrances

5. Section 087113 – Automatic Door Operators

6. Division 28 – Electronic Access Control and Intrusion Detection

1.4 HARDWARE COMPLIANCE

A. Provide only hardware that has been tested and listed by UL for types and sizes of doors required and complies with requirements of door and door frame. All hardware used on fire labeled openings will be listed for those types of openings and bear the identifying label indicating UL (Underwriter's Laboratories) approved for use on fire doors.

B. All hardware specified herein will be in compliance with:

1. NFPA-80 - Standard for Fire Doors and Windows
2. NFPA-101- Life Safety Code
3. ADA, the Americans with Disabilities Act – title III – Public Accommodations
4. ANSI-A 117.1 – American National Standards Institute – Accessible and Usable Buildings and Facilities
5. UL – Underwriter's Laboratories
6. WHI – Warnock Hersey International, Division of INCHAPE Testing Services
7. TAS - Texas Accessibility Standards
8. State and local codes including authority having jurisdiction

1.5 GENERAL

A. Installation of door hardware is by SECTION 062000: Finish Carpentry. Hardware will be fitted prior to the painting and then removed. After painting is completed, final installation of the hardware will be made.

B. Finish hardware must be neatly and properly installed in accordance with the best practices as approved by AISD or an AISD designated representative. All hardware must be thoroughly clean when it is turned over to AISD.

C. No extra cost will be allowed because of changes or corrections necessary to facilitate the proper installation of any hardware. The General

Contractor will be responsible for the proper fabrication of all work or materials to receive the hardware.

D. Any specified hardware not specifically mentioned herein will be called to the attention of the Architect during the bidding period so that an addendum may be prepared to cover such items. It will be the responsibility of the successful bidder to furnish all required door hardware, whether or not herein mentioned, unless excluded from this section of the specifications.

E. "AISD facilities operate in multiple security modes and change modes independently. The AISD Police Department has no interest in electronic "programming" of its approximately 2,500 card access doors. Changing of security modes is handled at the facility using mechanical means. This allows facility managers to lock the facility all-the-time, unlock doors during peak-traffic-periods, or lock doors only evenings/weekends. Security modes can, in this way be modified immediately at the discretion of Principals/facility managers."

1.6 QUALIFICATIONS

A. The door hardware supplier will be a person or firm technically proficient and experienced in this trade, who has been furnishing "Institutional Grade" hardware in the Austin area or within a fifty (50) mile-radius for not less than five (5), years and will be responsible for properly detailing and fitting material to the conditions required by the Drawings.

B. Hardware supplier to be a qualified "direct distributor" of the products to be furnished. In addition, the supplier is to have, in their employment, an A.H.C. representative, certified by the "Door and Hardware Institute", who will be made available at reasonable times to consult with the Architect, Contractor and AISD Project Manager, regarding any matters affecting the door hardware.

C. Installer for mechanical hardware shall have a minimum of 2 years of experience of installing architectural door hardware and attend a pre-installation meeting with the manufacturer's representative of locks, exit devices and closers.

D. Installer for electrified hardware shall have a minimum of 3 years of experience of installing electrified architectural hardware and attend a pre-installation meeting with the manufacturer's representative of the electrified locking devices.

E. Installer of permanent keyed cores and services to setup key cabinet shall be only from one of the following AISD pre-authorized locksmith dealers.

1.	Rae Security (also Advanced Lock Solutions, Inc.)	512-933-0300
2.	Dormakaba	855-365-2407
3.	Integrity Door Solutions	512-269-3502
4.	IML Security Supply	210-943-9928

1.7 SUBMITTALS

A. Hardware Schedule: in a prudent and timely manner, submit copies of schedule in accordance with Division 1, General Requirements. Schedule will be in “vertical format”, listing each door opening, including handing of opening, all hardware scheduled for opening or otherwise required to allow for proper function of door opening as intended, and finish of hardware.

B. Submit manufacturer’s cut sheets on all hardware items.

C. Submit a sample of each lockset, with lever handles and any specially identified hardware, if requested by AISD. Samples will be returned after review, for use on this project.

D. The General Contractor will deliver door hardware templates to and coordinate with related door and frame suppliers.

E. System diagrams: provide complete systems diagrams, including elevation drawings, for each opening requiring electrified hardware, except openings where only magnetic hold-open devices are specified. Supply one copy with delivery of hardware to jobsite.

F. Operational descriptions: provide complete operational descriptions of electronic components listed by opening in the hardware submittals. Operational descriptions (electronic hardware and systems) to detail how each electrical component functions within the opening, incorporating all conditions of ingress and egress. Provide a copy with delivery of hardware to the jobsite.

G. The General Contractor will furnish to Owner’s Representative one complete copy of installation instructions and maintenance guides on all hardware, both electrical and mechanical.

1.8 DELIVERY, HANDLING, AND PACKAGING

A. Furnish all hardware to the jobsite securely boxed, bagged, wrapped or packaged with each unit clearly marked and numbered in accordance with the hardware schedule. Include door and item number for each.

1. Each delivery will be accompanied by a listing the items by schedule item number, door opening number from the architectural plans, or description correlated to the hardware schedule.

B. Pack each item complete with all necessary parts and fasteners. Include information may be necessary to show compliance with requirements, and include instructions for installation and for maintenance of operating parts and finish. Transmit copy of applicable data to Installer.

C. Hardware supplier is responsible for setting-up the hardware on the site, in a suitable, dry and secure room, provided by the General Contractor.

1.9 WARRANTY

A. Provide warranty that all items furnished under this section of the specification will be free of defects in material and workmanship and will perform the services for which it was intended for a period of one (1) year (door closers, thirty (30) years, exit devices five (5) years) after substantial completion. Replace, repair or adjust any items not fulfilling this warranty at no further expense to AISD.

1.10 TEMPLATES

A. The General Contractor will furnish, in a timely manner, door hardware templates to each supplier or fabricator of doors, frames, and other work to be factory-prepared for the installation of hardware. Contractor will check the shop drawings of such other work, to confirm that adequate provisions are made for the proper installation of hardware, with all specified operating characteristics and clearances.

1.11 KEY CONTROL

A. On all new schools, additions and remodels requiring more than thirty locksets, furnish and install one complete wall key cabinet with lock and with sufficient hooks for all the cylinder locks, padlocks and cabinet locks for the entire school building, plus 50% for extra and miscellaneous keys. The system will be what is known as the double tag system. The file key has a tag of a different color from the duplicate key. All keys have a fiber

tab. Also provide system with triple cross index, collection envelopes, receipt forms, etc.

1.12 KEYING

A. The General Contractor must be coordinated through the AISD Service Center Locksmith Coordinator (512) 414-3298, and the AISD Project Manager assigned to the project.

B. All locks requiring mortise cylinders, locks requiring rim cylinders, panic devices, and padlocks to be grandmaster keyed in the set to be acted upon by existing AISD grandmaster keys, control keys and a master key that are already established for this facility or shall be grandmaster keyed in the set to be acted upon by new AISD BEST Cormax grandmaster system and a new master key that will be established for this facility.

1. On additions or remodeling to existing schools, Hardware Supplier will verify with the AISD Service Center Locksmith Coordinator (512) 414-3298 for the matching of key system with existing campus master key system or the use of new interchangeable core master key system in the new BEST Cormax interchangeable core grandmaster key system.

C. Two or more doors entering the same room will be keyed alike in one set for the room.

D. Locks will be further master keyed, sub-mastered, sub-sub-mastered, keyed alike or otherwise keyed as directed by AISD. Hardware supplier will not place the order with the manufacturer until the hardware schedule has been approved in writing by AISD Locksmith Foreman.

E. All grandmaster, master and control keys will be delivered direct to The Service Center Lockshop by the lock manufacturer to the attention of the AISD Locksmith Coordinator.

F. All locks will be supplied with construction cores.

G. Permanent cores shall be installed only by an AISD pre-authorized locksmith dealer as outlined in this section; upon completion of the facility and at request from AISD Project Manager.

1. At the time of installation of permanent cores, keys will be cataloged and placed in key cabinet. Provide complete instruction to the school administration on how key system and key cabinet is set up.

H. Contact the Hardware Supplier 9 days before the anticipated installation date of the permanent key system to ensure the following:

1. Cores have been purchased for the job.
2. A BEST Lock Company Key System Specialist is contacted in writing to set up the key system directly with the AISD Service Center Locksmith.
3. BEST Lock Co. is given an approximate date for core installation.

I. The prime contractor shall contact the AISD Project Manager and the AISD Service Center Locksmith Coordinator somewhere around (60) to (90) days before the anticipated installation date of the permanent key system to provide the following:

1. A labeled floor plan with all the openings involving keying identified with the same architectural information that was supplied to BEST Lock Co.
2. A hardware schedule of all the openings involving keying.

J. AISD Pre-authorized Locksmith dealer must be contacted (60) to (90) days before the anticipated installation date of the permanent key system to ensure the following.

1. Contract issued for permanent core installation and key cabinet setup agreed upon.
2. Tentative scheduled dates for core installation and key cabinet setup are agreed upon.

K. Contact permanent core supplier 30 days prior to installation to confirm that the permanent keying package will be deliverable at the approximate installation date.

L. As soon as a definite installation date can be determined, at least 5 working days prior to installation, contact the AISD pre-authorized locksmith dealer to schedule the core installation.

1.13 OPERATION AND MAINTENANCE DATA

A. Provide Owner with manufacturer’s parts list and maintenance instructions under provisions of the General Conditions, for each type of hardware supplied and necessary wrenches and tools required for proper maintenance of hardware

PART 2 - PRODUCTS

2.1 HARDWARE

A. Provide items as listed in schedule at end of this section, complete to function as intended.

B. Items include but are not limited to the following:

1. Levers and Trim
2. Locks and Latches
3. BEST Cormax– Cylinders, Cores and Keying
4. Door Closers
5. Hinges**,** Continuous Hinges and Pivots
6. Exit devices
7. Mullions
8. Flush bolts
9. Door silencers
10. Stops, overhead controls
11. Kick plates
12. Push/pull plates
13. Thresholds, gasketing, and door bottoms
14. Miscellaneous trim and accessories
15. Electrified hardware, power supplies, system diagrams

2.2 ACCEPTABLE MANUFACTURERS

A. The numbers and symbols used herein, establish the quality, merit, and function required and have been selected from the following manufacturers:

LCN
Glynn-Johnson Corporation
Hager Hinge Co.
Dormakaba
PHI Precision Exit Device
BEST Lock Co.
Falcon Lock Co.
Trimco
Von Duprin
H. B. Ives

National Guard Products
Select Products
Don-Jo
Rockwood
Allegion

B. Goods of equal quality and merit will be accepted from the following manufacturers:

McKinney Manufacturing Co.
Precision (PHI)
Pemko
Zero International

2.3 FINISHES

A. US 26 D DULL CHROME or US-32D Stainless Steel unless otherwise noted

B. All exposed hardware will be dull chrome (US 26 D) finish unless otherwise noted. Closers will be powder coated epoxy enamel to match adjacent hardware finish

2.4 FASTENINGS

A. As required for finished installation

B. Hardware furnished under this section of the specifications will be complete with all necessary screws, bolts, anchors, adapter brackets or other fastenings for proper application. Such fastenings will be of suitable size and type, and will harmonize with hardware as to material and finish and as the manufacturer supplies with their products. Stops, thresholds and holders will be fastened to concrete with steel drop-in anchors and to doors with sex bolts. All closers and exit devices will be thru-bolted.

C. Utilize screws and installation tools provided with the hardware. No other screws or attachments are acceptable. Self-taping screws will not be accepted unless provided by the manufacturer.

2.5 LEVERS AND TRIM

A. Levers will be cast or forged solid brass (dull chrome US 26 D or 626), or stainless steel (US 32 D or 630). Zinc alloys or pot metal material will not be acceptable.

B. Roses for use with levers will be wrought brass or stainless steel, and will have built-in dead stops. Roses shall have concealed springs, or trim cassettes, to keep lever from sagging.

2.6 LOCKS AND LATCHES

A. BEST 45H 3 Lever R rose or FALCON – MA (SG)

All Classroom/Studio/Maker Space Locks shall be

Storeroom Function

B. Series (no substitutions).

C. Will be of the mortise type only. All locksets, latch sets, electrified locksets, cylinders, and trim to be of one manufacturer as hereafter listed for continuity of design and consideration of warranty.

D. Case will be of .090 gage Cold formed steel, zinc dichromate plated: 6" high by 4-1/4" wide by 1" wide with post indexed trim.

E. Front will be armored, wrought brass, bronze or stainless steel, adjustable for door bevel, reinforced by heavy gauge steel with stabilizing ribs, fastened by machine screws. Fronts will be 8" x 1-1/4" in size.

F. Strikes will be ASA size of stainless steel, brass or bronze with lips of length to protect all jamb trim but will be no longer than so required. Provide and install stamped box strikes at all locations.

G. Deadbolts will be no less than 1" projection. Construction shall be either solid brass or bronze, chrome plated, with two hardened free-floating steel pins, or solid stainless steel to prevent sawing.

H. Backset will be 2-3/4".

I. Hubs will be stainless powdered metal or forged brass or hardened steel. Lever action will be balanced mechanically to provide equal pressure on knob in either direction to actuate the latch bolt.

J. Springs will be a coiled spring for latch bolt return and a coiled torsion spring for hub return.

K. Furnish and install one Dormakaba PowerPlex 2000 series combination lock with SFIC key override on a minimum of one exterior egress door not furnished with card access device for each separate and non-contiguous building. This combination lock serves as an emergency access in the event card access system is not working for buildings equipped with Best Cormax key system.

2.7 CYLINDERS, CORES AND KEYING

A. Cylinders will be on the New AISD BEST Lock Cormax patented key system grandmaster and control system. No exceptions.

B. Furnish all locks & cylinders as follows: All mortise locks, panic devices, cylindrical locks, and padlocks to be keyed to an existing AISD grandmaster key and control keys on the BEST Cormax grandmaster key and control keys. Establish a new master key for new facilities. Match existing master keys of existing facilities for additions and renovations as directed by AISD Locksmith Coordinator. Keying of new BEST Cormax shall be coordinated with BEST Access System's Key System Specialist and as directed by AISD Locksmith Coordinator.

C. Furnish construction master keys & control keys as listed or per the attached hardware schedule.

1. Furnish (10) each construction master keys.
2. Furnish (1) each construction control keys.

D. All permanent cores and cut keys shall have "VKC' visual key control using standard Door and hardware Institute keying system nomenclature or as required by AISD Service Center Locksmith Coordinator. All cores shall be stamped on the FACE.

E. All permanent cores, cut keys and blanks shall be shipped directly from the manufacturer to Austin ISD Service Center, 5101 E. 51st Street, Austin, Texas 78723, Attn. AISD Lockshop.

2.8 DOOR CLOSERS

A. LCN 4041 or Dormakaba QDC100

B. All door closers, unless otherwise specified or shown on the Drawings, will be heavy duty, surface mounted, full rack and pinion liquid (hydraulic) type, with cast iron cylinders, capable of controlling door through 180 degrees of swing or max degree of opening hits door stop. Provide full covers of non-ferrous, non-corrosive material painted to match the adjacent hardware finish. Closer is not permitted to act as a door stop.

C. Surface closers will be adjusted by key valves. Furnish six (6) adjusting keys. Spring power of each closer will be adjustable, and will be capable of meeting handicapped accessibility code requirements.

D. No closer will be installed on the outside of any exterior door or on the corridor side of any room door. Wherever it is necessary to install a closer on the side of a door away from the butts, a parallel arm will be used.

E. Corner or soffit brackets will not be permitted. Corridor installation is acceptable where abutting walls prevent normal installation. All fastenings to the door will be by sex bolts.

F. Closers to have adjustable spring power, which allows for closer sizing. Closers to have separate tamper resistant, non-critical regulating hydraulic screw valves for closing speed, latching speed, and back check control as a standard feature.

G. All parallel arms will be extra heavy-duty solid forged steel (EDA Extra Duty Arm). All closers, without exception, will be installed to 180º door swing specifications or until door hits floor/wall stop. Closers shall not have soffit stops.

H. All door closers must be covered by a minimum of 30 year warranty against defective material and a one year warranty on workmanship.

I. The successful bidder is required to keep in touch with the progress of the job and have a factory trained representative visit the job prior to installation to train the General Contractor’s installer on proper techniques and once again insure that all closers are properly adjusted at completion of the installation. Closers will be re-inspected and adjusted by the General Contractor, at no cost to AISD, one month prior to the expiration of the one- year warranty period.

J. All Automatic Low Energy Door Operators shall be Dormakaba ED100LE or LCN 4600.

2.9 CONTINUOUS HINGES

A. Continuous hinges – Shall be Aluminum Gear-Select Products SL-24HD as indicated in hardware schedule or BEST 600 Series or Markar.

B. Continuous hinges shall be manufactured of aluminum alloy with anodized finish. All hinge profiles shall be manufactured to template screw locations, with heavy duty patterns identical as to number and placement of holes.

C. Hinge fasteners shall be 410 stainless steel, brite hardened and plated. Continuous hinges shall be warranted for the life of the opening.

D. All doors with Continuous Hinges must have Institutional floor stop.

2.10 HINGES

A. (BUTTS) BB1279 or BB1168 Series Hager or BEST FBB179

B. Hinges will be five-knuckle, standard or heavy-duty, ball bearing, button-tip, full mortise template type hinges, and equal to Hager BB1279 or BB1168 Series. Electric hinges equal to Hager ETW 6 wire hinge are acceptable in grouted jamb hollow metal frame conditions. All exterior Butt hinges shall be 32D Stainless Steel.

C. At labeled doors, or doors with closers, provide steel (no painted hinges permitted) bearing-type hinges.

D. Exterior door hinges will be of steel (No painted) with non-removable pins, or will have pins held in place by a set screw which can only be removed while the door is open.

E. Provide heavyweight hinges on all openings with high frequency usage as indicated in the hardware schedule.

F. Hinges (butts) will be of the class as indicated by manufacturer’s number in the hardware sets. All hinges will have sufficient throw to clear the door trim, plinth, or cove base, but will have no more throw than is necessary.

G. Hinges will be sized as follows:

1. Doors 3'-0" wide or less:	4-1/2" x 4-1/2" (1-1/2 pair hinges)
2. Doors over 3'-0" wide:	4-1/2" x 4-1/2" (2 pair hinges)

H. Quantity of hinges per door will be as follows:

1. Door up to 60" in height	1 pair (2)
2. Door up to 90" in height	1-1/2 pair (3)
3. Door over 90" in height	1 additional hinge for every 30" or fraction thereof.

2.11 EXIT DEVICES

A. Von Duprin #99 Series finish as follows:

1. Housing	US 32 D (630) stainless steel
2. Push Pad	US 32 D (630) stainless steel
3. Exterior Pull	US 26 D (626) dull chrome
4. Trim Kits	Doors – NL Trim on active side and EO trim on inactive side Gates - VR Trim

B. PHI 2000 Series finish as follows:

1. Housing	US 32 D (630) stainless steel
2. Push Pad	US 32 D (630) stainless steel
3. Exterior Pull	US 26 D (626) dull chrome
4. Trim Kits	Doors – NL Trim on active side and EO trim on inactive side

C. All devices will be manufactured by Von Duprin or PHI – no substitutions. Devices will be Von Duprin Touch Bar 99 series or PHI 2000 series. Electrified devices and trim to be the same series and design as mechanical devices and trim. All devices must have dead locking latches for better security.

D. Vertical rod exit devices will not be accepted. All Exit Devices shall be LESS Dogging unless otherwise noted.

E. All exit devices for fire rated labeled doors **and labeled frame assemblies** will bare the UL label for "fire exit hardware." All devices will comply with NFPA 80 and NFPA 101 requirements.

F. All pairs of doors shall have one active pull trim and the other leaf shall have an exit only plate trim.

2.12 MULLIONS

A. All mullions shall be either Allegion or Dormakaba.

1. Von Duprin #9954 at fire rated openings and Von Duprin #4954 at non-fire rated openings.

2. PHI FLKR822 at fire rated openings and PHI KR822 at non-fire rated openings.

B. Removable mullions will be 2" x 3" steel, with sprayed aluminum (SP 28) finish. Provide a set of stabilizers per pair of doors. Removable mullions will be installed at specially designated doors, as indicated on the floor plan or hardware schedule. All mullions shall be key removable.

2.13 FLUSH BOLTS

A. Trimco # 3917

B. Edge mount all flush bolts unless specifically noted to be face mounted. The rod for the top bolt will be at least 12". Flush Bolts will be UL listed equal to Trimco # 3917 (Cast).

C. Provide Flush bolts with dust proof strikes as indicated in the individual hardware sets.

D. Provide frame-stop type coordinators with filler bars and brackets for proper installation / coordination with adjacent hardware.

2.14 DOOR SILENCERS

A. Ives #SR64 or Glynn-Johnson #GJ64 or National Guard Products

B. Furnish door silencers for all interior doors (except gasketed doors); SR64 for doors with metal jambs. Furnish three (3) silencers for each single door and four (4) silencers for each pair of doors.

2.15 DOOR STOPS

A. Interior: Trimco #1214H (2-1/4”)

B. Exterior: Trimco #1209

C. Wall Mounted: Trimco #1270

D. Door Stops to be furnished on every door leaf (no closer arm stops accepted unless special approval is given from the AISD Locksmith Coordinator).

E. When possible, doorstops should be wall mounts

F. Place door stops in such a position that they permit maximum door swing, but do not present a hazard or obstruction. All floor mounted doorstops will be installed using flush bolts and steel drop-in anchors manufactured by Lead Wedge: Anchors will be set at least one inch into the concrete. Lead anchors will not be allowed. Floor stops shall be placed as far from the hinge edge of the door so as to not allow a trip hazard.

G. Exterior door stops, when possible, should be wall mounted on a wing wall or recess that acts to stop the door from swinging more than 90 degrees from the closed position. **If wing walls are not possible to construct, the alternative floor mounted stop is to be provided, with appropriate railing to prevent a tripping hazard.**

H. No Door Holders permitted on any doors within AISD, except for Fire Rated doors.

2.16 KICK PLATES

A. Kick plates will be of 1/8” thick Textolite, Formica, Micarta, Stainless Steal or Bakelite and will be 10” high by width of door less 2”. Where louvers or other construction prevents use of 10” kick plate, 8” may be used. Color: Gray.

B. For doors with louvers or narrow bottom rails, kick plate height to be 1” less than the dimension shown from the bottom of door to the bottom of the louver or glass.

2.17 PUSH/PULL PLATES

A. Push Plates: Trimco #1001-3

B. Pull Plates: Trimco #1013-3

C. Push plates and pull plates finish to match door hardware. (Provide thru-bolt mounting for all pull plates)

2.18 THRESHOLDS AND GASKETING

A. Provide materials and finishes as listed in the hardware schedule or as shown on the Drawings. All thresholds must be in accordance with the requirements of ANSI A117.1 and the ADA. If no thresholds or gasketing is specified, provide thresholds and complete gasketing at all exterior doors, and smoke seals at all interior fire rated doors as follows:

1. Weatherstip NGP#120NA – 628
2. Smoke Seal NGP #5050 – Brn
3. Threshold NGP #425 “SIA” – 628 or NGP #896V “SIA” – 628
4. Bottom NGP #200NA – 628
5. Auto Bottom NGP #420NA – 628
6. Astragal NGP #137NA (2pc) –628

B. Provide overhead rain drips at all exterior doors without canopy protection. Width shall be door-frame width plus 6”.

1. Overhead Rain Drip NGP #16AD

C. Provide thresholds with machine screws and steel anchors, and all necessary anchoring devices for weather-stripping and seals.

2.19 PRODUCT STANDARDS / SUBSTITUTIONS

A. Unless otherwise approved in writing, provide only the specified products.

B. All requests for substitutions must be made prior to bid in accordance with Division 1, General Conditions, and are to be in writing, and delivered to the Architect. Requests will be evaluated by **AISD Lock Shop Coordinator**. Decisions will be issued through the Project Manager to the Architect. All

requests must be accompanied by (2) copies of the manufacturer's brochures and a physical sample of each item in the appropriate design and finish. No substitutions shall be made after bid date, unless manufacturer specified cannot supply specified product.

2.20 ELECTRONIC HARDWARE AND SYSTEMS

A. Selected exterior and interior doors are required to have "card-reader" access per AISD requirements in locations as noted.

B. Von Duprin QEL Retraction 99 series devices with the Less Dogging option shall be installed with Von Duprin power transfer EPT10 wired to Von Duprin power supply at selected exterior entrance doors. The use of electric hinges is acceptable at specific locations where existing jamb frames are fully grouted. Precision Apex 2000 (Motorized Latch Retraction), power transfer and power supplies is an acceptable alternative.

C. Falcon LM881 or BEST 40HW Series fail-secure storeroom function shall be installed with Von Duprin or Precision power transfer EPT10 or electric hinge at exterior kitchen doors and interior card reader controlled doors. The lock shall provide for free egress from the secured space at all times.

D. Von Duprin Electric Strike 6211 shall be installed at interior and/or exterior doors where other electronic hardware may not be practical. The Owner shall review and approve all electric strike applications. Provide power supplies for electrified strikes. Substitute HES or RCI.

E. Section 281300 will provide card readers, door position switches, and other access control system equipment.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Hardware installers shall be professional hardware installers with ten years of documented hardware installation experience. Contractor shall submit hardware installer's names and experience qualifications to Architect and Owner for review and approval prior to start of hardware installation.

B. Check hardware against the reviewed hardware schedule upon delivery. Do not install hardware when it is apparent that the scheduled hardware will not function properly for the application for which it was intended. Contact the Architect immediately for clarification, and correction of the application – prior to installation of the incorrect hardware.

C. Finish hardware installed prior to the building being “dried in” and “climate conditioned”, which shows any signs of rusting, wear or abuse, will be subject to rejection by the Architect, AISD Locksmith Coordinator or AISD Project Manager. Any such rejected hardware will be replaced, at no cost to AISD, by the General Contractor.

D. Mount hardware units at heights recommended in “Recommended Location for Builders’ Hardware” by BHMA, except as otherwise specifically indicated or required to comply with governing regulations, including ADA and the Accessibility Standards of the Architectural Barriers Act Article 9102, of the Texas Civil Statutes, except as may be otherwise directed by the Architect. Use only the fasteners supplied by the manufacturer. All fastening points will be used.

E. Install each hardware item in compliance with the manufacturer’s instructions and recommendations. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished in another way, install each item completely and then remove and store in a secure place during the finish application. After completion of the finishes, re-install each item. Do not install surface-mounted items until finishes have been completed on the substrate. The use of cardboard shim stock is prohibited.

F. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation. Mortise and cutting to be done neatly, and evidence of cutting to be concealed in the finished work.

G. Drill and countersink units that is not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.

H. Mount door stops using plated, flat Phillips screws and steel drop-in anchors.

I. Take care when using cleaning chemicals around door hardware so as not to damage the finish.

J. Architect, AISD and Door Hardware Supplier shall inspect completed hardware installation and operation upon completion of hardware installation. Hardware installer shall correct any installation deficiencies noted during this inspection. Hardware manufacture to provide final walk-thru with AISD.

K. Permanent keyed core

1. One Key Cabinet system is required to be mounted onsite, if possible in the Vault, when new cores are installed by ONLY pre-authorized AISD locksmith dealers (see Section 087100 1.6.E).

2. Approved locksmith installer is to provide a list of each key and the corresponding room number and left inside cabinet after its setup.

3.2 FINAL ADJUSTMENT

A. Wherever hardware installation is made more than one month prior to acceptance or occupancy of a space or area, return to the work during the week prior to acceptance or occupancy, and make a final check and adjustment of all hardware items in such space or area. Clean and re-lubricate operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

B. Instruct Owner's personnel in proper adjustment and maintenance of hardware during the final adjustment of hardware.

C. Door closers will be adjusted by a tradesman trained by the hardware supplier/manufacturer trained personnel at completion of installation and again one month prior to expiration of the Contractor's one-year anniversary of substantial completion. Substantial completion is granted after the project walk-thru with the AISD Locksmith Coordinator and manufacturer representative.

3.3 FIELD QUALITY CONTROL

After installation has been completed, a Punchwalk including AISD Locksmith Foreman and Manufacturer needs to be completed to check for proper application of door hardware, according to the door hardware schedule, keying schedule and specifications. In addition, check all hardware for adjustments and proper operation. A complete report of any omissions, errors and general condition of installation shall be submitted to AISD Office of Construction Management.

3.4 HARDWARE SCHEDULE

ARCHITECT TO PROVIDE FINISH HARDWARE SCHEDULE HERE

3.5 Cabinet Locks

A. Drawers - SFIC Locks
B. Wardrobe Doors - SFIC Locks
C. All Cabinet Locks to Include combinated BEST Core keyed to existing Austin ISD Existing Key System

END OF SECTION 087100

SECTION 220100 – COMMISSIONING OF PLUMBING SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes commissioning process requirements for Plumbing systems, assemblies, and equipment.

B. Related Sections:

1. Division 01 Section 016500 – "GENERAL COMMISSIONING REQUIREMENTS" for general commissioning process requirements.

2. Division 23 Section 230100 – "COMMISSIONING OF MECHANICAL SYSTEMS".

3. Division 23 Section 230926c – "COMMISSIONING OF BUILDING AUTOMATION SYSTEM."

4. Division 26 Section 260100 - "COMMISSIONING OF ELECTRICAL SYSTEMS".

1.3 DEFINITIONS

A. Commissioning Authority (CxA): Independent agent hired by Owner and not associated with General Contractor or its subcontractors, Architect or its sub-consultants, or Construction Administrator or its staff or consultants. Under Owner's direction, and not General Contractor's direction, CA will direct and coordinate day-to-day commissioning activities without assuming oversight responsibilities.

B. Refer to section 016500- GENERAL COMMISSIONING REQUIREMENTS for additional definitions and assignment of responsibilities.

1.4 CONTRACTOR'S RESPONSIBILITIES

A. Refer to section 016500 - GENERAL COMMISSIONING REQUIREMENTS.

B. Perform commissioning tests at the direction of the CxA.

C. Attend construction phase controls coordination meeting.

D. Attend testing, adjusting, and balancing review and coordination meeting.

E. Participate in plumbing systems, assemblies, equipment, and component maintenance orientation and inspection.

F. Provide information requested by the CxA for final commissioning documentation.

G. Provide measuring instruments and logging devices to record test data, and provide data acquisition equipment to record data for the complete range of testing for the required test period.

H. Complete and provide to CxA project-specific pre-functional/construction checklists and commissioning process test procedures for actual plumbing systems, assemblies, equipment, and components to be furnished and installed as part of the construction contract.

I. Direct and coordinate commissioning testing among subcontractors, suppliers, and vendors.

J. Verify testing, adjusting, and balancing of plumbing work are complete.

K. Provide test data, inspection reports, and certificates.

1.5 COMMISSIONING DOCUMENTATION

A. Provide the following information to the CxA for inclusion in the commissioning plan:

1. Plan for delivery and review of submittals, systems manuals, and other documents and reports.
2. Identification of installed systems, assemblies, equipment, and components including design changes that occurred during the construction phase.
3. Process and schedule for completing pre-functional/construction checklists and manufacturer's pre-start and startup checklists for plumbing systems, assemblies, equipment, and components to be verified and tested.
4. Certificate of completion certifying that installation, pre-start checks, and startup procedures have been completed.
5. Certificate of readiness certifying that plumbing systems, subsystems, equipment, and associated controls are ready for functional testing.
6. Test and inspection reports and certificates.
7. Corrective action documents.

1.6 SUBMITTALS

A. Certificates of readiness.

B. Certificates of completion of installation, pre-start, and startup activities.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 GENERAL

A. Refer to section 016500 - GENERAL COMMISSIONING REQUIREMENTS.

3.2 PRE-FUNCTIONAL CHECKLISTS

A. To be provided by CxA upon review of 50% CDs.

B. Contractor shall complete Pre-functional Testing to document compliance with installation and pre-functional checklists prepared by Commissioning Authority for Division-22 items.

C. Request verification of Pre-functional checklists by CxA prior to proceeding with system start-up and Functional Testing of systems.

D. Refer to Section 016500 - GENERAL COMMISSIONING REQUIREMENTS for issues relating to pre-functional checklists and testing, description of process, details on non-conformance issues relating to pre-functional checklists and test.

3.3 FUNCTIONAL CHECKLISTS

A. To be provided by CxA following review of submittals.

3.4 SYSTEM START-UP & INSPECTIONS

A. Contractor is solely responsible for system start-up. CxA may, at his discretion, witness start up procedures, but will not witness any Functional Testing of systems until Contractor has completed start-up and resolved all operating deficiencies.

B. Contractor is solely responsible for all tests and inspections required by the Authority Having Jurisdiction (AHJ). All test reports and certificates required by the AHJ shall be submitted prior to Functional Testing.

3.5 TESTING PREPARATION

A. Certify that plumbing systems, subsystems, and equipment have been installed, calibrated, and started and are operating according to the Contract Documents.

B. Certify that plumbing instrumentation and control systems have been completed and calibrated, that they are operating according to the Contract Documents, and that pretest set points have been recorded.

C. Certify that any required testing, adjusting, and balancing procedures have been completed and that testing, adjusting, and balancing reports have been submitted, discrepancies corrected, and corrective work approved.

D. Set systems, subsystems, and equipment into operating mode to be tested (e.g., normal shutdown, normal auto position, normal manual position, unoccupied cycle, and alarm conditions).

E. Inspect and verify the position of each device and interlocks identified on checklists.

F. Check safety cutouts, alarms, and interlocks with smoke control and life-safety systems during each mode of operation.

G. Testing Instrumentation: Install measuring instruments and logging devices to record test data as required.

3.6 GENERAL TESTING REQUIREMENTS

A. Provide technicians, instrumentation, and tools to perform commissioning test at the direction of the CxA.

B. Scope of plumbing testing shall include entire plumbing installation. Testing shall include measuring capacities and effectiveness of operational and control functions.

C. Test all operating modes, interlocks, control responses, and responses to abnormal or emergency conditions, and verify proper response of building automation system controllers and sensors.

D. Tests will be performed using design conditions whenever possible.

E. Simulated conditions may need to be imposed using an artificial load when it is not practical to test under design conditions. The CxA may direct that set points be altered when simulating conditions is not practical.

F. The CxA may direct that sensor values be altered with a signal generator when design or simulating conditions and altering set points are not practical.

G. If tests cannot be completed because of a deficiency outside the scope of the plumbing system, document the deficiency and report it to the Owner. After deficiencies are resolved, reschedule tests.

H. If the testing plan indicates specific seasonal testing, complete appropriate initial performance tests and documentation and schedule seasonal tests.

3.7 GENERAL TESTING PROCEDURES FOR PLUMBING SYSTEMS, SUBSYSTEMS, AND EQUIPMENT

A. Pipe system cleaning, flushing, hydrostatic test and chemical treatment requirements are specified in Division 22 piping Sections. Plumbing Subcontractor shall prepare a pipe system cleaning,

flushing, and hydrostatic testing plan. Provide cleaning, flushing, testing, and treating plan and final reports to the CxA. Plan shall include the following:

1. Sequence of testing and testing procedures for each section of pipe to be tested, identified by pipe zone or sector identification marker. Markers shall be keyed to Drawings for each pipe sector, showing the physical location of each designated pipe test section. Drawings keyed to pipe zones or sectors shall be formatted to allow each section of piping to be physically located and identified when referred to in pipe system cleaning, flushing, hydrostatic testing, and chemical treatment plan.
2. Description of equipment for flushing operations.
3. Minimum flushing water velocity.
4. Tracking checklist for managing and ensuring that all pipe sections have been cleaned, flushed, hydrostatically tested, and chemically treated.

B. Plumbing Equipment System Testing: Provide technicians, instrumentation, tools, and equipment to test performance of systems and equipment at the direction of the CxA. The CxA shall determine the sequence of testing and testing procedures for each equipment item to be tested. Refer to Section 016050

C. Plumbing Distribution System Testing: Provide technicians, instrumentation, tools, and equipment to test performance of hydronic and other distribution plumbing systems.

D. Refer to Section 016500 - GENERAL COMMISSIONING REQUIREMENTS for specific equipment testing requirements.

3.8 FUNCTIONAL TEST PROCEDURES FOR SYSTEMS TO BE COMMISSIONED

A. General

1. The following paragraphs outline the functional test procedures for the various Div. 22 items to be commissioned. Detailed testing scripts will be developed as part of the Commissioning Plan.
2. Functional testing will take place only after pre-functional checklists have been completed, equipment has been started-up, TAB has been verified, and GC has certified that systems are ready for functional testing.
3. Refer to Section 016500 - GENERAL COMMISSIONING REQUIREMENTS for specific systems to be tested.

B. All Equipment

1. Verify nameplate information (serial numbers, model numbers, etc.); verify that equipment capacity is in accordance with requirements of construction documents.
2. Verify unit runs smoothly and quietly.
3. Verify operation of safeties.
4. Verify electrical wiring and grounding is correct.
5. Verify maintenance and NEC clearances are maintained.
6. Verify Pre-Functional Checklists have completed.

C. Domestic Water Heaters & Circulation Pumps

1. Verify accuracy of temperature sensors and thermometers.
2. Verify operation of hot water heater control thermostats and thermometer.
3. Verify water pressure within appropriate pressure range.
4. Verify system cycles and ramps up/down to maintain DHW temperature setpoint.
5. Witness water heater manufacturer startup.
6. Verify operation of domestic hot water circulation pumps.
7. Verify On/Off controls for domestic hot water circulation pump.

D. Domestic Water Distribution System

1. Verify system operating pressure and backflow preventer
2. Verify performance of pipe insulation via IR scans.
3. Verify operation of heat trace systems.

E. Domestic Water System Fixtures

1. Verify operation of interior plumbing fixtures (water closets and urinals flush, all faucets, culinary/kitchen fixtures)
2. Verify lack of water hammer, and water hammer arrestors are installed where called for.
3. Verify operation of trap primers.
4. Verify temperature control of thermostatic mixing valves, and that hot water is present at all hot water outlets, at desired temperature.

F. Other Plumbing Systems: Testing requirements for additional plumbing systems shall be identified in the Construction Phase Commissioning Plan to be developed by CxA prior to beginning of construction.

3.9 TRAINING

A. Refer to section 016500 - GENERAL COMMISSIONING REQUIREMENTS.

3.10 O&M MANUALS

A. Refer to section 016500 - GENERAL COMMISSIONING REQUIREMENTS and section 017800 CLOSEOUT SUBMITTALS.

END OF SECTION

SECTION 230100 – COMMISSIONING OF MECHANICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes commissioning process requirements for mechanical (HVAC&R) systems, assemblies, and equipment.

B. Related Sections:

1. Division 01 Section 016500 – "GENERAL COMMISSIONING REQUIREMENTS" for general commissioning process requirements.

2. Division 22 Section 220100 - "COMMISSIONING OF PLUMBING SYSTEMS".

3. Division 23 Section 230926c – "COMMISSIONING OF BUILDING AUTOMATION SYSTEM."

4. Division 26 Section 260100 - "COMMISSIONING OF ELECTRICAL SYSTEMS".

1.3 DEFINITIONS

A. Commissioning Authority (CxA): Independent agent hired by Owner and not associated with General Contractor or its subcontractors, Architect or its sub-consultants, or Construction Administrator or its staff or consultants. Under Owner's direction, and not General Contractor's direction, CA will direct and coordinate day-to-day commissioning activities without assuming oversight responsibilities.

B. Refer to section 016500- GENERAL COMMISSIONING REQUIREMENTS for additional definitions and assignment of responsibilities.

1.4 REFERENCES

A. National Environmental Balancing Bureau (NEBB) - Procedural Standards for Building Systems Commissioning

B. American Air Balance Council (AABC) - Commissioning Guideline

C. SMCNA - HVAC Systems commissioning Manual

1.5 CONTRACTOR'S RESPONSIBILITIES

A. Refer to section 016500 - GENERAL COMMISSIONING REQUIREMENTS.

B. Perform commissioning tests at the direction of the CxA.

C. Attend construction phase controls coordination meeting.

D. Attend testing, adjusting, and balancing review and coordination meeting.

E. Participate in mechanical systems, assemblies, equipment, and component maintenance orientation and inspection.

F. Provide information requested by the CxA for final commissioning documentation.

G. Provide measuring instruments and logging devices to record test data, and provide data acquisition equipment to record data for the complete range of testing for the required test period.

H. Complete project-specific pre-functional/construction checklists and commissioning process test procedures for actual mechanical systems, assemblies, equipment, and components to be furnished and installed as part of the construction contract.

I. Direct and coordinate commissioning testing among subcontractors, suppliers, and vendors.

J. Verify testing, adjusting, and balancing of Work are complete.

K. Provide test data, inspection reports, and certificates in Systems Manual.

1.6 COMMISSIONING DOCUMENTATION

A. Provide the following information to the CxA for inclusion in the commissioning plan:

1. Plan for delivery and review of submittals, systems manuals, and other documents and reports.
2. Identification of installed systems, assemblies, equipment, and components including design changes that occurred during the construction phase.
3. Process and schedule for completing construction checklists and manufacturer's pre-start and startup checklists for mechanical systems, assemblies, equipment, and components to be verified and tested.
4. Certificate of completion certifying that installation, pre-start checks, and startup procedures have been completed.
5. Certificate of readiness certifying that mechanical systems, subsystems, equipment, and associated controls are ready for testing.
6. Test and inspection reports and certificates.
7. Corrective action documents.
8. Verification of testing, adjusting, and balancing reports.

1.7 SUBMITTALS

A. Certificates of readiness.

B. Certificates of completion of installation, pre-start, and startup activities.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 GENERAL

A. Refer to section 016500 - GENERAL COMMISSIONING REQUIREMENTS.

3.2 PRE-FUNCTIONAL CHECKLISTS

A. To be provided by CxA upon review of 50% CDs.

B. Contractor shall conduct Pre-functional Testing to document compliance with installation and pre-functional checklists prepared by Commissioning Authority for Division-23 items.

C. Request verification of Pre-functional checklists by CxA prior to proceeding with system start-up and Functional Testing of systems.

D. Refer to Section 016500 - GENERAL COMMISSIONING REQUIREMENTS for issues relating to pre-functional checklists and testing, description of process, details on non-conformance issues relating to pre-functional checklists and test.

3.3 FUNCTIONAL CHECKLISTS

A. To be provided by CxA following review of submittals.

3.4 SYSTEM START-UP & INSPECTIONS

A. Contractor is solely responsible for system start-up. CxA may, at his discretion, witness start up procedures, but will not perform any Functional Testing of systems until Contractor has completed start-up and resolved all operating deficiencies.

B. Contractor is solely responsible for all tests and inspections required by the Authority Having Jurisdiction (AHJ). All test reports and certificates required by the AHJ shall be submitted prior to Functional Testing.

C. Contractor shall provide no less than 48 hours notice prior to conducting tests specified in other sections of the specifications, including:

1. Duct pressure tests
2. Hydronic piping pressure tests
3. Hydronic piping flushing

CxA shall witness tests at his discretion. Test results shall be documented with respective Pre-functional/construction checklists

3.5 FUNCTIONAL TESTING PREPARATION

A. Certify that mechanical systems, subsystems, and equipment have been installed, calibrated, and started and are operating according to the Contract Documents.

B. Certify that mechanical instrumentation and control systems have been completed and calibrated, that they are operating according to the Contract Documents, and that pretest set points have been recorded.

C. Certify that testing, adjusting, and balancing procedures have been completed and that testing, adjusting, and balancing reports have been submitted, discrepancies corrected, corrective work approved, and balance has been verified by CxA (see paragraph below).

D. Set systems, subsystems, and equipment into operating mode to be tested (e.g., normal shutdown, normal auto position, normal manual position, unoccupied cycle, and alarm conditions).

E. Inspect and verify the position of each device and interlocks identified on checklists.

F. Check safety cutouts, alarms, and interlocks with smoke control and life-safety systems during each mode of operation.

G. Testing Instrumentation: Install measuring instruments and logging devices to record test data as directed.

3.6 TESTING AND BALANCING VERIFICATION

A. Prior to performance of testing and balancing Work, provide copies of reports, sample forms, checklists, and certificates to the CxA.

B. Upon completion of testing and balancing work, submit a copy of the report for CxA via Architect. CxA shall review report and issue comments via the Architect.

C. Verification: The CxA will notify Contractor seven (7) days in advance of the date of field verification. Notice will not include data points to be verified. This verification must take place prior to Functional Testing of systems.

1. Provide technicians, instrumentation, and tools to verify testing and balancing of mechanical systems at the direction of the CxA.
2. The testing and balancing Subcontractor shall use the same instruments (by model and serial number) that were used when original data were collected.
3. Failure of an item includes, other than sound, a deviation of more than 10 percent. Failure of more than 10 percent of selected items shall result in rejection of final testing, adjusting,

and balancing report. For sound pressure readings, a deviation of 3 dB shall result in rejection of final testing. Variations in background noise must be considered.

4. Remedy the deficiency and notify the CxA so verification of failed portions can be performed.

3.7 GENERAL TESTING REQUIREMENTS

A. Provide technicians, instrumentation, and tools to perform commissioning test at the direction of the CxA.

B. Scope of mechanical testing shall include entire HVAC installation, from central equipment for heat generation and refrigeration through distribution systems to each space served. Testing shall include measuring capacities and effectiveness of operational and control functions.

C. Test all operating modes, interlocks, control responses, and responses to abnormal or emergency conditions, and verify proper response of building automation system controllers and sensors.

D. Tests will be performed using design conditions whenever possible.

E. Simulated conditions may need to be imposed using an artificial load when it is not practical to test under design conditions. Before simulating conditions, calibrate testing instruments. Provide equipment to simulate loads. Set simulated conditions as directed by the Contracting Officer and document simulated conditions and methods of simulation. After tests, return settings to normal operating conditions.

F. The CxA may direct that set points be altered when simulating conditions is not practical.

G. The CxA may direct that sensor values be altered with a signal generator when design or simulating conditions and altering set points are not practical.

H. If tests cannot be completed because of a deficiency outside the scope of the mechanical system, document the deficiency and report it to the Owner. After deficiencies are resolved, reschedule tests.

I. If the testing plan indicates specific seasonal testing, complete appropriate initial performance tests and documentation and schedule seasonal tests.

3.8 GENERAL TESTING PROCEDURES FOR HVAC SYSTEMS, SUBSYSTEMS, AND EQUIPMENT

A. HVAC Instrumentation and Control System Testing: Contractor shall fully test operation of controls system prior to requesting Functional Testing of equipment and systems with CxA. Point-to-point check out sheets and as-built control diagrams shall be provided to CxA so he may develop testing procedures. Refer to Section 230926c BUILDING AUTOMATION SYSTEM COMMISSIONING REQUIREMENTS for commissioning of controls.

B. Mechanical Subcontractor shall prepare a pipe system cleaning, flushing, and hydrostatic testing plan for piping systems. Provide cleaning, flushing, testing, and treating plan and final reports to the CxA.

C. HVAC Distribution System Testing: Provide technicians, instrumentation, tools, and equipment to test performance of air distribution systems, chilled water systems and hot water systems.

D. HVAC Equipment Testing: Provide technicians, instrumentation, tools, and equipment to test performance of all HVAC equipment as outlined below.

3.9 FUNCTIONAL TEST PROCEDURES FOR SYSTEMS TO BE COMMISSIONED

A. General
1. The following paragraphs outline the functional test procedures for the various Div. 23 items to be commissioned. Functional testing will take place only after pre-functional checklists have been completed, equipment has been started-up, TAB has been verified, and Contractor has certified that systems are ready for functional testing.
2. All systems controlled via the Building Automation System shall have all control points and sequences tested by Controls Contractor prior to requesting testing by Commissioning Authority. Refer to Section 230926c BUILDING AUTOMATION SYSTEM COMMISSIONING REQUIREMENTS for commissioning of controls.
3. Refer to Section 016500 - GENERAL COMMISSIONING REQUIREMENTS for specific systems to be tested.

B. All Equipment:
1. Verify nameplate information (serial numbers, model numbers, etc.); verify that equipment capacity is in accordance with requirements of construction documents.
2. Verify unit runs smoothly and quietly.
3. Verify operation of safeties.
4. Verify electrical wiring and grounding is correct.
5. Verify maintenance and NEC clearances are maintained.
6. Verify Pre-Functional Checklists have completed.

C. Boilers:
1. Record outside air temperature during test.
2. Record programmed schedules.
3. Record programmed setpoints (hot water supply, safeties).
4. Verify boiler fan runs smoothly and quietly.
5. Verify voltages and amperages are within tolerance.
6. Verify gas pressure is within tolerance.
7. Verify burner modulation/staging at varying loads
8. Verify flow data in TA&B report versus design
9. Verify all alarms and safeties.
10. Verify all interlocks.

D. Cooling Towers:
1. Record outside air temperature during test.
2. Record programmed setpoints (condenser water temp, OA reset temps, heater temp, freeze control temp, low-limit temp.)

3. Record programmed schedules
4. Verify fans run smoothly and quietly.
5. Verify voltages and amperages are within tolerance.
6. Verify correct fan rotation (in VFD Auto, Hand, Manual, and Bypass positions).
7. Verify tower data in TA&B report versus design
8. fan modulation to maintain temperature setpoint.
9. condenser water bypass valve operation
10. Verify all alarms and safeties.
11. Verify all interlocks.
12. Verify all sequences.

E. Chillers:
1. Record outside air temperature during test.
2. Record programmed setpoints (supply chilled water setpoint, minimal temperature differentials, minimal flow, safeties)
3. Verify chillers run smoothly and quietly under varying loads.
4. Verify voltages and amperages are within tolerance.
5. Verify chiller data in TA&B report versus design (condenser and evaporator side)
6. Verify compressor modulation to control supply chilled water temperature.
7. Verify low-flow (condenser and evaporator) shutdown and restart.
8. Verify high-condenser water alarm and shutdown
9. Verify loss of power restart
10. Verify all alarms and safeties.
11. Verify all interlocks
12. Verify all sequences.

F. HVAC Pumps:
1. Record outside air temperature during test.
2. Record programmed schedules
3. Verify pumps run smoothly and quietly.
4. Verify voltages and amperages are within tolerance.
5. Verify correct fan rotation (in VFD Auto, Hand, Manual, and Bypass positions).
6. Verify pump data in TA&B report versus design flow and pressure
7. Verify all alarms and safeties.
8. Verify all sequences.

G. VAV Boxes:
1. Record outside air temperature during test.
2. Record space temperature during test.
3. Record programmed setpoints (occ/unocc heating and cooling temps, max and min airfows, discharge air temp, safeties)
4. Record programmed schedules
5. Verify voltages and amperages are within tolerance.
6. Verify VAV data in TA&B report versus design
7. Verify fan operation.
8. Verify hot water control valve operation.
9. Verify damper operation
10. Verify all alarms and safeties.
11. Verify all interlocks.
12. Verify all sequences.

H. Air Handling Units:
1. Record outside air temperature during test.
2. Record programmed setpoints (supply air temp, static pressure, CO2, occupied/unoccupied, warm-up/cooldown, safeties)
3. Record programmed schedules
4. Verify fans run smoothly and quietly.
5. Verify voltages and amperages are within tolerance.
6. Verify correct fan rotation (in VFD Auto, Hand, Manual, and Bypass positions).
7. Verify AHU data in TA&B report versus design (air and water side)
8. Verify chilled water control valve operation and temperature control.
9. Verify hot water control valve operation and temperature control.
10. Verify fan modulation to maintain duct static pressure setpoint and cfm
11. Verify damper operation (Return, Outside and relief).
12. Verify Smoke detector operation.
13. Verify all alarms and safeties.
14. Verify all sequences.

I. Terminal Units:
1. Record outside air temperature during test.
2. Record space temperature during test.
3. Record programmed setpoints (occ/unocc heating and cooling temps, max and min airflows, discharge air temp, filter hours, safeties)
4. Record programmed schedules
5. Verify fans run smoothly and quietly.
6. Verify voltages and amperages are within tolerance.
7. Verify correct fan rotation.
8. Verify AHU data in TA&B report versus design
9. Verify fan operation.
10. Verify verify heating coil/electric heater operation.
11. Verify damper operation
12. Verify all alarms and safeties.
13. Verify all sequences.

J. Exhaust Fans
a. Record outside air temperature during test.
b. Record programmed schedules and interlocks
c. Verify fans run smoothly and quietly.
d. Verify voltages and amperages are within tolerance.
e. Verify fan data in TA&B report versus design
f. Verify backdraft damper operation
g. Verify all alarms and safeties.
h. Verify all sequences.

K. Dx Single-Zone Units:
1. Record outside air temperature during test.
2. Record space temperature during test.
3. Record programmed setpoints (occ/unocc heating and cooling temps, runtime, safeties and alarms)
4. Record programmed schedules and interlocks
5. Verify fans run smoothly and quietly.

6. Verify voltages and amperages are within tolerance.
7. Verify unit data in TA&B report versus design.
8. Verify compressor cycling to control space temperature.
9. Verify Smoke detector operation.
10. Verify all alarms and safeties.
11. Verify all sequences.

L. Heat Exchangers:
1. Record outside air temperature during test.
2. Verify isolation valves are installed correctly and operational.
3. Verify control valves are and installed correctly and operational.
4. Verify proper flow direction.
5. Verify unit data in TA&B report versus design.
6. Verify proper flow direction
7. Record entering and leaving water temperatures
8. Record entering and leaving water pressure
9. Verify secondary temperature variations with respect to primary
10. Verify all alarms and safeties
11. Verify sequences maintain loop temperature setpoints.

M. Heat Recovery Units:
1. Record outside air temperature during test.
2. Verify unit data in TA&B report versus design.
3. Verify On/Off control of exhaust and supply fans.
4. Verify damper Open/Close Control.
5. Record programmed schedules and interlocks.
6. Record entering and leaving DB and WB temperatures
7. Verify fans run smoothly and quietly.
8. Verify voltages and amperages are within tolerance.
9. Verify all alarms and safeties.
10. Verify all interlocks.

N. Water Source Heat Pumps:
1. Record outside air temperature during test.
2. Verify unit data in TA&B report versus design.
3. Record space temperature during test. Record programmed setpoints (occ/unocc heating and cooling temps, coil discharge air temps, static pressure, safeties and alarms)
4. Record entering and leaving water temperature in cooling and heating mode.
5. Record programmed schedules.
6. Verify unit issues call for plant.
7. Verify isolation valve open and closes without causing alarm
8. Verify fans run smoothly and quietly.
9. Verify voltages and amperages are within tolerance.
10. Verify hot gas reheat operation.
11. Verify Smoke detector operation.
12. Verify all alarms and safeties.
13. Verify all sequences.

O. Testing Adjusting and Balancing (TAB).
1. Review TAB report for accuracy and completeness.

2. Take random sample of air flow from supply air diffusers and compare to TAB report / design drawings.
3. Take pressure readings at inlets and outlets of hydronic pumps and compare to TAB report and pump curves.

P. Direct Digital Controls (DDC) for HVAC –Refer to Section 230926c BUILDING AUTOMATION SYSTEM COMMISSIONING REQUIREMENTS.

3.10 TRAINING

A. Refer to section 016500 - GENERAL COMMISSIONING REQUIREMENTS.

3.11 O&M MANUALS

A. Refer to section 016500 - GENERAL COMMISSIONING REQUIREMENTS and section 017800 CLOSEOUT SUBMITTALS.

END OF SECTION

DIRECT DIGITAL CONTROLS FOR LOCAL BUILDING AUTOMATION SYSTEMS
TRIDIUM-BACNET WEB-BASED –SECTION 230926a
REVISION March 25, 2026

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, apply to this Section.

B. Specifications and drawings are complementary to each other and binding. What is called for by one shall be binding as if called for by both. Should there be a conflict between drawings and specifications regarding a material shown of work described or detailed then the material of work having the greater value shall be provided.

1.2 SUMMARY

A. Provide all hardware, software, materials, labor, and programming for the implementation of a complete standalone Local Building Automation System (BAS) for control of HVAC systems and components.

B. The system shall consist of a network of microprocessor-based, peer-to-peer, networked, distributed devices utilizing the BACnet communication protocol in an open, interoperable system. The system shall include all wiring and control devices, sensors, actuators, valves, dampers, and hardware required for a complete operational system that will achieve the control sequences specified.

C. Factory mounted controls on hydronic equipment are not permitted and shall not be considered as an option to achieve scope of work. All building controls shall be field installed except for packaged equipment that is specifically listed to be provided with onboard controls on the equipment schedules.

D. Provide all programming to achieve specified operational sequences, and development of graphical screens, setup of schedules, trends, logs, alarms, network management, and operational connection of the Operator Workstation (B-OWS/AWS) to the local area network.

E. Access to the Building Automation System for configuration and monitoring shall be performed via the Operator Workstation (B-OWS/AWS) connected to the LAN or WAN.

F. All components of the system shall be BACnet Testing Laboratories (BTL) Certified.

G. System design shall follow pertinent and applicable BACnet guidelines. Controllers that require a master computer or controller to perform basic functions are not acceptable. In the event of a network communication failure, or the loss of any other controller on the BACnet network, the control system shall continue to independently operate under control of the resident program stored in nonvolatile memory as detailed herein.

H. The network infrastructure shall conform to the BACnet published guidelines for network wiring and system architecture. Wire type, distance, termination, and use of routers shall strictly conform to the BACnet wiring standards. The number of nodes per channel shall be

no more than 80% of the defined segment (logical or physical) limit to provide future system enhancement with minimal infrastructure modifications.

I. Mechanical equipment controllers shall include all control points and achieve all control sequences specified while operating under stand-alone control, independently of connection to the network manager.

J. Provide DDC system shop drawings and submittals, participate in submittal review meetings, and obtain final approval of submittal from Owner and Engineer prior to installation of system.

K. Fully test system prior to requesting installation inspection and pre-functional testing by Owner, Engineer, and Commissioning Authority.

L. Schedule competent technical personnel to participate in Commissioning activities.

M. Provide a Schedule of Values for work of this section, that includes the following:

1. Submittals (5%)
2. Materials (35%)
3. Installation (35%)
4. Installation Verification with Owner's CxA (5%)
5. Programming & Graphics (10%)
6. Point check out and Commissioning with Owner's CxA (5%)
7. Final O&Ms and As-Built Documentation (5%)

1.3 SYSTEM PERFORMANCE

A. Comply with the following performance requirements:

1. Graphic Display: Display graphic with minimum 20 dynamic points with current data within 10 seconds.
2. Graphic Refresh: Update graphic with minimum 20 dynamic points with current data within 8 seconds.
3. Object Command: Reaction time of less than ten seconds between operator command of a binary object and device reaction.
4. Object Scan: Transmit change of state and change of analog values to control units or workstation within eight to ten seconds.
5. Alarm Response Time: Annunciate alarm at workstation within 45 seconds. Multiple workstations must receive alarms within five seconds of each other.
6. Program Execution Frequency: Run capability of applications as often as five seconds, but selected consistent with mechanical process under control.
7. Performance: Programmable controllers shall execute DDC PID control loops, and scan and update process values and outputs at least once per second.

1.4 ACCEPTABLE CONTRACTORS

A. Pending compliance with this specification, the following firms have been deemed acceptable contractors for the products and services herein specified (in no specific order):

1. Tempset Controls Inc.
2. Goto Automation
3. Climatec (for New Construction only)

B. Contractor responsible for work under this Section shall be a local factory certified office of the manufacturer of control systems located within 75-mile radius from the job site. Experience requirements below apply only to the local factory certified office.

C. Contractor shall have, as a minimum, five (5) years of documented continuous business experience in the installation of controls, instrumentation, and Energy Management Systems.

D. Contractor's local personnel conducting work of this section shall have a minimum of three (3) years of experience in the installation of BACnet systems. Personnel conducting work shall be:

1. Tridium Niagara N4 Certified
2. BACnet Certified Professional

Contractor shall provide evidence of certifications upon request.

E. The installing office shall provide a list of completed and accepted BACnet job references. The references shall include one job from each of the Three (3) years required.

F. Each reference shall include the following: the job name, the job size, the owner with address, contact name and phone number, the general contractor, the mechanical contractor, and the contracting company's system programmer name(s).

G. The Contractor's BACnet Certified personnel shall be directly responsible for all work related to:

1. System design
2. Submittals
3. Programming
4. Installation Supervision
5. Calibration
6. Checkout
7. Commissioning.

1.5 SUBMITTALS

A. Scope of Work Summary: Include in submittal package a clear written summary of the scope of control work, including but not limited to the following:

1. Integration with the existing systems (if any) at the facility.
2. Scope of demolition work (if any)
3. Systems to be controlled as part of this work, clearly stating which systems will receive full DDC systems, and which (if any) will receive only timeclock control.
4. Evidence of coordination with manufacturers of equipment provided under the mechanical and electrical scope of work to verify that all required control points and sequences will be implemented, regardless of whether the DDC controls reside in a controller provided by the equipment manufacturer or the controls contractor.

B. Product Data:

1. DDC System Hardware:
   a. Include technical data for operator workstation equipment, interface equipment, control units, transducers/transmitters, sensors, actuators, valves, relays/switches, control panels, and operator interface equipment.

b. Include manufacturer's technical literature for each control device. Indicate dimensions, capacities, performance characteristics, electrical characteristics, finishes for materials, and installation and startup instructions for each type of product indicated. Highlight model/options of proposed device when product data shows multiple models/options.
c. Provide in schedule form a complete listing of all network control devices along with the device profile to which the device conforms (BACnet standard Annex L).

2. System Software: Include technical data for operating system software, service maintenance agreements, Niagara connections and device/point count license details.
3. Controlled Systems: Instrumentation list with element name, type of device, manufacturer, model number, and product data.
4. Cabling: Technical data sheets for all cables.

C. Shop Drawings:

1. Include AISD Project Number on cover page.
2. Include specification section and revision on cover page.
3. Include installing Contractor and their contact information on the cover page.
4. Single-line schematic diagram, top-level subsystem, depicting the network architecture with scheduled devices shown as distinct items. The top-level subsystem shall illustrate the network media, channel transceiver types, subsystems, network interfaces, repeaters, and terminators if utilized.
5. Provide floor plan drawings of the building showing location of equipment, control panels, room numbers, space sensors and mounting location of remote sensors/transmitters/actuators. Include proposed routing of all digital communication links capturing all controllers and communicating devices. Mark floor plans where control wiring transitions to other floors when applicable.
6. System diagrams for each system and subsystem, including power supply through starters and motors; motor starting and interlock wiring; pushbuttons; all control wiring; interior electrical circuits of control instruments with terminal designations; control motors; wire tags and tag numbers, instruments, and remote elements; normal position of valves, dampers, and relays. A detailed description of the operation of the control system, including control device designation, shall accompany the drawings.
7. Bill of materials of equipment indicating quantity, manufacturer, and model number.
8. Details of control panel faces, including controls, instruments, and labeling.
9. Schedule of dampers including size, leakage, and flow characteristics.
10. Schedule of valves including flow characteristics.
11. DDC System Hardware:
    a. Wiring diagrams for control units with termination numbers.
    b. Schematic diagrams and floor plans for field sensors and control hardware.
    c. Schematic diagrams for control, communication, and power wiring, showing trunk data conductors and wiring between operator workstation and control unit locations.
12. Controlled Systems:
    a. Schematic diagrams of each controlled system with control points labeled and control elements graphically shown, with wiring.
    b. Scaled drawings showing mounting, routing, and wiring of elements including bases and special construction.
    c. Written description of sequence of operation including schematic diagram. In the event the sequences proposed by Engineer are unclear, incomplete, or

known to be non-compliant with Owner's requirements, Contractor shall issue a Request For Information (RFI) document prior to preparing submittals.

d. Points list: Provide a complete list of all input and output points, alarms, setpoints and schedules that will be transmitted to and from the Web Server. This point list shall include points to be obtained from BACnet Controllers provided by equipment manufacturers.

D. Preliminary Submittal (Shop Drawings and Product Data)

1. Prepare a Preliminary Submittal for review by Owner, Engineer, and Commissioning Authority.
2. Make arrangements with General and Mechanical Contractors to transmit Preliminary Submittal electronically to all recipients simultaneously, with no paper copy to follow.
3. Shop Drawings and Product Data shall be submitted at the same time but as separate files.
4. Request a Preliminary Submittal Review meeting with General Contractor, Mechanical Contractor, Owner, Engineer, and Commissioning Authority no less than six (6) days after transmittal. This time is required for review by all parties.
5. Contractor shall lead the Preliminary Submittal Review Meeting to address at least the following:
   a. Owner, Engineer, and Commissioning Authority comments
   b. Resolution to any pending RFI's related to control work
   c. Final coordination of any controls provided by equipment manufacturers (in which case manufacturers should be asked to attend meeting as well)
   d. Timeline for final submittal

E. Final Submittal (Shop Drawings and Product Data)

1. Prepare Final Submittal after addressing all issues discussed during Preliminary Submittal Review Meeting.
2. Allow six (6) days for review by Owner, Engineer and Commissioning Authority.
3. Installation shall not begin until submittal approval is obtained. Installation shall agree with the approved submittals. All work performed prior to submittal approval shall be at Contractor's own risk.

1.6 OPERATION AND MAINTENANCE DATA

A. At the time of Functional Testing, update submittal data to reflect condition of systems as installed and programmed.

B. Make any final revisions made during Functional Testing with Owner and Commissioning Authority.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Refer to Paragraph 1.5.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Installation in accordance with all codes and local ordinances. Refer to Part 3 of this specification for additional installation requirements.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Factory-Mounted Components: Where control devices specified in this Section are indicated to be factory mounted on equipment, arrange for shipping of control devices to equipment manufacturer.

1.9 COORDINATION

A. Prior to preparing submittals, coordinate location of control devices and routing of wiring with plans and room and equipment details. For retrofit applications, conduct a detailed inspection of the site and equipment to receive controls in order to identify optimal locations for devices, mounting of controllers, and routing of wiring.

B. It is the intent of this specification that the Section 230926 Contractor shall be responsible for all power and control wiring and raceways associated with the turnkey operational installation of the DDC system.

1.10 WARRANTY

A. The entire BACnet network controls system including wiring, controllers, controlling devices, sensing devices, integral components, service and labor will be warranted for one (1) year from date of system acceptance date unless the manufactures warranty extends beyond the one (1) year warranty. The warranty will then be as indicated by the manufacture of the product.

B. System acceptance date starts upon successful completion of Functional Testing, as determined by Commissioning Authority.

C. If corrective software and/or hardware modifications are made during the warranty period, the BAS controls contractor shall update all user documentation, user and manufacturer archived CD ROM and software disks.

1.11 TRAINING

A. Provide a minimum of **16 hours** of training to AISD personnel. The number of individuals selected for training shall be at the sole discretion of AISD.

B. Training shall cover all aspects of the specified controls system from system overview and operation to basic troubleshooting. Training shall include a mix of classroom and actual hands-on instruction to include but not limited to training during commissioning of BACnet nodes on site and application specific at the BAS system contractor's local office. Training shall include a minimum of eight (8) hours of classroom and eight (8) hours of field training on the newly installed control system. At AISD's discretion, the training may be mixed to allow for more or less time in the classroom or field training areas.

C. The BAS System Contractor shall create an agenda for the training class and submit it for approval by AISD Energy Management Department before training classes are scheduled.

D. Provide all training manuals, materials, and operator and maintenance manuals as required.

1.12 CODES AND STANDARDS

A. The completed and operational BAS shall be in compliance with and meet the requirements of all governing bodies, Authorities Having Jurisdiction (AHJ), applicable local or national standards and codes, except where more stringent or detailed requirements are indicated by the Contract Documents, including the requirements set forth in this Specification and the following:

1. ASHRAE 135-2020: BACnet -Building and Air Conditioning Engineers (ASHRAE)
2. Underwriters Laboratories UL-916: Energy Management Systems (EMS)
3. NIST IR 6392 Annex B: Profiles of Standard BACnet Devices
4. EIA-485: Standard for Electrical Characteristics of Generator and Receivers for Use in Balanced Digital Multi-Point System.

PART 2 - PRODUCTS

2.1 OPEN, INTEROPERABLE, INTEGRATED ARCHITECTURES

A. The intent of this specification is to provide a peer-to-peer networked, distributed control system using ANSI/ASHRAE Standard 135-2020, BACnet technology communication protocols, in an open, interoperable system. The direct digital control (DDC) system shall consist of BACnet based microprocessor-based controllers, plus instrumentation, control valves, dampers, operators, control devices, interface equipment, network manager, BACnet communication interfaces, and other apparatus required to operate systems and perform functions specified. The DDC system shall be capable of providing total integration of the facility infrastructure systems with user access to all system data via Human Machine Interface (HMI) using a Web Browser such as Internet Explorer™, Mozilla Firefox™ or Google Chrome™ connected to the system network using the LAN or WAN.

2.2 NETWORKS

A. The system architecture shall support the following devices

1. Operator Workstation (B-OWS)
2. Advanced Operator Workstation (B-AWS)
3. Building Controllers (B-BC)
4. Advanced Application Controllers (B-AAC)
5. Application Specific Controllers (B-ASC)
6. BACnet Router (B-RTR)
7. BACnet Gateway (B-GW)
8. BACnet Smart Sensor (B-SS)
9. BACnet Smart Actuator (B-SA)
10. Broadcast Management Device (B-BBMD)

B. BAS Manufacturer must natively support the following BACnet protocols as defined in the ANSI/ASHRAE Standard 135-2020, BACnet:

1. BACnet MSTP
2. BACnet IP

C. Enterprise Level Communication Network (ELCN) shall consist of an Owner furnished high-speed Ethernet/IP Local Area Network (LAN) and/or Wide Area Network (WAN) to host Operator Workstations (B-OWS, B-AWS).

D. Building Level Communication Network (BLCN) shall consist of a Contractor-furnished secondary and dedicated BACnet-IP network to host Building Controllers, Advanced Application Controllers, Application Specific Controllers, BACnet Routers, BACnet Gateways, BACnet Smart Sensors and BACnet Smart Actuators.

1. Secondary LAN shall be Ethernet-IP with the following minimum requirements:
   a. Media: Unshielded Twisted-Pair (UTP-8), Category 6

b. Throughput; 10/100 Mbps

E. BACnet Routers shall be used to create serial networks such as BACnet MSTP to host Advanced Application Controllers or Application Specific Controllers.

1. Acceptable Products
   a. 1-Channel: Contemporary Controls BASRT-B
   b. 2-Channel: Loytec LIP-ME202C
   c. 4-Channel: Loytec LIP-MEP204C

F. BACnet Gateways shall be used when scope of work requires integrating existing LonWorks devices.

1. Acceptable Products
   a. 1-Channel: Loytec LIP-3ECTC
   b. 2-Channel: Loytec LIP-33ECTC
   c. 4-Channel: Loytec LIP-3333ECTC

G. BACnet MSTP Serial Networks

1. Provide B-BC/AACs controllers with built-in BACnet-MSTP sub-network communication as required to maintain traffic isolation and peak network performance.

2.3 GRAPHICAL USER INTERFACE (GUI) SOFTWARE

A. Graphical User Interface: Provide a software tool that allows for the development and management of the end users' Graphical User Interface (GUI) and as the primary point of access to the BAS for the end user.

B. The GUI shall employ browser-like functionality for ease of navigation. It shall include a tree view (similar to Windows Explorer) for quick viewing of, and access to, the hierarchical structure of the database. In addition, menu-pull downs, and toolbars shall employ buttons, commands and navigation to permit the operator to perform tasks with a minimum knowledge of the HVAC Control System and basic computing skills. These shall include, but are not limited to, forward/backward buttons, home button, log-off button and a context sensitive locator line (similar to a URL line), that displays the location and the selected object identification.

C. Real Time Displays: The GUI shall at a minimum support the following features and functions:

1. Graphic screens shall be developed using any drawing package capable of generating or assembling objects from a GIF, JPG, PNG or ICO file format. Use of proprietary graphic file formats shall not be acceptable. In addition to, or in lieu of a graphic background, the GUI shall support the use of scanned pictures.
2. Graphic screens shall have the capability to contain objects for text, real-time values, animation, color spectrum objects, logs, graphs, HTML or XML document links, schedule objects, hyperlinks to other URL's, and links to other graphic screens.
3. Modifying common application objects, such as schedules, calendars, and set points shall be accomplished in a graphical manner.
4. Schedule and holiday times shall be adjusted using a graphical calendar.
5. Commands to start and stop binary objects shall be done by right-clicking the selected object and selecting the appropriate command from the pop-up menu.

6. Adjustments to analog objects, such as set points, shall be done by right-clicking the selected object and using a graphical slider to adjust the value.

D. System Configuration: At a minimum the GUI shall permit the operator to perform the following tasks with proper password access:

1. Create, delete or modify control strategies
2. Add/delete objects to the system
3. Tune control loops through the adjustment of control parameters
4. Enable or disable control strategies
5. Override inputs and outputs (permanent and timed)
6. Generate hard copy records or control strategies on a printer
7. Select point to be trended over a period of time and initiate the recording of values automatically.

E. On-Line Help: Provide a context sensitive, on-line help system to assist the operator in operation and editing of the system. On-line help shall be available for all applications and shall provide the relevant data for that particular screen. Additional help information shall be available through the use of hypertext. All system documentation and help files shall be in HTML format.

F. Security: Each operator shall be required to log on to that system with a username and password in order to view, edit, add, or delete data. System security shall be selectable for each operator. The system administrator shall have the ability to set passwords and security levels for all other operators. Each operator password shall be able to restrict the operators' access for viewing and/or changing each system application, full screen editor, and object. Each operator shall automatically be logged off of the system if no keyboard or mouse activity is detected. This auto log-off time shall be set per operator password. All system security data shall be stored in an encrypted format.

G. System Diagnostics: The system shall automatically monitor the operation of all workstations, printers, modems, network connections, building management panels, and controllers. The failure of any device shall be annunciated to the operator.

H. Alarm Console:

1. The system will be provided with a dedicated alarm window or console. This window will notify the operator of an alarm condition and allow the operator to view details of the alarm and acknowledge the alarm. The use of the Alarm Console can be enabled or disabled by the system administrator.
2. When the Alarm Console is enabled, a separate alarm notification window will supersede all other windows on the desktop and shall not be capable of being minimized or closed by the operator. This window will notify the operator of new alarms and un-acknowledged alarms. Alarm notification windows or banners that can be minimized or closed by the operator shall not be acceptable.

2.4 WEB BROWSER CLIENTS

A. A web browser shall be the primary means of access to the BAS for day-to-day operation from any PC connected to the LAN and remote via internet without the need for any proprietary software.

B. The system shall be capable of supporting an unlimited number of clients using a standard Web browser such as Internet Explorer™, Mozilla Firefox™ or Google Chrome™.

Systems requiring additional software (to enable a standard Web browser) to be resident on the client machine, or manufacture-specific browsers shall not be acceptable.

C. The Web browser shall provide the same view of the system, in terms of graphics, schedules, calendars, logs, etc., and provide the same interface methodology as is provided by the Graphical User Interface. Systems that require different views or that require different means of interacting with objects such as schedules, or logs, shall not be permitted.

D. The Web browser client shall support at a minimum, the following functions:

1. User log-on identification and password shall be required. If unauthorized user attempts access, a blank web page shall be displayed. Security using Java authentication and encryption techniques to prevent unauthorized access shall be implemented.
2. Graphical screens developed for the GUI shall be the same screens used for the Web browser client. Any animated graphical objects supported by the GUI shall be supported by the Web browser interface.
3. HTML programming shall not be required to display system graphics or data on a Web page.
4. Storage of the graphical screens shall be in the Operator Workstation (B-OWS/AWS), without requiring any graphics to be stored on the client machine. Systems that require graphics storage on each client are not acceptable.
5. Real-time values displayed on a Web page shall update automatically without requiring a manual “refresh” of the Web page.
6. User shall have administrator-defined access privileges. Depending on the access privileges assigned, the user shall be able to perform the following:
    a. Modify common application objects, such as schedules, calendars, and set points in a graphical manner.
    b. Schedule times will be adjusted using a graphical slider, without requiring any keyboard entry from the operator.
    c. Holidays shall be set by using a graphical calendar, without requiring any keyboard entry from the operator.
    d. Commands to start and stop binary objects shall be done by right clicking the selected object and selecting the appropriate command from the pop-up menu. No entry of text shall be required.
    e. View logs and charts.
    f. View and acknowledge alarms.
    g. The system shall provide the capability to specify a user’s (as determined by the log-on user identification) home page. Provide the ability to limit a specific user to just their defined home page. From the home page, links to other views, or pages in the system shall be possible, if allowed by the system administrator.
    h. Graphic screens on the Web Browser client shall support hypertext links to other locations on the Internet or on Intranet sites, by specifying the Uniform Resource Locator (URL) for the desired link.

2.5 OPERATOR/ADVANCED OPERATOR WORKSTATION (B-OWS/AWS)

A. The Operator/Advanced Operator Workstation (B-OWS/AWS) shall provide the interface between the LAN or WAN and the field control devices and provide global supervisory control functions over the control devices connected to the B-OWS/AWS.

B. The B-OWS/AWS shall be capable of executing application control programs to provide:

1. Calendar functions
2. Scheduling
3. Trending
4. Alarm monitoring and routing
5. Time synchronization
6. Integration of BACnet controller data
7. Network management functions for all BACnet based devices.

C. The B-OWS/AWS shall provide the following features as a minimum:

1. Hardware (Minimum Requirements)
   a. 12th Generation Intel i5 Processor
   b. 8GB DDR4 RAM
   c. 128GB SSD
   d. Dual Gigabit LAN
   e. Fanless, Dust-Proof Chassis
   f. 2-USB Ports
   g. 1-HDMI Port
   h. 3-Year Warranty
   i. Provide with panel mounted UPS
2. Software
   a. Windows 11 Pro
   b. Niagara N4 Supervisor
      1) Version: Consult with AISD Controls Department for latest Niagara version in use.
      2) NiCS: Open License (Vendor Neutral, No Vendor Locking)
3. Niagara Licenses
   a. Devices/Points: 25% Spare Capacity (Devices & Points)
   b. Supervisor SMA: 5-Year
   c. Niagara Connections: N+1 where,
      1) N=Total number of existing B-OWS/AWS's on Campus
   d. Niagara Connections SMA: 5-Year to match number of connections
4. Acceptable Hardware Products
   a. OnLogic
   b. SimplyNUC
   c. Other manufacturers may be accepted upon review and approval.

D. The B-OWS/AWS shall provide multiple user access to the system and support for ODBC or SQL. A database resident on the B-OWS/AWS shall be an ODBC-compliant database or must provide an ODBC data access mechanism to read and write data stored within it.

E. The B-OWS/AWS shall provide all scheduling, alarming, trending, and network management for all BACnet devices.

F. The B-OWS/AWS shall support standard Web browser access via the Intranet/Internet. It shall support a minimum of 5 simultaneous users.

G. Event Alarm Notification and actions - The B-OWS/AWS shall provide alarm recognition, storage; routing, management, and analysis to supplement distributed capabilities of equipment or application specific controllers. The B-OWS/AWS shall be able to route any alarm condition to any defined user location whether connected to a local network or remote via dial-up, telephone connection, or wide-area network.

1. Alarm generation shall be selectable for annunciation type and acknowledgement; routing, management, and analysis to supplement distributed capabilities of equipment or application specific controllers. The B-OWS/AWS shall be able to route any alarm condition to any defined user location whether connected to a local network or remote via dial-up, telephone connection, or wide-area network.
   a. To Alarm
   b. Return to normal
   c. To fault
2. Provide for the creation of a minimum of eight of alarm classes for the purpose of routing types and or classes of alarms, i.e.: security, HVAC, Fire, etc.
3. Provide timed (schedule) routing of alarms by class, object, group, or node.
4. Provide alarm generation from binary object "runtime" and /or event counts for equipment maintenance. The user shall be able to reset runtime or event count values with appropriate password control. Control equipment and network failures shall be treated as alarms and annunciated.
5. Alarms shall be annunciated in any of the following manners as defined by the user, but implemented by this contractor:
   a. Screen message on screen
   b. Email of the complete alarm message to multiple recipients. Provide the ability to route and email alarms based on:
      1) Day of week
      2) Time of day
      3) Recipient
   c. Pagers via paging services that initiate a page on receipt of email message.
   d. Graphic with flashing alarm object(s).
   e. Printed message, routed directly to a dedicated alarm printer.
6. The following shall be recorded by the B-OWS/AWS for each alarm (at a minimum):
   a. Time and date
   b. Equipment (Air handler #, pump, etc.)
   c. Acknowledge time, date and user who acknowledged
   d. Number of occurrences since last acknowledgement
7. Alarm actions may be initiated by user defined programmable objects created for that purpose.
8. Defined users shall be given proper access to acknowledge any alarm, or specific types or classes of alarms defined by the user.
9. A log of all alarms shall be maintained by the B-OWS/AWS and/or a server (if configured in the system) and shall be available for review by the user.
10. Provide a "query" feature to allow review of specific alarms by user defined parameters.
11. A separate log for system alerts (controller failures, network failures, etc.) shall be provided and available for review by the user.
12. An Error Log to record invalid property changes or commands shall be provided and available for review by the user.

H. Data Collection and Storage

1. The B-OWS/AWS shall have the ability to collect data for any property of any object and store this data for future use.
2. The data collection shall be performed by log objects, resident in the B-OWS/AWS that shall have, at a minimum, the following configurable properties:

a. Designating the log as interval or deviation.
b. For interval logs, the object shall be configured for time of day, day of weeks and the sample collection interval.
c. For deviation logs, the object shall be configured for the deviation of a variable to a fixed value. This value, when reached, will initiate logging of the object.
d. For all logs, provide the ability to set the maximum number of data stores for the log and to set whether the log will stop collecting when full, or rollover the data on a first-in, first-out basis.
e. Each log shall have the ability to have its data cleared on a time-based event or by a user-defined event or action.

3. All log data shall be stored in a relational database in the B-OWS/AWS and the data shall be accessed from a server (if the system is so configured) or a standard Web Browser. All log data, when accessed from a server, shall be capable of being manipulated using standard SQL statements. All log data shall be available to the user in the following data formats:
   a. HTML
   b. XML
   c. Plain Text
   d. Comma or tab separated value
4. Systems that do not provide log data in HTML and XML formats at a minimum shall not be acceptable.
5. The B-OWS/AWS shall have the ability to archive its log data either locally (to itself), or remotely to a server or other B-OWS/AWS on the network. Provide the ability to configure the following archiving properties, at a minimum:
   a. Archive when the log has reached its user-defined capacity of data stores
   b. Archive on time of day
   c. Archive on user-defined number of data stores in the log (buffer size)
   d. Provide ability to clear logs once archived
6. Provide and maintain an Audit Log that tracks all activities performed on the B-OWS/AWS. Provide the ability to specify a buffer size for the log and the ability to archive log based on time or when the log has reached its user-defined buffer size. Provide the ability to archive the log locally to the B-OWS/AWS, to another B-OWS/AWS on the network, or to a server. For each log entry, provide the following data:
   a. Time and date
   b. User ID
   c. Change or activity, i.e. change setpoint, add or delete objects, commands, etc.

I. Database Backup and Storage

1. The B-OWS/AWS as provided shall have the ability to automatically backup its database. The database shall be backed up based on a user-defined time interval. Copies of the current database and, at the most recently saved database shall be stored in the B-OWS/AWS. The age of the most recently saved database is dependent on the user-defined database save interval. The B-OWS/AWS database shall be stored, at a minimum, in XML format to allow for user viewing and editing, if desired. Other formats are acceptable as well, as long as XML format is supported.
2. Provide all tools necessary for the development, maintenance, expansion and use of the BAS described within these specifications. All software tools shall be compatible with the network management tool (workbench) that is provided as part of this project.

For the purpose of this specification software tools shall be divided into the following categories and meet these specified requirements.

J. B-OWS/AWS Programming Wizards for B-BC/B-AAC/ASC Controllers

1. Provide Wizards or objects that facilitate the programming and configuration of the B-BC, B-AAC and B-ASC Controllers sequence of operation through a menu driven wizard. All software tools (including Wizards) shall be compatible with the network management tool (workbench) that is provided as part of this project. The programming and configuration tools shall perform the following functions:
   a. B-BC and B-AAC Controllers programming shall be accomplished by Graphical programming language (GPL) where objects are used to define different portions of the control sequence. All control sequences programmed into the controller shall be stored in non-volatile memory. Systems that only allow selection of sequences from a library or table are not acceptable. All code must be exportable to a library for future use.
   b. B-ASC Controllers – Provide for the programming of the required sequence of operation through an intuitive menu driven selection process. The configuration tools menu shall define items such as I/O configurations, set point, delays, PID loops, optimum start stops, and network variables settings. The configuration tool must indicate the device status and allows system override. Or, provide for the programming of the required sequence of operation through Graphical programming language (GPL) where objects are used to define different portions of the control sequence. All control sequences programmed into the controller shall be stored in non-volatile memory. Systems that only allow selection of sequences from a library or table are not acceptable. All code must be exportable to a library for future use.

K. B-OWS/AWS Network Management Software Tools

1. Provide a complete set of Network Management tools that provides for the development and management of BACnet networks.
2. Network management shall include the following services: device identification, device installation, device configuration, device diagnostics, device maintenance and network variable binding.
3. The network configuration tool shall also provide diagnostics to identify devices on the network, to reset devices, and to view health and status counters within devices.
4. These tools shall provide the ability to “discover” existing BACnet networks, regardless of what network management tool(s) were used to install the existing network, so that existing BACnet devices and newly added devices are part of a single network management database.
5. The network management database shall be resident in the B-OWS/AWS and with proper authorization, shall allow access to the network management database. Systems employing network management databases that are not resident in the B-OWS/AWS, shall not be accepted.
6. System shall allow access to all of the Network Management tool functions including controller programming from a Web Browser.

L. B-OWS/AWS Programming Software

1. Provide programming software for the B-OWS/AWS that allows for the development of the B-OWS/AWS control logic, point management, global properties such as alarm, trend, and scheduling.

2. All library of control, application, and graphic objects shall be provided to enable the creation of all applications and user interface screens. Access to these functions shall be provided through Graphical User Interface software (GUI). Applications are to be created by selecting the desired control objects from the library, dragging or pasting them on the screen, and linking them together using a built-in graphical connection tool. Completed applications may be stored in the library for future use. Graphical User Interface screens shall be created in the same fashion. Data for the user displays is obtained by graphically linking the user display objects to the application objects to provide "real-time" data updates. Any real-time data value or object property may be connected to display its current value on a user display. Systems requiring separate software tools or processes to create applications and user interface displays shall not be acceptable.
3. Programming Methods – Provide the capability to copy objects from the supplied libraries, or from a user-defined library to the user's application. Objects shall be linked by a graphical linking scheme by dragging a link from one object to another. Object links will support one-to-one, many-to-one, or one-to-many relationships. Linked objects shall maintain their connections to other objects regardless of where they are positioned on the page and shall show link identification for links to objects on other pages for easy identification. Links will vary in color depending on the type of link, i.e., internal, external, hardware, etc.
    a. Configuration of each object will be done through the object's property sheet using fill-in the blank fields, list boxes, and selection buttons. Use of custom programming, scripting language, or a manufacturer-specific procedural language for configuration will not be accepted.
    b. The software shall provide the ability to view the logic in an off-line (debug), the monitor mode shall allow the user to set values to inputs and monitor the logic for diagnosing execution before it is applied to the system.
    c. All programming shall be done in real-time. Systems requiring the uploading, editing, and downloading of database objects shall not be allowed.
    d. The system shall support object duplication within a customer's database. An application, once configured, can be copied, and pasted for easy re-use and duplication. All links, other than to the hardware, shall be maintained during duplication.

M. B-OWS/AWS Object Library

1. A standard library of software objects that represent functions and applications for the development and setup of application logic, user interface displays, system services, and communication networks.
2. The objects in this library shall be capable of being copied and pasted into the user's database and shall be organized according to their function. In addition, the user shall have the capability to group objects created in their application and store the new instances of these objects in a user-defined library.
3. In addition to the standard libraries specified here, the supplier of the system shall maintain an on-line accessible (over the Internet) library, available to all registered users to provide new or updated objects and applications as they are developed.

2.6 BUILDING CONTROLLERS (B-BC), ADVANCED APPLICATION CONTROLLERS (B-AAC), APPLICATION SPECIFIC CONTROLLERS (B-ASC)

A. General

1. All controllers provided as part of this system shall be able to operate normally under ambient environmental conditions of 32°F to 122°F and 5% to 90% relative humidity, non-condensing.
2. All controllers shall be able to accept 10K Type-2 Thermistors.
3. All analog input sensors shall be capable of calibration through the B-OWS/AWS.

B. System Design

1. Building Controllers (B-BC's) and Advanced Application Controllers (B-AAC's) shall be utilized primarily for Mechanical Systems such as Chiller System Control, Boiler System Control, Air Handling Units and Make-up Air Units.
2. Application Specific Controllers (B-ASC's) may be utilized for Terminal Equipment, such as VAV Terminal Units, DX Fan Coil Units, Unit Ventilators and Heat Pumps applications provided the scheduled sequence of operation can be met and unless otherwise specified on the drawings.
3. Each B-BC, B-AAC and B-ASC controller shall have a minimum of 10% spare capacity of each point type for future points. As a minimum, each controller shall have one spare of each point type available on the controller.
4. The B-BC, B-AAC and B-ASC controller programming or configuration tool shall be fully accessible through the Operator Workstation (B-OWS/AWS) and Web Browser Client through the use of Wizards. Provide Wizards or objects as specified in B-OWS/AWS paragraph that facilitate the programming and configuration of the B-BC's, B-AAC's and B-ASC's through a menu driven wizard.
5. Each B-BC, B-AAC and B-ASC controller shall perform its primary control function independent of the Building Operator Workstation (B-OWS/AWS). Reversion to a fail-safe mode of operation during LAN interruption is not acceptable.

C. Programming Software for B-BCs and B-AACs

1. Provide programing software that allows for the development of the control logic and point management.
2. Main programming method shall be Object-Oriented-Programming. Conditional programming (If, Then, Else) as the main programming method is not permitted.
3. A library of control, application, and graphic objects shall be provided to enable the creation of all applications and user interface screens. Access to these functions shall be provided through Graphical User Interface software (GUI). Applications are to be created by selecting the desired control objects from the library, dragging or pasting them on the screen, and linking them together using a built-in graphical connection tool. Completed applications may be stored in the library for future use. Graphical User Interface screens shall be created in the same fashion. Data for the user displays is obtained by graphically linking the user display objects to the application objects to provide "real-time" data updates. Any real-time data value or object property may be connected to display its current value on a user display. Systems requiring separate software tools or processes to create applications and user interface displays shall not be acceptable.
4. Provide the capability to copy objects from the supplied libraries, or from a user-defined library to the user's application. Objects shall be linked by a graphical linking scheme by dragging a link from one object to another. Object links will support one-to-one, many-to-one, or one-to-many relationships. Linked objects shall maintain their connections to other objects regardless of where they are positioned on the page and shall show link identification for links to objects on other pages for easy identification.

5. Configuration of each object will be done through the object's property sheet using fill-in the blank fields, list boxes, and selection buttons. Use of custom programming, scripting language, or a manufacturer-specific procedural language for configuration will not be accepted.
6. The software shall provide the ability to view the logic with value being inputted/outputted of the graphical blocks (debug mode).
7. The software shall allow for controllers to be programmed and debugged remotely without the need for direct connecting to the controller needing reprogramming or debugging.
8. The system shall support object duplication within a customer's database. An application, once configured, can be copied and pasted for easy re-use and duplication. All links, other than to the hardware, shall be maintained during duplication.

D. Building Controllers (B-BCs) and Advanced Application Controllers (B-AACs)

1. The Building Controller (B-BC) and Advanced Application Controller (B-AAC) shall be 32-bits microprocessor-based. They shall also be multi-tasking, real-time digital control processors consisting of modular hardware with plug-in enclosed processors, communication controllers, power supplies and input/output point modules. Controller size shall be sufficient to fully meet the requirements of this specification and the project point list.
2. Each B-BC and B-AAC shall have sufficient memory, to support its own operating system and databases, including:
   a. Control processes
   b. Energy management applications
   c. Alarm management applications
   d. Historical/trend data for points specified
   e. Maintenance support applications
   f. Custom processes
   g. Manual override monitoring
3. Each B-BC shall support:
   a. Two (2) RJ-45 Switched 10/100Mbps Ethernet ports.
   b. One (1) Built-in RS-485 communication port supporting up to fifty (50) BACnet MSTP devices.
   c. BACnet MSTP to IP Routing
   d. BACnet Broadcast Management (BBMD)
4. Each B-BC and B-AAC shall support:
   a. Analog inputs of 4-20 mA, 0-10 Vdc or 10,000 ohm thermistor.
   b. Digital inputs from dry contact closure, pulse accumulators, voltage sensing.
   c. Each B-BC and B-AAC shall be capable of providing the following control outputs without the addition of equipment outside the DDC controller cabinet:
      1) Digital outputs (contact closure for motor starters up to size 4)
      2) Analog outputs of 4-20 mA or 0-10 VDC
   d. The B-BC and B-AAC analog or universal input shall use a 16-bit A/D converter.
   e. The B-BC and B-AAC analog or universal output shall use a 10-bit D/A converter.
   f. Each B-BC and B-AAC controller shall be fitted with a user-friendly color backlit LCD display for monitoring, and override control of points. Display

shall either be built-in or external type, mounted inside the associated control panel.

g. Each B-BC and B-AAC shall have a minimum of 10% spare capacity for each point type for future point connection. Provide all processors, power supplies and communication controllers complete so that the implementation of a point only requires the addition of the appropriate point input/output termination module and wiring. As a minimum, provide one of each type of point available on the controller.

h. Provide sufficient internal memory for the specified control sequences and have at least 25% of the memory available for future use.

i. The B-BC and B-AAC shall provide local status indication for each output for constant, up-to-date verification of all point conditions via dedicated LEDs or built-in LCD operator interface without the need for an operator handheld device.

j. The B-BC and B-AAC shall continuously perform self-diagnostics, communication diagnosis and diagnosis of all panel components. The controller shall provide both local and remote annunciation of any detected component failures, low battery conditions or repeated failure to establish communication.

k. Should the B-BC and B-AAC memory be lost for any reason, the user shall have the capability of reloading the controller software via the Operator Workstation (B-OWS/AWS). Direct connection to B-AAC controller for reloading controller software is not acceptable.

5. Connected VAV Controller (B-BC, B-AAC)

a. The VAV box controller shall be powered from a dedicated 24 VAC source and shall function normally under an operating range of 20 to 28 VAC (±15%), allowing for power source fluctuations and voltage drops. The controllers shall also function normally under ambient conditions of 32°F to 122°F and 5% to 90% RH (non-condensing). Provide each controller with a suitable cover or enclosure to protect the intelligence board assembly.

b. The Variable Air Volume (VAV) Controller shall include a built-in differential pressure transducer that shall connect to the VAV terminal unit manufacturer's standard differential pressure sensor to measure the average and amplify differential pressure in the duct. The controller shall convert this value to actual air flow. Single point differential pressure sensing device is not acceptable. The VAV Controller onboard airflow sensor shall have a differential pressure range of ±2 in. W.C. with an input resolution of 0.00007 in. W.C. and and airflow accuracy of 4.0%, ensuring primary air flow conditions shall be controlled and maintained to within 5% of setpoint at the specified minimum and maximum air flow parameters.

c. The VAV Controller shall provide a web browser-based air flow balancing tool. This tool shall allow the air balancer to manually control the action of the actuator including the following function: open VAV damper, close VAV damper, open all VAV dampers, close all VAV dampers.

d. It shall be possible to view and adjust the space temperature, temperature setpoint, maximum airflow setting, minimum airflow setting, and actual airflow, through the B-OWS/AWS.

6. Connected Thermostats (B-BC, B-AAC)

a. Provide Connected Thermostat controllers only when called out on drawings.

b. Connected Thermostat – A self-contained fully-programmable controller with a built-in user interface that is intended for installation in the occupied space of the building. The Connected Thermostat shall have the following features:
   1) The Connected Thermostat shall be a microprocessor-based fully programmable controller with all of its control logic, inputs and outputs, network communication and user interface provided within the manufacturer provided enclosure specific to the application. The enclosure shall be aesthetically appealing with a modern design that will fit in with the architecture of the building. A sample of the Connected Thermostat shall be provided as part of the submittal process and approval shall be obtained from the AISD Controls Department.
   2) The user interface display shall be provided with 3 levels of password protection: Level 1 – Schedule override and setpoint offset adjust; Level 2 – Leve 1 + mode settings; Level 3 – full access to all parameters.
   3) The Connected Thermostat shall be capable of providing the following control inputs and outputs without the addition of equipment/modules:
      a) One (1) on-board temperature sensor
      b) One (1) on-board humidity sensor
      c) Four (4) universal inputs (0-10VDC, 0-20mA, thermistor 10K2, dry-contact)
      d) Three (3) universal outputs (0-10VDC, dry-contact)
      e) Five (5) digital outputs (dry-contact)

E. Application Specific Controllers (B-ASCs)

1. The Application Specific Controller (B-ASC) shall be 32-bit microprocessor-based. They shall also be multi-tasking, real-time digital control processors consisting of modular hardware with plug-in enclosed processors, communication controllers, power supplies and input/output point modules. Controller size shall be sufficient to fully meet the requirements of this specification and the project point list.
2. Each B-ASC shall have sufficient memory, to support its own operating system and databases, including:
   a. Control processes
   b. Maintenance support applications
   c. Custom processes
   d. Manual override monitoring
3. Each B-ASC shall support:
   a. Analog inputs of 4-20 mA, 0-10 Vdc or 10,000 ohm thermistor.
   b. Digital inputs from dry contact closure, pulse accumulators, voltage sensing.
   c. Each B-ASC shall be capable of providing the following control outputs without the addition of equipment:
      1) Digital outputs (contact closure for motor starters up to size 4)
      2) Analog outputs of 4-20 mA or 0-10 VDC
4. The B-ASC analog or universal input shall use a 16-bit A/D converter.
5. The B-ASC analog or universal output shall use a 10-bit D/A converter.
6. Controllers shall include all point inputs and outputs necessary to perform the specific control sequences. As a minimum, 25% of the point outputs shall be of the universal type; that is, the outputs may be utilized either as modulating or two-state, allowing for additional system flexibility. Analog outputs shall be industry standard signals such as 24V floating control, allowing for interface to a variety of modulating actuators.

7. Provide each B-ASC with sufficient memory to accommodate point databases, operating programs, local alarming and local trending. All databases and programs shall be stored in non-volatile EEPROM, EPROM and PROM. The controllers shall be able to return to full normal operation without user intervention after a power failure of unlimited duration. Operating programs shall be field selectable for specific applications. In addition, specific applications may be modified to meet the user's exact control strategy requirements, allowing for additional system flexibility. Controllers that require factory changes of all applications are not acceptable.

F. Acceptable Manufacturers/Products

1. Distech

2.7 ELECTRONIC INPUT/OUTPUT DEVICES

A. Sensors and Transmitters

1. Provide sensors and transmitters required as outlined in the input/output summary and sequence of operation, as required to achieve the specified accuracy as specified herein.
2. Temperature transmitters shall be sized and constructed to be compatible with the medium to be monitored.
3. All Temperature sensors shall be Non-Linear NTC 10KΩ Type-2 Thermistors. No exceptions.
   a. Acceptable Manufacturers
      1) BAPI
      2) ACI
4. Combination Sensors or “Combo Sensors” such as Temperature and Humidity are only permitted with prior authorization from AISD Energy Management Department.
5. Multiplexer boards that convert an analog input into several digital inputs such as the DUIC-5P board are not permitted and shall not be used without explicit authorization from the AISD Energy Management Department.
6. Space Temperature Sensors
   a. Each room sensor shall include the following options:
      1) Style: Delta style. Acceptable Manufacturers/Models:
         a) ACI; A/CP-R
         b) BAPI; BA/10K-2-R
      2) Setpoint Adjustment: The setpoint adjustment slider shall allow for modification of the temperature setpoint by the occupant. Each Setpoint Slider shall be adjustable for allowable range from the Graphic User Interface. Default Offset Range [+/-3F].
      3) Setpoint Adjust Indication: “COOL/WARM”
      4) Setpoint Adjust Configuration: Direct Acting; 0-10KΩ
      5) Temperature Indicator/Local Display: Do Not Provide.
      6) Override Switch: Required. In parallel with sensor.
      7) Foam-backing: Provide for sensors mounted on exterior walls, CMU walls, structure beams or if sensor is subjected to air draft from wall.
7. Outside air Temperature, Humidity and CO2 Sensors
   a. Sensors shall be designed to withstand the environmental conditions to which they will be exposed. They shall be provided with a solar shield.

b. Transmitters shall be of NEMA-3R construction and rated for ambient temperatures.

8. Duct Type Sensors
   a. Duct mount sensors shall mount using a handy box through a hole in the duct and be position do as to be easily accessible for repair or replacement. A neoprene grommet (seal-tight fitting and mounting plate) shall be used on the sensor assembly to prevent air leaks.
   b. Duct sensors shall be insertion type and constructed as a complete assembly including lock nut and mounting plate. Sensor probes shall be constructed using 304-rated stainless steel.
   c. Duct sensor shall be of the appropriate length and mounted in a location on the duct to obtain the best representation of the actual air temperature.
   d. For outdoor air duct applications, use a weatherproof box with weatherproof cover and gasket.
   e. Sensor handy box shall not be used as a pull-box. Installation shall allow the replacement of sensor without the need for disconnecting/removing additional wiring or conduit.

9. Averaging Duct Type Sensors
   a. Provide capillary supports at the sides of the duct to support the sensing string. Support the middle of the span to prevent flopping of the capillary tube as required. No metal-to-metal contact shall be allowed. Plastic cable-ties shall not be used as the main means for supporting capillary element -Only purpose-built capillary supports are allowed.
   b. Where the capillary enters the equipment, it shall be protected from sharp edges using a poly tube sleeve.

10. Thermowells
    a. When thermowells are required, the sensor and well shall be supplied as a complete assembly.
    b. Thermowells shall be pressure rated and constructed in accordance with the system working pressure.
    c. Thermowells and sensors shall be mounted in a thread-o-let or ½" NPT saddle and allow easy access to the sensor for repair or replacement.
    d. Thermowells shall be constructed of a single piece machined 304/316 stainless steel. Two-part (welded) thermowells shall not be used.
    e. Heat transfer grease shall be used when required by manufacturer.

11. Relative Humidity Sensors/Transmitters
    a. The sensor shall be a solid state, capacitive polymer type.
    b. The humidity transmitter shall meet the following requirements:
       1) Field-replaceable humidity element
       2) Universal Output: 0-5VDC, 0-10VDC, 4-20mA
       3) Resolution: 0.01%RH
       4) Linearity: < 1%RH
       5) Hysteresis: < 1%RH
       6) Drift: <0.25%RH per year
       7) Response Time: 8 seconds
       8) Calibration: Factory calibrated
       9) Display: None for Space Sensors

12. Dry-Media Differential Pressure Transmitters

a. Pressure transmitters shall be constructed to withstand 100% pressure over range without damage and to hold calibrated accuracy when subject to a momentary 40% over-range input.
b. Pressure transmitters shall provide the option to transmit a 0-5 VDC, 0-10 VDC, or 4-20 mA output signals.
c. Pressure transmitters shall be equipped with an LCD display indicating the transmitter output signal.
d. Duct sensing pressure applications shall utilize static pressure traverse probes.

13. Wet-Media Differential Pressure Transmitters
a. The differential pressure transmitter shall be of industrial grade and transmit a linear output signal in response to variation of differential pressure or water pressure sensing points.
b. The differential pressure transmitter shall meet the following performance specifications:
1) Die-cast NEMA-4 Enclosure with readout LCD display
2) Suitable input differential pressure range
3) Dual sensor design
4) Microprocessor profiled with built-in noise rejection
5) 0-10VDC, 0-5VDC or 4-20mA output
6) Maintain accuracy up to 20 to 1 ratio turndown
7) Reference Accuracy: ±0.2% of full span
8) Push-button auto-zero
9) Provide with bypass/test manifold
c. Differential pressure transmitters with wired remote sensors are not to be used without the prior approval from the AISD Energy Management Department.

14. Wireless Sensors and Transmitters
a. Wireless sensors and transmitters such as WiFi, Zigbee, Z-Wave, Enocean or Lora Devices are strictly prohibited and shall not be used without the explicit approval from the AISD Energy Management Department. Any approved exceptions shall only apply for the specific application and specific project and shall not be assumed as a blanket-statement of approval for future projects.

B. Valve and Damper Actuators

1. Electronic Valve and Damper Actuators
a. Electronic actuators shall be direct-coupled type capable of being mounted over the shaft of the damper or valve. They shall be approved by a suitable safety or regulatory agency. Power consumption shall not exceed 8 watts or 15 VA of transformer sizing capacity per high torque actuator nor 2 watts or 4 VA for VAV actuators. Sound level shall not exceed 45 dB for high torque or 35 dB for VAV actuators.
b. Electronic overload protection shall protect actuator motor from damage. If damper jams actuator shall not burnout. Internal end switch type actuators are not acceptable. Actuators may be mechanically and electrically paralleled on the same shaft to multiply the available torque. A reversing switch shall be provided to change action from direct to reverse in relation to control signal as operation requires.
c. All 120 VAC powered actuators shall be installed with a locking switch (key operated switch, Leviton 1221-2L) as a disconnecting means for servicing within reach of the actuator, but not on the actuator. Verify location with Architect, Engineer, and/or Owner prior to install.

2. Control Damper Actuators
   a. Outside air, return air, and exhaust air actuators shall be spring return type. Individual battery backup or capacitor return is not acceptable.
   b. The control circuit shall be fully modulating using 0-10VDC, 2-10VDC, 4-20 mA, or Pulse Width Modulation signals. A 0-10VDC, 2-10VDC, or 4-20 mA signal shall be produced by the actuator which is directly proportional to the shaft clamp position which can be used to control actuators paralleled off a master motor or to provide a feedback signal to the automation system indicating damper position. Accuracy shall be within ±2.5%.
   c. Zone and Face and bypass dampers and other control dampers shall be modulating using the same control circuit detailed above but shall not be spring return.
   d. Actuators serving Outside, Return, Exhaust, Relief and Face and Bypass dampers shall provide position feedback to the control system.
   e. Provide auxiliary switches on damper shaft or blade switch to prove damper has opened on all 100% outside air handling equipment.

3. Miscellaneous Damper Actuators
   a. Outside air combusting and ventilation air intake and exhaust damper actuators shall be 2 position (open/close) spring return, and close if any water piping, coils or other equipment in the space which the damper servers needs to be protected from freezing.

4. Air Terminals
   a. Air terminal actuators shall be fully modulating floating (drive open, drive closed) 3 wire control or use control circuit as detailed in control dampers depending on the controller’s requirements.
   b. Air terminal controllers requiring an external damper actuator shall use Belimo actuators.

5. Inlet Vanes Actuators
   a. Inlet vanes and actuators shall not be used for this job. Speed control of the fan motor shall use a variable frequency drive (VFD).

6. Combination Smoke and Fire Damper Actuators
   a. Actuators shall be factory mounted and connected to the damper section and conform to suitable safety or regulatory agency approved specifications.

7. Valve Actuators
   a. Actuators shall have a gear release button on all non-spring return models to allow manual setting. The actuator shall have either an insulating air gap between it and the linkage or a non-conducting thermoplastic linkage. Care shall be taken to maintain the actuator's operating temperatures and humidity within its specifications. Pipes shall be fully insulated and heat shields shall be installed if necessary. Mount actuators so condensation shall not form on actuators and be prevented by a combination of insulation, air gap, or other thermal break.
   b. The control circuit shall be fully modulating using 0-10VDC, 2-10VDC, 4-20 mA, or Pulse Width Modulation signals. A 0-10VDC, 2-10VDC, or 4-20 mA signal shall be produced by the actuator which is directly proportional to the shaft clamp position which can be used to control actuators paralleled off a master motor or to provide a feedback signal to the automation system indicating valve position.

c. Actuators shall be provided with linkage extension kit when used on insulated piping. (e.g., CCV-EXT-KIT).
d. Valve body and actuators shall be equipped fully assembled and tested at the valve factory.
e. Valve actuators serving bypass valves shall provide position feedback to the control system.
f. All actuators shall be provided with means to accept a ½" conduit fitting.

8. Control Valve Actuators (4 inch and larger)
a. The Valve actuator shall consist of a permanent split capacitor, reversible type electric motor that drives a compound epicycle gear. The electric actuator shall have visual mechanical position indication, readable from a distance, and show output shaft and valve position. Unit shall be mounted directly to the valves without brackets and adapters, or readily adapted to suit all other types of quarter-turn valves.
b. The actuator shall have an integral terminal strip, which, through conduit entries, will ensure simple wiring to power supplies. Cable entries should be approved by a suitable safety or regulatory agency. Use recommended gland stops within the NPT hole to prevent glands from being screwed in too far and damaging cable.
c. The actuator shall be constructed to withstand high shock and vibrations without operations failure. The actuator cover shall have captive bolts to eliminate loss of bolts when removing the cover from the base. One copy of the wiring diagram shall be provided with the actuator.
d. The actuator shall have a self-locking gear train that is permanently lubricated at the factory. The gearing shall be run on ball and needle bearings. Actuators with high output torque shall have two adjustable factory calibrated mechanical torque limit single-pole double-throw switch type. The motor shall be fitted with thermal overload protection. The motor rotor shaft shall run in ball bearings at each end of motor.
e. The actuator housing shall be hard anodized aluminum for full environmental protection.
f. The actuator shall be provided with means for manual override.
g. The environmental temperature range of the actuator shall be from –30°C to +60°C (-20°F to +140°F).
h. For intermittent on/off service, the actuator shall be rated at a 20% duty cycle (i.e., 12 minutes extended duty in every hour, or alternatively; one complete cycle every 2 minutes). For more frequent cycling and modulating service, an actuator shall be rated for continuous duty. The actuator rated for continuous duty shall be capable of operating 100% of the time at an ambient temperature of 40°C.
i. The actuator shall have an integral self-locking gear train. Motor brakes shall not be required to maintain desired valve position. Levers or latches shall not be required to engage or disengage the manual override. Mechanical travel stops, adjustable to 15° in each direction of 90° rotation shall be standard, as well as two adjustable travel limit switches with electrically isolated contacts. Additional adjustable switches shall be available as an option.
j. Single Phase Motor: The motor shall have Class B insulation capable of withstanding locked-rotor for 25 seconds without overheating. Wiring shall also be Class B insulation. An auto-reset thermal cutout protector shall be embedded in the motor windings to limit heat rise to 80°C in a 40°C ambient.

All motors shall be capable of being replaced by simply disconnecting the wires and then removing mounting bolts. Disassembly of gears shall not be required to remove the motor.

k. Materials of Construction: The electric actuator shall have a pressure die-cast, hard-anodized aluminum base and cover. The compound gear shall be made of die-cast, hard-anodized aluminum or steel. An alloy steel worm gear shall be provided for manual override and torque limiting. Bearings for gears shall be of the ball and needle type; bronze bearings shall be used on the shafting parts.

l. Accessories: Potentiometer for providing continuous feedback of actuator position at the CU (for valves specified position feedback).

9. Acceptable Manufacturers/Products
   a. Belimo

C. Flow, Pressure and Measuring Apparatus

1. Liquid Flow Meters (Insertion-Type)
   a. Provide an insertion-type electromagnetic flow meter complete with NIST traceable wet-calibrated flow-measuring element, remote transmitter/display, installation valves, installation depth gauge, and calibration certificate. Flow meter shall be wet-tappable, allowing insertion and removal from the flow stream without system shutdown. The flow meter shall further comply with the following requirements:
      1) Sensing Technology: Electromagnetic
      2) Construction: 316L stainless steel (wetted components)
      3) Flow Sensor Electronic Enclosure: NEMA-6
      4) Remote Transmitter/Display: NEMA-4
      5) Input Power: 24VAC
      6) Analog Output Signal (2): 0-10VDC, 0-5VDC, 4-20mA
      7) Dry Contacts 3): Volume Pulse Output, Direction, Master Alarm
      8) Accuracy:
         a) ±1.0% of rate from 2.0 to 20.0 ft/sec velocity
         b) ±0.02 ft/sec at flow rates below 2.0 ft/sec
      9) Maximum Pressure Rating: 400 psi.
      10) Maximum Temperature Rating: 200°F
   b. Contractor shall be responsible for selecting the flowmeter options based on the application.
   c. Approved Manufacturers/Products: ONICON F-3500 Series.
   d. Remote-mounted transmitter/display shall be installed at 65-inch AFF, preferably next to the associated control panel.
   e. Insertion-type shall only be used on renovation projects where associated hydronic piping is existing and to remain in-place. Insertion-type flow meters may be approved on new construction projects only with prior approval from the AISD Energy Management Department.

2. Liquid Flow Meters (Inline-Type)
   a. Provide an inline electromagnetic flow meter complete with NIST traceable wet calibrated flow-measuring element, transmitter, built-in display, and ANSI Class 150/300 mounting flanges. The flow meter shall further comply with the following requirements:
      1) Sensing Technology: Electromagnetic

2) Construction: Epoxy painted carbon steel outer body, 304 stainless steel outer flow tube and integral liner selected based on the operating temperature and fluid.
3) Transmitter Enclosure: NEMA-4X
4) Input Power: 24VAC
5) Output Signal: 4-20mA with 2 Configurable Pulse Outputs.
6) Accuracy:
   a) ±0.2% of rate from 1.6 to 33.0 ft/sec
   b) ±0.0033 ft/sec at flow rates below 1.6 ft/sec
7) Maximum Pressure Rating: 580 psi
8) Maximum Temperature Rating: 266°F
9) Display:
   a) Menu-driven built-in LCD backlit display shall provide instantaneous flow rate information, flow velocity and flow direction.
   b) Meter shall be provided with remote-mounted display when installation requires meter to be higher than 6-feet AFF or when meter is installed vertically. Remote-mounted display shall be installed at 65-inches AFF, preferably next to the associated control panel.

b. Contractor shall be responsible for selecting the flowmeter options based on the application.
c. Approved Manufacturers/Products: ONICON F-3200 Series.
d. Inline-type shall be used in new construction projects involving new hydronic piping.

3. Outdoor Air Flow Measuring Stations
   a. The Outdoor Air Measuring System shall consist of a complete system capable of directly measuring the airflow through an outside air inlet / opening and providing the measured airflow values via a local display, multiple analog outputs, and BACnet MS/TP communication. The system shall be factory calibrated and configured based on the application and type of installation. The Airflow Measuring System shall be tested in accordance with ANSI/ACMA standard 610 and licensed to bear the AMCA Certified Rating program seal. The airflow measuring system shall further comply with the following requirements:
      1) Sensing Technology: Temperature Compensated Uniform Static Differential Pressure using AMCA certified flow equation. Airflow measuring stations using thermal dispersion technology shall not be used.
      2) Transmitter Enclosure: NEMA-1, NEMA-4X, NEMA-4X with Heater and Insulation depending on application.
      3) Transmitter: The transmitter shall incorporate an absolute pressure sensing system to provide automatic airflow compensation at the installed elevation. The transmitter shall incorporate temperature sensor inputs as required to perform continuous airflow density compensation.
      4) Transmitter Display:
         a) Menu-driven integral display. Shall be configurable to indicate four measured process variables such as volume, velocity, temperature and pressure.

b) Transmitter/Display shall be installed at 65-inch AFF, preferably next to the associated control panel.

5) Accuracy: ±5% of reading withing the factory calibrated velocity range.

6) Flow Sensing Elements (For use with Louvers and Rain Hoods)

a) The flow sensing elements shall be constructed of 316 stainless steel. The flow sensing elements shall not be affected by the presence of moisture, dirt or debris in the airstream and shall not be affected by gusting wind.

7) Flow Sensing Elements (For use in Ducts and Plenum Openings)

a) The flow sensing elements shall be constructed of 316 stainless steel with sensing elements mounted in a factory galvanized sheet metal casing frame and a galvanized expanded metal sheet.

4. Shielded Static Pressure Probes

a. Provide for each zone where required a shielded static pressure sensor suitable for recessed surface mounting, complete with multiple sensing ports, pressure impulse suppression chamber, airflow shielding, all contained in a stainless-steel casing, with brushed finish on the exposed surfaces.

b. These probes shall be capable of sensing the static pressure in the proximity of the sensor to within 1% of the actual pressure value while being subjected to a maximum airflow of 1,000 FPM from a radial source.

c. Measuring of outside air pressure shall be accomplished by using a pressure pickup probe suitable for outdoor pressure sampling that stabilizes and reduces fluctuations from wind gusts.

d. All pressure pickup probes shall be installed according to the manufacturer's installation specifications sheet and in a location that is not subject to frequent air disturbance.

5. Static Pressure Traverse Probes

a. Provide multipoint traverse probes in the duct at each point where static pressure sensing is required.

b. Each duct static traverse probe shall contain multiple static pressure sensors located along the exterior surface of the cylindrical probe. Pressure sensing points shall not protrude beyond the surface of the probe.

c. The duct static traverse probe shall be of 304 stainless steel construction and be complete with threaded end support rod, sealing washer and nut, and mounting plate with gasket and static pressure signal fitting. The static traverse probe shall be capable of producing a steady, non-pulsating signal of standard static pressure levels without the need for correction factors, and an instrument accuracy of 5% full range.

d. The probe shall be installed according to the manufacturer's installation specifications sheet and in a location that is not subject to frequent air disturbance.

6. Traverse Prove Air Flow Measuring Stations

a. Traverse probes shall be a dual manifold, cylindrical, type constructed of 3003 extruded aluminum with an anodized finish to eliminate surface pitting and unnecessary air friction. The multiple total pressure manifold shall have sensors located along the stagnation plane of the approaching airflow and without the physical presence of forward projecting sensors into the air stream. The static pressure manifold shall incorporate dual offset static tips on opposing

sides of the averaging manifold so as to be insensitive to flow-angle variations of as much as ±20° in the approaching air stream.

b. The airflow traverse probe shall not induce a measurable pressure drop, nor shall the sound level within the duct be amplified by its singular or multiple presences in the airstreams. Each airflow-measuring probe shall contain multiple total and static pressure sensors placed at equal distances along the probe length. The number of sensors on each probe and the quantity of probes utilized at each installation shall comply with the ASHRAE Standards for duct traversing.

c. Traverse probes shall be accurate to ±2.5% of the measured airflow range and be installed in a duct section that meets manufacturer's installation specifications sheet. Allow adequate distance from elbows, junctions or other disturbances.

D. Other Accessories

1. Electric Low Limit Thermostat (Freeze-Stat)
   a. Heavy-duty, duct type, fixed differential, vapor-charged sensing element, manual reset, with test/reset button.
   b. Sensing element shall be a capillary tube responding to the lowest temperature sensed along any segment of bulb length. Switch shall be SPDT (single-pole double-throw) rated for 10 amps at full load.
   c. The capillary tube shall be protected from damage at the location that it enters the AHU. Any exposed areas of the capillary tube shall be protected by covering with poly-tubing. Refer to Averaging sensors section above. Provide one 20-feet long bulb thermostat for every 20-sq.ft of coil area.
   d. Adjustable Range: 15 to 55°F.
   e. AISD prefers Johnson Controls A70 Series Low Limit Thermostats.

2. Water Flow Switches
   a. Thermal Dispersion (Preferred):
      1) Flow Sensor:
         a) Wetted Materials: 316 Stainless Steel
         b) Measuring Range: 0.1-10 ft/s
         c) Temperature Range: 0 to 176 °F
         d) Maximum Pressure: 1000 psi
         e) Response Time: 1-10 seconds
         f) Enclosure: NEMA-6
      2) Transmitter:
         a) DIN-Rail (mounted in associated control panel).
         b) Input Voltage: 24VDC
         c) Display: LED Bargraph
         d) Setpoint Adjustment: Potentiometer
         e) Outputs: SPDT Relay
      3) Acceptable Manufacturers/Products
         a) IFM SF5200/SR0151
         b) Omega FSW-91-R/FSCN-91

   b. Vane/Paddle (Requires Owner approval):
      1) Wetted Materials: Vane/Paddle: Stainless Steel; Body: Brass
      2) Temperature Limit: 200 °F
      3) Pressure Limit: 145 psi

4) Output Signal: SPST/SPDT snap switch.
5) Enclosure Rating: NEMA-4
6) Setpoint Adjustment: Paddle size and adjustment screw.

3. Strap-On Aqua-stat
   a. Strap-on aqua stats are not to be used without the prior approval from AISD Energy Management Department.

4. Relays
   a. Relays other than those associated with digital output cards shall be general-purpose, din-rail, plug-in type with indicator light. Number of contacts and operational function shall be as required.
   b. Solid State Relays (SSR): Solid state relays are not permitted and shall not be used without prior authorization from AISD Energy Management Department.
   c. Acceptable Manufacturer/Products: IDEC

5. Variable Frequency Drives (VFD)
   a. Refer to division 23 and 26 for approved list of VFDs and other requirements.
   b. The VFD shall communicate utilizing the BACnet protocol via manufacturer card to communicate and receive data through the DDC system. All VFDs shall have separate conduits for hi-voltage input circuits, hi-voltage output circuits and control circuits. In addition to the BACnet communications, each drive shall have three hard-wired points from the BAS system:
      1) VFD Start/Stop
      2) VFD Speed Reference
      3) VFD Run Status
   c. Remote mounted VFDs with service disconnects between the VFD and the load, shall be wired to the service disconnect early-break auxiliary switch for proper VFD shutdown upon disconnect operation.

6. Carbon Monoxide (CO) Sensor
   a. Wall mounted with replaceable electromechanical sensor and front panel LCD.
   b. Output Signal -Dry Contact: For Systems shutdown
   c. Output Signal -BACnet MSTP: For BAS Monitoring
   d. Output Resolution: 10bit PWM (+/- 0.4ppm)
   e. Buzzer Alarm: 85db (minimum)
   f. Measurement Range: 0-100, 150, 300, 400, 500 PPM.
   g. Relay Output: Two Form-C Relays with programmable trip point.
   h. Acceptable Manufacturers/Products
      1) Greystone

7. Thermal Energy (BTU) Meters
   a. The BTU meter shall consist of a standalone microprocessor-based thermal energy measurement unit, flow meter, matched set of temperature sensors and installation hardware and cabling required for a complete system installation.
   b. Total thermal energy measurement system shall be provided by a single manufacturer, including flow meter, temperature sensors and BTU meter and shall comply with the following requirements:
      1) BTU Calculator: Computation error <= 0.09% @ 30°F Delta T.
      2) Enclosure: NEMA-12K minimum designed for wall mounting.
      3) Temperature Sensors:
         a) Current based, wet-calibrated over the intended application range against NIST traceable.

b) Uncertainty: <= to +/-0.15°F

4) Calibration and Configuration: Each thermal energy metering system shall be factory programmed for the specific application and each metering system component, including temperature sensors and flow meter shall receive a certificate of calibration, traceable to NIST.

5) Transmitter and Display:

a) Provide an operator interface with pushbuttons and graphical interface. Display shall indicate total fluid in gallons, instantaneous flow rate, supply temperature, return temperature, thermal energy flow rate and thermal energy flow total in BTU.

b) Transmitter/Display shall be installed at 65-inch AFF, preferably next to the associated control panel.

6) Output Signals: BACnet MS/TP plus one (1) analog output.

c. Contractor shall be responsible for selecting the BTU meter options based on the application.

8. Network Switches
   a. Din-Rail Mountable
   b. Unmanaged
   c. 100Mbps
   d. Industrial Grade
   e. 24VAC Powered
   f. Acceptable Manufacturers/Products
      1) Contemporary Controls

9. Current Transformers
   a. The current transformers shall be designed to be installed or removed without dismantling the primary bus or cables.
   b. The current transformer shall meet the following specifications:
      1) Housing: Split-Core
      2) Current Range: As required for the application
      3) Frequency Range: 50-60 Hz
      4) Insulation Class: 600VAC RMS
      5) Accuracy: ± 2% from 10% to 100%
      6) Output Signal: 0-5VDC, 4-20mA

10. Current Sensing Switches
    a. The current sensing switch shall be self-powered with solid-state circuitry. Current sensing switches shall be provided with adjustable trip point, solid state single-pole switch with LED for indicating On/Off status. A conductor of the load shall be passed through the window of the device and looped if required to attain the correct sensing value.
    b. The current switch shall meet the following specifications:
       1) Housing: Split Core
       2) Current Range: As required for the application
       3) Frequency Range: 50-60 Hz
       4) Insulation Class: 600VAC RMS
       5) Hysteresis: 10%
       6) ECM/VFD Compatible: As required for the application.

11. Power Monitoring
    a. Power meter shall consist of a self-enclosed BACnet communicating multi-function power meter. The meter shall meet the following specifications:

1) Housing: Self-Enclosed NEMA-1/4X as required for application.
2) Voltage & Current Ratings: As required for application
3) Power Supply: Self-Powered
4) Safeties:
   a) Fuse protected voltage leads and control power circuits.
   b) Shorting terminal block for current transformer circuits.
5) BACnet Protocol: BACnet MS/TP, BACnet-IP.
6) Acceptable Manufacturers/Products
   a) Shark 50B/100B

2.8 CONTROL VALVES AND DAMPERS

A. General Control Valve Requirements

1. All automatic control valves shall be linear, fully proportioning, with modulating ball, plug or V-port inner guidelines unless otherwise specified. The valves shall be quiet in operation and fail safe in either normally open, normally closed position or fail in last commanded state in the event of loss of electronic output signal. See drawings and sequence of operation for system requirements.
2. All valves shall be capable of operating per sequence when required by the sequence of operation. All control valves shall be sized by the BAS system contractor and/or the valve manufacturer and shall be guaranteed to meet the heating and cooling loads as specified. All control valves shall be suitable for the pressure conditions, and shall close against the differential pressures involved. Valve body pressure rating and connection type (screwed or flanged) shall conform to ANSI pressure classifications appropriate for the system working pressures.
3. All valves shall be programmed to be 0% on HMI = 0% signal on DDC controller = Valve Closed to Coil. Likewise, 100% on HMI = 100% Signal (10VDC, 20mA, etc.) on DDC controller = Valve Open to Coil. Same holds true for Dampers (Multizone dampers shall be 0% = Full Hot Deck, 100% = Full Cold Deck). For Cooling Tower Bypass Valve shall be: 0% = Water over the top; 100% = Full Bypass. Any deviation from this strategy shall require permission from Owner during the 90% Submittal review.

B. Hot and Cold Water Control Valves

1. Hot and cold water globe type control valves shall be single-seated type, with equal percentage flow characteristics. The valve discs shall be composition type and shall be sized using ISA methods.
2. Pressure drop through the valves shall not exceed 5 PSI when the valve is fully open and under design flow unless otherwise indicated
3. Ball valves shall be equipped with 316 stainless steel trim, Teflon seals and adjustable packing gland nuts. Provide a handle for manual operation during start-up and maintenance.

C. Air Terminal Reheat Valves

1. Reheat valves shall be modulating logarithmic equal percentage type globe or ball valves as detailed in paragraph C above. 2-position control is not acceptable.

D. Two Position Control Valves

1. For open/closed and/or three-way diverting applications, butterfly valves are acceptable and shall be heavy-duty pattern with a body rating comparable to the pipe rating.
2. Provide each butterfly valve with a replaceable lining suitable for temperature and service requirements.
3. Equip each with a butterfly valve with disc and stainless-steel stem.
4. Valves used for shut-off or isolation purposes shall be bubble-tight.

E. Automatic Control Dampers

1. Automatic dampers shall have multiple blades and sized for the application by the BAS Contractor and/or as indicated on the design drawings.
2. Submit a schedule of damper sizes to the Prime Contractor, with a copy to the Architect/Engineer and AISD within 15 days after being awarded the contract.
3. Dampers used for throttling airflow shall be opposed blade type arranged for normally open or normally closed operation as required. The damper is to be sized so that when wide open the pressure drop is a sufficient amount of its close-off pressure drop to shift the characteristic curve to near linear. Multi-section dampers must be provided with sufficient interconnecting hardware or jackshaft for unison operation of all blades in the entire assembly.
4. Damper frames and blades shall be constructed of either minimum 16 gauge galvanized steel or 14 gauge aluminum and arranged to facilitate field assembly of several individual sections into a larger damper area and allow secure fastening of damper frame to the surrounding ductwork, collar or fan housing. Maximum blade length in any section shall not be longer than 48 inches. Additional stiffening or bracing shall be provided for any section exceeding 48 inches in height.
5. Damper blades shall not exceed eight (8) inches in width. All blades except for fume hood exhaust systems shall be galvanized sheet steel. Blades shall be suitable for high velocity performance.
6. All damper bearings to be made of nylon. Bushings that turn in the bearing are to be oil impregnated sintered metal. Dampers shall be tight closing, low leakage type with synthetic elastomer seals on the blade edges and on the top, bottom and sides of the frame. Dampers shall not leak in excess of 8 cubic feet per minute per square foot when closing against 4 inches water gauge static pressure.
7. Leakage and flow characteristic charts shall be submitted to the Architect/Engineer for review.

PART 3 - EXECUTION

3.1 GENERAL

A. Do not proceed with work without approved submittals. Any alterations and/or changes to the control sequences shall be submitted to the Engineer for approval for such changes prior to design of the control system and submittal of control shop drawings. AISD Energy Management Department to review and comment on shop drawings before work begins. All work performed prior to submittal approval shall be at contractor's own risk.

B. Provide all hardware, software, programming, materials, labor, licenses, permits and incidentals necessary to provide completely operational digital controls systems. Perform start up and commissioning on each control product, system, and subsystem to provide fully operable systems in accordance with the specified functional performance.

C. Comply with applicable codes and ordinances. If any conflict arises between these specifications and drawings or codes and ordinances, immediately notify the Architect/Engineer and AISD. Do not deviate from the drawings and specifications nor install any work which may be in conflict with codes and ordinances until the conflict is resolved and the solution accepted by the Architect/Engineer and AISD.

D. The BAS System Contractor is responsible for providing a complete and operational system as described in the description of operation, in the points lists summary, and/or the mechanical/electrical drawings for this project. Any item referenced in one part of the system documentation but not listed elsewhere shall be covered under contractors pricing (i.e. damper called out in sequence but not indicated on drawings).

E. The mechanical, electrical, and building automation system drawings show the general arrangement of the respective systems. Follow these drawings, as closely as actual building construction and the work of other trades permit. Provide devices, fittings, and accessories, which may be required but not shown on the drawings or specified herein. Investigate conditions affecting the work and arrange the work accordingly. Provide modifications and accessories as required to meet such conditions.

F. The BAS Contractor shall schedule an above ceiling inspection with the Commissioning Authority and the AISD Energy Management Department. A 72-hour notice shall be given. Failure to schedule this inspection before the ceiling is installed shall result in the BAS Contractor removing ceiling tiles as requested by the Commissioning Authority or the AISD Energy Management personnel during a later scheduled inspection. The BAS Contractor shall be responsible for any damage to the ceiling grid or tiles.

3.2 COORDINATION OF WORK

A. Examine and compare the BAS specifications and drawings with the specifications and drawings of the other trades and report any discrepancies between them to the Architect/Engineer and AISD. Obtain the Architect/Engineer's written instructions for changes necessary to the BAS work.

B. Install and coordinate the BAS work in cooperation with the other trades installing interrelated work including mechanical, testing adjusting and balancing, and electrical (including fire alarm) during bidding and submittal process. All changes required in the work

of the contractor, caused by inadequate coordination and noncompliance with specifications, shall be made at contractor's expense.

C. Where control system will interface with controls provided by equipment manufacturers, ensure that coordination takes place such that all sequences and required control and monitoring points are made available. Documentation stating "work by others" is not acceptable. All work must be clearly coordinated.

D. Carefully check space requirements with other trades to ensure that all material can be installed in the allotted spaces, including above finished suspended ceilings, between coils sections, etc.

E. Install the BAS work to permit removal (without damage to other parts) of parts requiring periodic replacement or maintenance.

F. Renovations/Additions: The BAS contractor shall examine the existing controls system and shall become familiar with all pertinent components and functions of the existing system, including any energy management systems. The contractor shall be responsible for including all work necessary for the following:

1. Existing controls that are to remain in operation after this project shall remain in place and be modified only as required to incorporate new controls.
2. The new controls shall be fully compatible with the existing system.
3. The new controls shall be fully interconnected with the existing system.
4. Obtain as-builts of existing controls and append new controls to single-line schematic.
5. In shall be the responsibility of the Prime contractor to ensure the coordination of proper decommissioning and disconnection/removal of old control system components that will not be reused. Old database and sequences of operation shall be cleaned up, old conduit and wiring removed, old devices and controllers salvaged and returned to the AISD Energy Management Department in a timely manner. Any controllers and/or field devices damaged or lost during the removal process shall be repaired and/or replaced at no cost to AISD.

3.3 OBSERVATION OF THE WORK

A. The AISD Project Manager, Energy Management Department and AISD's representatives will observe the general progress and quality of the work.

B. The BAS Contractor shall provide opportunity for the AISD representatives to examine all work prior concealment. This includes above ceiling inspection and interior rough-in, piping/ductwork and equipment prior to insulating or other concealment. The BAS Contractor shall notify the Architect/Engineer and AIDS at least 72 hours in advance of such work so that AISD representative may arrange for such observations prior to concealment.

3.4 RELATED WORK

A. All control wiring shall be furnished and installed as specified in this section, unless shown on the electrical drawings.

B. The BAS contractor shall be responsible for all control and power wiring associated with the control system including any related 120V electrical work that may require interlocks, circuit breakers, and/or connections at the panel boards spares or spaces. The control contractor shall use a licensed, qualified, and bonded electrical contractor for all wiring

above 24V. Provide electrical disconnecting means for servicing, for each control panel, digital controller, transformer, power supply, and other devices that are served by 120VAC or higher voltage.

C. Units already having 120V power run by Division 26 for Fans, VAV Terminal Units, Electric Heat, etc., shall be provided with required 24VAC power via a step-down transformer and protected with an internal circuit breaker on the secondary side, whether provided by the BAS system Contractor or the unit manufacturer.

D. Equipment installations shall be such as to facilitate servicing, maintenance, and repair or replacement of equipment components. As much as practical, equipment shall be connected for ease of disconnection, with minimum of interference with other installations. Coordinate with the Mechanical Installation Contractor to ensure VAV box controllers not be mounted on the side of the box adjacent to a wall unless the side of the box is a minimum three feet from the adjacent wall.

E. It is the BAS contractor's responsibility to coordinate all aspects of the DDC control system installation with all Divisions of this project specification.

F. It shall be the responsibility of the BAS contractor to verify, prior to proposal, that sequences of operation and control approaches presented within the drawings and these specifications are appropriate for the HVAC systems and equipment to be used, and that systems provided are complete. All elements and entire system shall provide stable operation without overshoot or hunting.

G. It shall be the responsibility of the BAS contractor to verify all third-party alarms with the manufacturer prior to coordination meeting.

H. All alterations and/or changes to the control sequences shall be submitted to the Engineer for approval for such changes prior to design of the control system and submittal of control shop drawings. AISD Energy Management Department to review and comment on shop drawings before work begins. All work performed prior to submittal approval shall be at contractor's own risk.

I. The BAS contractor shall coordinate proposing/bidding and execution of the work with that of other trades, including mechanical, testing adjusting and balancing, and electrical (including fire alarm). Full cooperation and coordination with the other trades shall be required. The BAS contractor shall be responsible for verifying proper installation of all wells, ports, etc. needed for installation of all control and instrumentation devices.

3.5 WIRING INSTALLATION

A. GENERAL

1. BAS contractor shall be responsible for all communication, control and power wiring associated with the control system including:
    a. Ethernet/BACnet-IP cabling:
        1) Between AISD Network Rack and B-OWS/AWS.
            a) Renovation Projects: Contractor shall terminate network cabling at network switch.
            b) New Construction: Contractor shall terminate network cabling at patch panel with patch cable between patch panel and network switch to be completed by network Contractor.

2) Between B-OWS/AWS and BACnet Routers, BACnet Gateways, Building Controllers, Advanced Application Controllers, Application Specific Controllers.

b. Any related 120V electrical work that may require interlocks, circuit breakers, and/or connections at the panel boards spares or spaces.

2. All wiring shall be run parallel and perpendicular to building lines (no angles) and concealed where possible. All wiring shall be installed in a professional manner and in accordance with the National Electrical Code and local ordinances. Electrical or mechanical inspection sign off does not remove AISD's right to refuse acceptance of the electrical installation for incorrect or noncompliance with NEC and project specifications. Installation must comply with all local control system electrical code requirements.
3. The control contractor shall use a licensed, qualified and bonded electrical contractor for all wiring above 24Volts.
4. Raceways:
   a. Wiring shall be run in EMT conduit in exposed areas and in vertical risers between floors with sleeves and including any new walls or existing walls that have additional work being performed. EMT conduit fittings shall be steel compression type. All firewall penetrations shall be caulked with approved fire caulking material.
   b. Low voltage plenum rated wire may be used without conduit in concealed but accessible areas (e.g., above lay-in ceilings) and shall be installed in a professional and workmanship like manner and secured up as high as possible. All wall penetrations by plenum cable shall use sleeves with bushings to avoid sharp edges.
   c. All conduits on roofs, in areas exposed to weather conditions, in mechanical spaces, and located within six (6) feet above floor level shall be of rigid type conduit with watertight fittings. Use of non-threaded fittings on rigid conduit shall be limited and used only when necessary.
   d. Underground conduit shall be of the appropriate schedule PVC or coated ridged and back filled per code.
   e. Where flexible metal conduit is used, the maximum allowable length shall be 36 inches, and the minimum shall be 18 inches. All flex conduit fittings shall be of the compression type. Where conduit is attached to vibrating or rotating equipment, flexible metal conduit with a minimum length of 18 inches and maximum length of 36 inches shall be installed and anchored in such a manner that vibration and equipment noise will not be transmitted to the rigidly mounted conduit. Where exposed to the elements or in damp or wet locations, (such as Mechanical rooms) waterproof flexible metal conduit shall be installed at and below 6 feet above floor level. Installation shall be as specified for flexible metal conduit.
   f. When in crawl spaces, EMT conduit may be used when kept up high to the structure; otherwise, rigid type conduit shall be used. Waterproof flexible metal conduit shall be used in crawl spaces with the above length requirements.
   g. Provide a pull string in all conduits for pulling spare wire.
   h. No conduit shall be filled to more than 80% of available space.
5. Provide supervised field-wiring for all alarm panel monitoring points, asset protection points (safeties, sump pumps, maintenance alarms) and all points identified to include supervised wiring on the points schedule.

6. Separate Ground: Where recommended by controls manufacturer for the system/application involved, DDC system/components shall employ and maintain a separate, "clean earth" grounding protection. "Mixing" of grounding systems shall be prohibited. (Isolate DDC controls conduits/metal boxes from other raceway systems using isolation bushings and other measures as necessary.)
7. There shall be no power wiring of 120 volts or higher in the same conduit or raceways with communications or low voltage control wiring
8. Control wiring shall follow the following jacket coloring conventions:
    a. Orange Jacket: BACnet IP wiring
    b. Orange Jacket: BACnet MS/TP wiring
    c. Yellow Jacket: Thermostat wiring
    d. White Jacket: All other field wiring
    e. Purple Jacket: LON wiring (legacy controls)
9. Hardwired Safety Circuit:
    a. Hardwired safety alarm monitoring and shutdown shall be accomplished through the use of a Fan Safety Relay Board Model: RIBMNLB-6/-4/-2 manufactured by Functional Devices, Inc. or approved equal. The number of circuits/size of board (6, 4 or 2) shall be selected accordingly to accommodate all the specified safety devices plus one spare relay/circuit. Each safety device shall be manual-reset and shall be homerun to the safety relay board via dedicated wiring. Daisy-chaining of devices is permitted when more than one device of the same kind is required to accomplish the specified scope of work (i.e. two freeze-stats to cover the entire area of the cooling coil). Safety relay board shall be installed in the associated controls cabinet. Enclosed version of this safety relay board shall not be used. Each relay on the board shall be clearly labeled identifying the function of the circuit (e.g. Freeze-Stat, Low-Static, High-Static, Condensate Overflow, etc.). The first Master relay shall be used to shut down the fan(s) of the associated unit via the Starter or VFD. Individual status monitoring of safeties shall be provided as specified on drawings.
    b. Units scheduled to receive only one safety device (e.g. float switch), are permitted to be installed without a Fan Safety Relay Board provided safety device is not scheduled to be monitored by the BMS for status reporting.

B. Wiring less than 30 volts:

1. In ceilings of areas where return air plenum is used, plenum rated cable will be allowed unless noted otherwise. Where plenum cable is used, it shall be run parallel with building lines, banded together in bundles, supported without sags or "clothes line" appearance at 5 foot centers or less. Cabling that is not run in a neat fashion shall be removed and reinstalled. Determination of neatness shall be at the discretion of the Owner and Engineer. All plenum rated cabling shall be clearly marked on the outside jacket to indicate "Plenum" service.
2. Exposed, unfinished locations, such as mechanical rooms and below accessible raised flooring: Conductors and cable plenum rated (where local code or officials allow). All plenum rated cables shall be in conduit in unfinished area and mechanical rooms starting 6 feet above finished floor.
3. Concealed, unfinished locations, such as ceiling plenums, ceiling spaces, shafts, crawl spaces, tunnels: Conductors enclosed in raceway and cable enclosed in raceway or plenum-rated cable (where local code or officials allow).

C. Twisted-Pair Communication Media

1. Only use the transceiver manufacturers recommended cable types.
2. Install the network communications segments for device channels using bus topology format. Install the network communications segments for all backbone channels using bus topology format.
3. Provide all network communication cables, terminations to network control devices and network infrastructure components in accordance with the current requirements of the BACnet Wiring Guide.
4. Splicing of the BACnet MSTP communication media is only permitted when communicating link is connecting to a controller or communicating device. Any other splicing such as splices in junction boxes or above ceiling are not permitted.

D. Control Power Wiring

1. All 120VAC power for the controls system components is the responsibility of the BAS Contractor. Contractor may employ the services of the Electrical Contractor on the project or the services of another Electrical Contractor.
2. BAS system contractor to provide list/location of all control panels requiring 120 VAC power so they may be coordinated with Electrical.
3. The BAS system contractor shall provide final low voltage power supplies and termination of power wiring to network devices and infrastructure components where required.
4. Provide interlock wiring between supply and return fans, electrical wiring for relays (including power feed) for temperature and pressure indication. Provide interlock wiring between refrigeration machines, pumps and condensing equipment as required for the specified sequence of operation and the refrigeration system integral controller(s). Do not provide interlock wiring if a dedicated digital output has been specified for the equipment or the sequence of operation requires independent start/stop.
5. Provide power wiring, conduit and connections for low temperature thermostats, high temperature thermostats, alarms, flow switches, actuating devices for temperature, humidity, pressure and flow indication, point resets and user disconnect switches for electric heating, appliances controlled by this division.

E. Input/Output Control Wiring

1. All input/output control wiring shall be stranded shielded with tinned copper drain wire, and minimum 18-gauge conductors.
2. 120 VAC control wiring shall be minimum of #14 gauge wire, THHN type, in ½" conduit.

F. Conduit and Fittings

1. Conduit for Control Wiring, Control Cable and Transmission Cable: Electrical metallic tubing (EMT) with steel compression fittings, cold rolled steel, zinc coated or zinc-coated rigid steel with threaded connections. Rigid steel (RGS) with threaded fittings (connections to junction/outlet boxes and cabinets shall be made with threaded HUBS or double lock-nuts). Provide insulated bushings at all RGS conduit terminations where double lock-nuts are used. The use of Hubs are preferred. The use of threadless RGS fittings shall be kept to a minimum and used only when threading of the GRS is impossible.
2. Outlet Boxes (Dry Location): Sherardized or galvanized drawn steel suited to each application, in general, four inches square or octagon with suitable raised cover.
3. Outlet Boxes (Exposed to Weather): Threaded hub cast aluminum or iron boxes with gasket device plate.

4. Pull and Junction Boxes: Size according to number, size, and position of entering raceway as required by National Electrical Codes. Enclosure type shall be suited to location.

3.6 CONTROL PANELS

A. Enclosed cabinet type with hinged door for mounting controllers, relays, power supplies and miscellaneous control and communication devices.

B. Control panels shall be fabricated to match the approved shop drawings submitted by the controls contractor. Fabrication shall be in a neat and workmanlike manner and shall facilitate repair, maintenance, and adjustment of the equipment contained therein.

C. Locate all panels in mechanical or electrical rooms. Mount panels on wall near the equipment being controlled. Control panels shall not be mounted on the unit. Submit proposed locations for approval prior to preparing control drawings.

D. Control panels shall be fabricated and laid out to incorporate the following features:

1. Lockable doors. All control panels shall be provided with lockable doors using a cylinder AH2 lock kit.
2. Hinged door shall swing left.
3. Identification of all internally and cover mounted devices. Cover mounted labels shall be engraved labels as specified in this section.
4. 120 VAC power wiring shall enter the panel separately as close to the point of connection as possible
5. Provide one duplex combination switch/outlet inside the control panel with switch being the main means of 120VAC disconnect to the control panel. Outlet shall remain energized regardless of the status of the switch. Label receptable with source circuit information. Disconnecting means of 120VAC shall not be installed outside of the Control Panel.
6. Provide disconnecting means for controls power. Provide one control power disconnect switch per system served (e.g. two disconnect switches for control panel serving two units).
7. All control panels containing electrical equipment shall be NEMA rated for the location in which they are installed. Cover mounted components, tubing penetration, and conduit penetrations shall be made in a manner consistent with the NEMA rating.
8. All conduits entering the control panel shall be fitted with a plastic insulating bushing to prevent cable damage.
9. Wires and tubes that pass from the panel interior to cover mounted devices shall be provided with a flex loop that is anchored on both sides of the hinge.
10. All internal wiring and tubing shall run inside plastic open-slot wire ducts. Wire duct shall be sized to hold the required number of wires and tubes without crimping the wires or tubing and with sufficient space to allow wiring and tubing to be traced during troubleshooting operation.
11. Labels serving all input/output wiring shall be installed between the open-slot wire duct and the controller so that labels are visible without removing the covers from the wire ducts. Labels shall be as specified in this section.
12. All wiring inside the panel shall be separated by classification, i.e., Class 1 circuits shall not be run with Class 2 circuits, etc. Segregation shall be maintained inside the panel to the fullest extent possible. Where low voltage wires carrying low level ac

and dc signals cross wires containing power and high level ac signals, the wires shall cross at a 90° angle.

13. Provide a wireway above or below the control panel whenever more than six conduits enter the panel. Wireway shall be the width of the panel with a minimum of six inches in height and six inches in depth.

E. Panel Location:

1. Each control panel is to be located for convenient servicing. Top of panel shall be at six-foot above finish floor.
2. Mount panels adjacent to associated equipment.

F. Operator Workstation Control Unit (B-OWS/AWS) Panel:

1. Mount in MDF room or pre-approved location.
2. Provide one duplex outlet mounted inside the control panel.
3. Locate B-OWS/AWS power adapter inside the control panel.

3.7 TEMPERATURE, PRESSURE SENSOR INSTALLATION

A. Temperature and pressure sensors shall require no field calibrations, initial calibration and range set at factory. BAS contractor to calibrate the DDC system with the field sensors. Thermistors are not field calibratable, but still must be field calibrated with the DDC system.

B. Temperature and pressure sensor assemblies shall be readily accessible and adaptable to each type of application in such manner as to allow for quick, easy replacement and servicing without special tools or skills.

C. Dry-media differential pressure transmitters shall be installed in the associated control panel with pressure sampling tubing routed in conduit to pressure sampling locations.

D. Wet-media differential pressure transmitters shall be installed in accessible location at 5-feet AFF. Submit proposed location in submittal package for approval.

E. Differential pressure transmitters intended for control of building chilled water or hot water distribution pumps, shall be hardwired to the Local Control Unit (LCU) in direct control of the associated Variable Frequency Drives.

F. Sensors installed on units shall be provided with their own dedicated handy box and under no circumstances a sensor shall be “tucked in” or hidden in a junction-box. Installation shall allow the replacement of a sensor without dismantling other sensors, wiring or conduit.

G. Outdoor installation shall be of weatherproof construction or in appropriate NEMA enclosures. These installations shall be protected from solar radiation and wind effects. Protective shield shall be stainless steel.

H. Sensors shall be provided with protective enclosure where located on plans in common areas (hallways, library, cafeteria, gymnasium). Enclosure shall be clear plastic and keyed alike. Key type is C254A as in a Honeywell Versa Guard TG510A 1001. All Gymnasium areas shall use a wire basket type of enclosure.

I. Sensors in duct shall be mounted in locations to sense the correct temperature of the air only and shall not be located in dead air spaces or positions obstructed by ducts, equipment, and so forth. Locations where installed shall be within the vibration and velocity limit of the sensing element. Ducts shall be securely sealed where elements or connections penetrate ducts to avoid measuring false conditions.

J. All sensors measuring temperatures in pipes larger than 2 inches in diameter or in pressure vessels shall be supplied with wells properly fabricated for the service. Wells shall be non-corrosive to the medium being measured and shall have sufficient physical strength to withstand pressures and velocities to which they are subjected. Wells shall be installed in the piping at elbows where piping is smaller than the length of the well to affect proper flow across the entire area of the well.

3.8 INSTALLATION OF METERS

A. Liquid Flow Meter (Insertion-Type): Allow ample slack on the meter cable/flexible conduit to allow full removal of the meter for servicing without the needing to disconnect control wires.

B. Liquid Flow Meter with Remote Display:

1. Control wiring between meter and remote display shall be installed in conduit.
2. Remote-mounted display shall be installed at 65-inches AFF, preferably next to the associated control panel.

C. BTU Meter: Transmitter/Display shall be installed at 65-inch AFF, preferably next to the associated control panel.

D. Outdoor Air Measuring Station: Transmitter/Display shall be installed at 65-inch AFF, preferably next to the associated control panel.

3.9 INSTALLATION OF ACTUATORS

A. Where damper motors operate outdoor relief, exhaust and fresh air dampers, pretension damper drive linkage to ensure tight closure.

B. Do not install damper motors on ductwork of less than 0.76 mm thick without first reinforcing it.

C. Where a damper motor is installed on an insulated surface of a duct plenum, mount it on a standoff bracket so as not to interfere with the continuity of the insulation.

D. Locate damper and valve actuators so that they are easily accessible for testing and servicing. Provide jack shaft extensions as required.

E. Where damper is operated via jackshaft, disassembling of jackshaft shall not be required for removal of damper motor. Provide Belimo ZG-JSL jackshaft retrofit linkage where needed to maintain ease of access and servicing.

F. Damper motors shall be selected for the torque requirements of the damper. Damper operators that are undersized for the application shall be replaced with larger operators, at no extra cost. On retrofit applications, when existing dampers are suspected to be dragging, the next larger torque actuator shall be used.

G. Provide one damper motor and linkage for every 2-m^2 damper section area, or as required to meet the torque requirements of the damper under design airflow conditions (or minimum of one damper motor per damper section). Do not use two motors linked together on one shaft, or by jackshaft.

H. Actuators shall be installed in such manner to avoid damage to actuator due to condensation.

3.10 NETWORK INFRASTRUCTURE INSTALLATION

A. All network infrastructure components and wiring shall be installed prior to control device installation. For twisted pair networks - install, test, and document test results and physical locations of cabling, conduit, and junction boxes on as-built drawings.

B. Install and commission all routers, physical layer repeaters, and terminators prior to control device installations. Test routers, etc. with the approved network management tool, document results, and identify physical locations of all routers, repeaters, and terminators on as-built drawings.

C. Install necessary power supplies for infrastructure components and devices prior to device installation. Document the following: power source location indicating panel number and breaker id on the set of as-built drawings, at the source panel, and at each device or infrastructure component.

3.11 CONTROL DEVICE INSTALLATION

A. Coordinate with mechanical and electrical contractors and identify each physical network device location. For retrofit applications physically inspect the site. Document locations on shop drawings and include with submittals provided to architect/engineer and AISD Energy Management department representative.

B. Provide all isolation, interfacing, and wiring to complete the installation of equipment items that have integral control systems such as packaged air conditioners, heating units and boiler firing systems. Coordinate with manufacturers prior to submitting proposals and again prior to preparing submittals. Provide all components and circuits and interdisciplinary coordination required to interface the controls system for all required status monitoring, operational features, and fire management functions. Completely test and adjust all systems.

C. Prior to device installation confirm that wiring for all network media, power supply, and I/O has been completed and is available at each location. Notify architect/engineer and/or owners representative immediately of any discrepancies or missing items

D. Install each network device as physically close as possible to controlled equipment with respect to environmental and electrical noise conditions.

3.12 NETWORK DEVICE PROGRAMMING, GRAPHICAL DISPLAYS, STANDARD SETPOINTS, POINT NAMING STANDARDS, ALARMING AND TREND LOGGING

A. All network device programming used to implement control sequences shall be provided to AISD. It shall not be necessary for AISD to further program the system. However, provisions shall be made to allow future modification of the installed control programs.

B. Provide legally licensed copies of all software tools, configuration tools, management tools, and utilities used during system installation and commissioning.

C. Implement the control sequences for the equipment on this project as prescribed in the construction documents and drawing sequence of operation descriptions.

D. Provide the following Graphic User Interfaces (GUI) as the minimum acceptable but not limited to:

1. Home Page

2. Time Schedule Page
   a. Standard View
   b. Tabbed View
3. Alarm Console Page
4. Summary Page(s)
5. Floor Plan(s)
   a. Provide each floor plan with key plans and dynamically highlight which part of the key plan is in current view.
   b. Mark location of space sensors to match final installation.
   c. Provide calibrated space readings (e.g., space temp, humidity, CO2, etc.).
   d. Provide quick links (buttons) to associated HVAC equipment graphic pages.
   e. Provide floor plans with room numbers/area names overlaid on graphic plans (not embedded/part of floor plan graphic file). Final room numbers may differ from room numbers included on bid documents. Contractor shall request final rooms numbers via a request of information (RFI) document and update floor plans accordingly when applicable.
6. Dedicated GUI per each equipment being monitored/controlled by the BAS
   a. Provide dedicated override points for all outputs.
   b. Group points as follows:
      1) Setpoints: Bottom left-hand side
      2) Status Points: Bottom center (e.g., space temp, effective setpoints, etc.)
      3) Overrides: Bottom right-hand side
      4) Actual Occupancy: Top right
      5) All Other Points: Overlaid around HVAC schematic
7. All graphics shall adhere to the Owner's graphic standards. Contact CxA for access to templates prior to graphics development.

E. Point naming shall adhere to the Owner's point name conventions. Contractor shall reach out to the CxA prior to the commencement of programming for a copy of the latest version of the Point Naming Standards.

F. Provide the following minimum cooling and heating setpoints for equipment scheduled to control to maintain space temperature:

1. Occupied Cooling Setpoint (OCS) [Default: 74°F]
2. Occupied Heating Setpoint (OHS) [Default: 70°F]
3. Unoccupied Cooling Setpoint [Default: 85°F]
4. Unoccupied Heating Setpoint [Default: 50°F]
5. Unoccupied Dead-band [Default: 5°F]
6. Slider Adjust Range [Default: ±3°F]
7. Effective Cooling Setpoint
8. Effective Heating Setpoint
9. Effective Cooling Setpoint (Occupied) = OCS + Slider Adjust Value
10. Effective Heating Setpoint (Occupied) = OHS + Slider Adjust Value
11. Effective Cooling Setpoint (Unoccupied) = Unoccupied Cooling Setpoint
12. Effective Heating Setpoint (Unoccupied) = Unoccupied Heating Setpoint

G. Provide Alarm Extensions to the following points (at a minimum):

1. History Name: School-Name/Equipment-Tag/Point-Name
2. Freeze-Stat (Change of State Alarm)
3. Condensate Float Switch (Change of State Alarm)

4. Low/High Static Pressure Alarm (Change of State Alarm)
5. Fan Command vs Fan Status (Command Failure Alarm)
6. Compressor Command vs Compressor Status (Command Failure Alarm)

H. Provide Trend Logs with the following points:

1. Record Count: 10,000
2. History Name: School-Name/Equipment-Tag/Point-Name
3. Sensors (Interval: 5 minutes)
   a. Temperature
   b. Humidity
   c. CO2
   d. Static/Building Pressure
4. Outputs
   a. Supply/Exhaust/Relief Fan Command
   b. Supply/Exhaust/Relief Fan Status
   c. Supply/Exhaust/Relief Fan Speed (Interval: 5 minutes)
   d. Valve/Damper Command (Interval: 5 minutes)
   e. Valve/Damper Feedback (Interval: 5 minutes)
5. Status Points
   a. Occupancy
   b. Fire Alarm
   c. Dehumidification Status
   d. Safeties (Low Limit, Low Static, High Static, Float)

3.13 NIAGARA SUPERVISOR

A. The Operator/Advanced Operator Workstation (B-OWS/AWS) shall be integrated into the District's existing Niagara Supervisor Management System for centralized dashboarding, system navigation, master scheduling, alarm reporting, data logging/trending, automatic database backups, archiving, and time synchronization in accordance with established District's standards. At a minimum the following features shall be provided and fully functional upon project completion:

1. Holiday Scheduling
2. User synchronization
3. Automatic History data off-loading
4. Automatic Station Backups

3.14 USER ACCESS

A. Coordinate with AISD Controls Department on required user accounts and passwords.

3.15 LABELS AND IDENTIFICATION

A. All devices relating to the work or systems included herein, including controllers, valves, relays, etc., shall be identified with a unique identification number or name on the submitted control drawings. This identification number or name, along with the service of the device (discharge air temperature, freeze-stat, etc.), shall be permanently affixed to the respective device.

B. All field devices shall be supplied with a label indicating its function and point name. Labels shall be “DYMO”-type electronically printed approximately 2-1/2” x 3/4”. Surface shall be cleaned before installing labels. No handwritten labels shall be accepted.

C. Damper and valve actuators shall be labeled indicating which direction is towards open/bypass position (i.e. CW=BYPASS; CCW=OPEN).

D. Label ceiling grid where sensors installed above ceiling when applicable.

E. BAS Panels shall be supplied with a nameplate indicating the equipment being served (i.e. AHU-1 Cafeteria, CO2 Monitoring, etc.). Nameplates shall be engraved on rigid plastic labels approximately 3” x 1”. “DYMO” tape will not be accepted. Only black phenolic with white lettering will be accepted.

F. All 120 VAC power shall be labeled with source panel and circuit number.

G. All BAS Junction Boxes covers shall be spray-painted green with “BAS” stenciled over.

H. All controls wiring, tubing and cabling both inside and outside of control panels shall be labeled at both ends using BRADY PermaSleeve Black on White Wire Marker Sleeves (do not shrink). The wire designations shall match those on the shop and installation drawings. All markings shall be mechanically produced. No handwritten labels shall be accepted.

I. Communication wiring shall be labeled to specify where trunk is coming from (previous device) and where it is going next (next device) at each communication drop (e.g. each controller inside a control panel, each VFD provided with a communication card).

3.16 EQUIPMENT PROTECTION AND CLEANING

A. The BAS system contractor shall provide adequate means for and shall fully protect all finish parts of the materials and equipment against damage during the progress of the work until final acceptance.

B. Equipment and accessories shall be thoroughly cleaned of cement, plaster, and other materials; grease and oil spots shall be removed with cleaning solvent and surfaces carefully wiped.

3.17 AIR BALANCING

A. The BAS system contractor shall assign an individual full time to assist the air balance technician during the air-balancing process to assure full balance compliance.

B. The air balance plug-in shall have the ability to globally override local set point values and command all VAV air terminal devices to fully closed, fully open, minimum, and maximum damper positions.

C. All air balance settings and values shall be documented on the as-built control drawings for future reference.

3.18 SUBSTANTIAL PERFORMANCE TEST PROCEDURES

A. General

1. The work under this section shall undergo a formal Functional Testing Commissioning process as documented in Section 230926c. Contractor shall set aside

adequate time for the Commissioning process, including point checkout, sequence verification, and graphics checkout. Contractor shall include adequate time to respond to deficiencies without delaying project completion.

2. Prior to requesting Functional Testing, this Contractor shall have every control point checked end to end to ensure accuracy and integrity of the system.
3. Upon completion of control point end-to-end checkout, Contractor shall submit check-out documentation and DDC O&M Manuals to AISD and Commissioning Authority for review. Refer to Part 1 of this specification for O&M documentation requirements.
4. Upon review and approval of DDC O&M documentation, AISD and Commissioning Authority shall schedule the date for commencement of Functional Testing.
5. Controls Contractor shall make available for the Commissioning process a competent technician who is familiar with the installation and programming of the system. Contractor's technician shall accompany AISD and Commissioning Authority during Functional Testing.
6. Refer to Section 230926c for detailed description and requirements of the Commissioning process.

B. Documentation

1. Upon successful completion of the Commissioning process, and once all deficiencies identified during Commissioning have been corrected, Contractor shall submit a final As-built DDC O&M Manual with all programming, control points, network variables, setpoints, and graphics as actually implemented.
2. Provide As-built wiring diagrams showing all device locations, infrastructure component locations, control panels, sensors, actuators, ladder diagrams for associated hardware interlocks, and sequence of operation descriptions for each subsystem within the network design. Show all interfaces with existing and equipment controls.
3. As-built drawings shall show the exact routing order of all network devices installed in the field.
4. Provide control panel layout sheets complete with point names, point addresses and wire identification numbers. Attach one copy to each respective panel door.
5. All As-built documentation, shop drawings, points verification sheets, coordination meeting minutes, etc. shall be included in the O&M manuals.

C. Software Backups & Platform Access

1. Upon successful completion of the Commissioning process, the Contractor shall provide a Platform & Station Backup of the Operator Workstation (B-OWS/AWS) along with the Credentials to access the Workstation Platform.

3.19 PROJECT ACCEPTANCE

A. Upon receipt and approval of final DDC O&M Controls work shall be considered substantially complete, as recommended by the Commissioning Authority and approved by Owner and Engineer For additional acceptance requirements see Div 230926c.

3.20 POINT LISTS AND SEQUENCES OF OPERATIONS

A. Refer to drawings.

END OF SECTION 230926a

INTEGRATION, RECONNECTION & REPURPOSING OF EXISTING DIRECT DIGITAL CONTROLS FOR LOCAL BUILDING AUTOMATION SYSTEMS SECTION 230926b

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings

B. Division 23

1. Section 230926a – Tridium BACnet Direct Digital Controls
2. Section 230926c – Commissioning of Building Automation Controls

1.2 SUMMARY

A. The contents of this specification describe the requirements for the demolition of existing control system elements, integration of new DDC controls into existing building controls as well as reconnection or repurposing of existing building automation controls when replacing end-of-life HVAC equipment with new.

B. Contractor shall refer to the Contract Drawings for a detailed description of equipment receiving new controls, equipment scheduled for reconnection to existing controls, reuse/repurposing of existing controls and reuse requirements of existing devices such as damper and valve actuators.

C. Where specification requires written notice/approval from the AISD Service Center, e-mail correspondence is acceptable.

1.3 ACCEPTABLE CONTRACTORS

A. The following firms have been deemed acceptable Contractors to work on the Legacy Vista and I/NET Controls Systems for the products and services herein specified. In this specification, approved Contractors will be referenced as the Legacy Controls Contractor.

1. Schneider Electric
2. Climatec

1.4 SUBMITTALS

A. Legacy Controls Contractor shall submit list of equipment/controllers scheduled for reconnection, repurposing or modification for hard-wired interfacing with Central Plant. Submittals are not required when specified scope of work only involves Decommissioning/Demolition.

B. Shop Drawings

1. Include AISD Project Number on Cover Page.
2. Include Specification Section and Revision on Cover Page.
3. Format: 11”x17” PDFs.

4. Network Diagram: Not required
5. Control Schematics: Not required
6. Controller Inputs/Outputs – Tabular Form
    a. Existing Input/Output Assignments
    b. Proposed Input/Output Assignments (if applicable)
    c. Controller/Equipment ID Tag
    d. Controller Network Address
    e. Controller Physical Location, shown on shop drawing campus/site floorplan.

1.5 DECOMMISSION

A. For the purposes of this specification, decommissioning is defined as the tasks that shall take place alongside and prior to the power-disconnect and demolition of existing legacy controls for the purpose of removing specified controls from the Legacy Building Management System database and Graphic User Interface to ensure accuracy and system performance is maintained upon completion of the demolition of legacy controls.

B. Notice to Proceed

1. Legacy Controls Contractor shall seek written approval from the AISD Service Center prior to any decommissioning work takes place to ensure that decommissioning work will not interfere with other activities already underway and database backups have been made available in case of data corruption during the decommissioning process.

C. Schneider Vista Controls

1. Contractor shall remove the associated Vista Controllers from the Vista Network and front-end interface. Decommissioning shall include:
    a. Removal of Controllers from the TAC Vista Workstation and LonMaker.
    b. Reclaiming of all associated LonMaker credits.
    c. Repair any broken network points/links that may have occurred after the removal of the specified controllers to ensure existing-to-remain equipment remains fully functional (e.g., existing-to-remain controllers polling a temperature point from a non-existent controller, causing excessive data traffic).
    d. Removal of associated graphics and alarms.
    e. Updating of all common graphics such as Floor Plans, Time Schedule Page, Summary Pages, etc.
2. Contractor shall ensure that communication to other sites remains unaffected when demolition of controls involves the removal of the site's Loytec Router and router is configured as the Loytec Configuration Server. If this is the case, Contractor shall coordinate with the AISD Service Center for re-assigning the role of Configuration Server to another router prior to demolition.

D. Schneider I/NET Controls

1. Contractor shall coordinate with the AISD Service Center to ensure decommissioning proposed activities are acceptable. In general, decommissioning shall include:
    a. Removal of I/NET Controllers from the site's network.
    b. Repair any broken network points/links that may have occurred after the removal of the specified controllers to ensure existing-to-remain equipment remains fully functional (e.g., existing-to-remain controllers polling a

temperature point from a non-existent controller, causing excessive data traffic).

c. Removal of associated graphics and alarms.

d. Updating of all common graphics such as Floor Plans, Time Schedule Page, Summary Pages, etc.

1.6 DEMOLITION WORK:

A. Demolition of existing controls shall be performed by the Tridium Controls Contractor. The Tridium Controls Contractor shall be deemed acceptable per the qualifications specified in Section 230926a.

B. Tridium Controls Contractor shall coordinate with the Legacy Controls Contractor to ensure that all decommissioning efforts have been completed before the start of any demolition work.

C. Contractor shall notify the AISD Service Center prior to the commencement of any demolition work and shall provide a brief report listing all HVAC equipment with existing controls being demolished for the purpose of communication issues that may arise after demolition.

D. Existing controllers and actuators not being reused shall be removed and turned over to AISD. All other devices not being reused such as sensors, safeties, and control cabinets, shall be removed and disposed of.

E. Existing control panels serving Legacy Controls scheduled for demolition may be reused for housing new Tridium-BACnet Controllers provided existing panels are of sufficient size to accommodate new scope of work and installation complies with all the requirements of the Controls Specification 230926a.

F. All existing electric metallic conduit (EMT), rigid conduit and flexible conduit serving equipment being demolished and not being reused, shall be demolished to the nearest junction-box and disposed of.

1. Where junction box remains and contains no cables, junction box shall be relabeled as “BAS Spare”.
2. Demolish all associated conduit/raceway supports/fasteners/anchors and paint/patch wall/ceiling/building elements to match adjoining existing conditions.

G. All pneumatic controls serving equipment scheduled for demolition shall be removed and disposed of. All pneumatic lines shall be removed to above ceiling tiles in all general rooms. Mechanical rooms shall have pneumatic lines removed to 8-feet above finished floor. All pneumatic lines that are not being removed shall be capped with caps/joints having the same materials as the existing pneumatic tubing.

1. Demolish all associated tubing supports/fasteners/anchors and paint/patch wall/ceiling/building elements to match adjoining existing conditions.

H. Communication Trunk:

1. Demolition of existing controls expected to affect communication to existing-to-remain controls due to the removal or modification to the communication line, shall only occur with prior knowledge and approval from the AISD Service Center. Provide a minimum four (4) week written notice to the AISD Service Center prior to any disruption to existing communication networks and/or control system elements.

2. Contractor shall disconnect, trim and splice communication line from existing controllers being demolished so that resulting splice is located in an accessible control panel or junction-box for future access/troubleshooting. Control panel door or junction-box cover shall be labeled to indicate control panel/junction-box is housing a BAS splice such as "BAS Splice".
3. Upon completion of modifications to existing communication line, Contractor shall notify the AISD Service Center in writing for confirmation that communication to all existing controllers has resumed successfully. If issues are identified by the Owner, Contractor shall assist in resolving them to return communication state to its original condition prior to the demolition taking place.

1.7 INTEGRATION

A. Existing Tridium Controls

1. Contractor shall integrate new Tridium-BACnet controls into the existing Tridium System when Contract Drawings indicate campus is already fitted with an existing Tridium System.
2. Contractor shall provide the necessary communication modules and licenses to existing building controller (JACE/PC-Based JACE) to cause the successful integration of the new DDC scope of work.
    a. If new/proposed BACnet controller is to be added to on an existing network served by an existing building controller (JACE/PC-Based JACE), and if that existing building controller requires a software upgrade or other modification in order to function with the new/proposed BACnet controller, the Contractor shall carefully review the existing controllers on the existing network and confirm the building controller software upgrade or other modification to the existing building controllers still allows the existing controllers on that network to continue to operate. The Contractor shall provide this verification and communicate it in writing to AISD prior to providing any modifications to the existing building controller.
3. When called out on the Contract Drawings, the Contractor shall replace existing building controller with a new PC-Based JACE to integrate the existing and new scope of work. New PC-Based JACE building controller shall comply with all the requirements laid out in the Tridium-BACnet specification section 230926a. Old/existing building controller (JACE/PC-Based JACE) shall be returned to the Owner.

B. Existing Schneider Vista Controls

1. Schneider Vista Controls have been discontinued by the manufacturer and the provision/installation of Vista controllers has since been removed by AISD as an approved solution for use on any new or renovation project.

C. Existing I/NET Controls

1. Schneider I/NET Controls have been discontinued by the manufacturer and the provision/installation of I/NET controllers has since been removed by AISD as an approved solution for use on any new or renovation project.

1.8 RECONNECTION

A. Existing Tridium Controls

1. Contractor shall refer to the Contract Documents for detailed information about reconnection of existing Tridium Controls when replacing end-of-life HVAC equipment with new.

B. Existing Schneider Vista Controls

1. Reconnection of existing Schneider Vista Controls is only permitted with prior authorization from the AISD Service Center and when new equipment is feature-identical to the equipment being replaced.

C. Existing Schneider I/NET Controls

1. See repurposing.

1.9 REPURPOSING

A. Existing Tridium Controls

1. Contractor shall refer to the Contract Documents for detailed information on repurposing existing Tridium Controls.

B. Existing Schneider Vista Controls

1. Repurposing of existing Schneider Vista Controls is not permitted and shall not be considered as an approved method of control for new equipment.

C. Existing Schneider I/NET Controls

1. Only where specifically shown/allowed on the Contract Drawings, existing I/NET controllers may be repurposed for controlling new HVAC equipment when either of the following cases apply:
   a. New HVAC equipment is a like-for-like replacement and therefore changes in controller programming and sensors/devices are not required.
   b. New HVAC equipment is not a like-for-like replacement and therefore changes in controller programming and sensors/devices are required.

2. Where existing controllers shall be reused and/or repurposed to serve new HVAC equipment/sensors, the Contractor shall properly verify and document in the form of shop drawings all existing Controller Inputs/Outputs submitted in tabular form for review per the submittal requirements of this specification section prior to disconnecting any cables from the existing controllers.
   a. The Contractor shall carefully label/mark all existing Input/Output cables/terminations and document the terminal points on the controller at which each existing cable terminates.
   b. The Contractor shall submit this documentation of the existing controllers and their terminations in tabular form as part of the submittal shop drawings required for this Work.
   c. Where the controller is reused to serve new HVAC like-for-like replacement equipment/sensors, as part of the submittal shop drawings, the Contractor shall show/confirm the new/proposed HVAC equipment/sensors shall make use of the same type/number of Input/Output points as used by the existing equipment that was removed as part of this Work. And, upon installation of the new HVAC equipment/sensors that serves a like-for-like replacement of the existing equipment/sensors, the Contractor shall terminate the new HVAC equipment/sensors to the existing controller terminals, to match the existing installation.

3. Contractor shall meet with personnel of the AISD Service Center to assess termination of all input and output wiring to the existing I/NET controller prior to any demolition work takes place. Schedule such meeting with AISD a minimum of four (4) weeks prior to any demolition activity.
4. Once all input and outputs terminations at existing I/NET controller are validated and agreed upon by the AISD Service Center via review of the Contractor submitted Shop Drawings, the Contractor may proceed with disconnection of existing wiring and devices to allow the removal of end-of-life HVAC equipment.
5. Upon installation of new HVAC equipment, the Contractor shall re-run conduit and wiring as required to reach all new sensors and actuators. Contractor may reuse existing conduit; however, cables splices shall NOT be allowed. The Contractor shall furnish/pull new wiring where existing wiring does not reach new device and extra splices is required.
6. All new conduit and wiring runs shall comply with all installation requirements laid out in Specification Section 230926a.
7. Prior to the re-energizing of existing I/NET controller, the Contractor shall notify the AISD Service Center and Commissioning Agent for validating termination of all control wiring to existing controller. Schedule the validation of existing terminations by AISD and the Commissioning Agent a minimum of four (4) weeks prior to any validation activity is required. Validation by AISD and/or the Commissioning Agent of any terminations does not relieve the Contractor of the responsibility to properly wire/terminate to existing controllers.
8. By default, all reprogramming effort required for the proper functioning of the existing controllers to provide the functions/sequences as shown on the Contract Drawings/Documents shall be provided by the Contractor at no additional cost to AISD.
    a. Where the Contract Drawings specifically allow/indicate that a portion of the reprogramming of existing controllers shall be provided by AISD Service Center personnel for this Work, upon validation of termination of all control wiring, the Contractor shall coordinate and schedule such reprogramming effort with AISD a minimum of four (4) weeks prior to when such effort is required.
9. Contractor shall provide a minimum four (4) week prior notice to AISD when requiring coordination with AISD Service Center personnel with regard to existing control system elements.

1.10 INTERFACING WITH CENTRAL PLANT

A. This section applies to projects replacing hydronic HVAC equipment for which the replaced equipment and its associated chilled and hot water plants will not reside on the same building automation system network (e.g. I/NET and/or Vista school with I/NET and/or Vista central plant and new proposed HVAC equipment residing on a Tridium Controls network).

1. When directed by the Contract Documents and with prior authorization from the AISD Service Center, the Contractor shall be directed to provide hardwired interfacing between the new Tridium system and existing I/NET or Vista System for the purpose of relaying calls for cooling and heating between the two building control systems.
2. At a minimum, the Contractor shall provide the following hardwired interconnections:

a. Chilled Water Plant (If applicable)
   1) Call for Cooling: One Dry-Contact
   2) Plant Ready: One Dry-Contact
b. Hot Water Plant (If applicable)
   1) Call for Heating: One Dry-Contact
   2) Plant Ready: One Dry-Contact
c. Condenser Water Plant (If applicable)
   1) Call for Plant: One Dry-Contact
   2) Plant Ready: One Dry-Contact
d. Other points (If applicable)
   1) Freeze Call: One Dry-Contact
   2) Humidity Override: One Dry-Contact

3. Contractor shall meet with AISD Service Center personnel for selecting the most convenient existing legacy control panel for terminating dry-contact points.
4. Contractor shall run conduit and wiring from new dedicated Tridium-BACnet controller to agreed upon Legacy Control Panel.
5. Contractor shall notify AISD Service Personnel to request termination of dry-contact signals and reprogramming of legacy controller for accepting and processing dry-contact points.

END OF SECTION 230926b

SECTION 230926c
COMMISSIONING OF BUILDING AUTOMATION SYSTEM (TRIDIUM-BACNET)

PART 1 - GENERAL

1.0 SCOPE

This specification is Austin Independent School District's Division 230926c Rev. 7/30/2018 and supplements the Commissioning Requirements in Division-1 with specific requirements from Direct Digital Controls (DDC) specified under Division 23. This specification shall be used in its entirety and shall only be modified by, or with permission from AISD-Energy Management Department.

1.1 RELATED DOCUMENTS

A. Division-1, Section 019113 -Commissioning Requirements, addresses responsibilities and procedures for the commissioning process. All requirements of Division-1 specifications apply to this section.

B. Division-23, Section 230926a -Direct Digital Controls for Local Building Automation Systems (TRIDIUM-BACNET) addresses requirements for design, installation and testing of DDC system using the BACnet protocol for local control of building HVAC systems. All requirements of Section 230926a apply to this section.

1.2 RESPONSIBILITIES

A. Commissioning is the joint responsibility of the Contractor (including subcontractors and vendors) and the Commissioning Authority hired directly by the Owner, the Owner, and the Design Engineer. General assignment of responsibilities during the Commissioning process is specified in Section 019113. All the requirements of Section 019113 apply to this section.

B. (General) Contractor retains responsibility for coordinating participation of Local Building Automation System subcontractors (Section 230926) throughout the commissioning process, and for ensuring participation by other subcontractors and equipment suppliers, vendors and manufacturers as required to conduct activities specified herein.

C. Building Automation Systems subcontractor (Division 23) is responsible for assigning representatives with expertise and authority to act on behalf of the subcontractor to conduct commissioning activities specified. Building Automation Systems subcontractors are also responsible for providing tools, software and equipment required to conduct commissioning activities.

D. Commissioning Authority is responsible for organizing, witnessing and documenting commissioning activities specified.

E. Owner is responsible for assigning personnel with expertise and authority to act on behalf of the Owner as relates to commissioning of Building Automation Systems, and to provide access to facilities, equipment, and servers as required to conduct commissioning tasks.

F. Design Engineer is responsible for developing a design that is in compliance with the Owner's Project Requirements and Design Guidelines and for responding to Commissioning Authority's comments.

Design Engineer is also ultimately responsible for the proper operation of the system as designed, regardless of whether or not he chooses to participate in testing and demonstrations.

1.3 SUMMARY OF WORK

A. DESIGN PHASE (Information Only)

1. Conceptual Design Meeting: Early during Conceptual Design and prior to making firm decisions on the type of HVAC systems and controls to be provided, Design Team shall request a meeting with AISD Service Center personnel and Owner's Commissioning Authority. The main objective of the meeting is to review the Owner's Standard Specifications and Guidelines and ensure design will proceed in accordance.

2. Preliminary Design Submittal: Design Engineer provides complete DDC points list and sequence of operations for all systems at DD design submittal and again at 95% CD design submittal. Sequences and points lists shall be in accordance with Owner's guidelines and standard points lists. Electronic Submittals shall be provided to AISD Service Center personnel and Owner's Commissioning Authority.

3. Design Review Comments: Owner and Commissioning Authority provide comments upon review of DD and 95% CD design submittals. Comments issued in electronic form.

4. Design Review Meeting: A final design review meeting is held upon review of 95% CD's, to verify inclusion of review comments in design. Meeting is attended (at least) by Design Engineer, Owner, and Commissioning Authority. Commissioning Authority provides written documentation of decisions made during meeting.

5. Design Review Follow-up: Commissioning Authority conducts a follow up review of Construction Documents issued for permitting/bids and forwards comments to Owner and Engineer on any outstanding items.

B. SUBMITTAL PHASE

1. Preliminary Submittal: Controls subcontractor (Div-23) provides preliminary DDC submittal in accordance with specifications, with digital copies transmitted to AISD Service Center and Owner's Commissioning Authority (ACR). This submittal shall occur shortly after contract award and prior to approval of equipment submittals so that systems may be properly coordinated. In addition to requirements of Section 230926, Building Automation System submittal shall include at least the following:

a. Detailed written sequences as they will actually be programmed and using the program variable names;

b. Complete point lists including all controlled devices, monitored values, status points, set-points and all variables obtained from BACnet devices including those from equipment provided with BACnet communication cards;

2. Preliminary Submittal Review: Owner and Commissioning Authority issue joint review comments on Preliminary Submittal to Engineer for inclusion with Design Team's review comments to Contractor.

3. Preliminary Submittal Review Meeting: Upon acknowledgement of receipt of Preliminary Submittal review comments, Local Controls subcontractor will request through the Contractor and AISD Project Manager, a review meeting with Owner, Engineer, and Commissioning Authority. Commissioning Authority documents action items resulting from meeting for inclusion in Final Submittal.

4. Final Submittal: Upon addressing comments, Local Controls subcontractor issues Final Submittal for review by Engineer, Owner, and Commissioning Authority.

5. Final Submittal Review Comments: Owner, and Commissioning Authority issue joint comments to Engineer for inclusion with Design Team's final submittal review comments to Contractor.

6. No hardware installation should take place prior to receiving submittals that have been approved by Owner, Engineer and Commissioning Authority.

C. PRE-FUNCTIONAL INSPECTION -Local Building Automation Systems Controls

1. Controls Contractor Request for Pre-Functional Inspection: Upon completion of installation and programming of ALL systems, Controls subcontractor shall issue a written request for Pre-Functional Inspection by Engineer, Owner and Commissioning Authority, certifying that the following work is complete and ready for inspection:

   a. Manufacturer start-up has been conducted for all equipment requiring it - coordinate with Mechanical Contractor;

   b. Piping has been flushed and (preliminary) test and balance completed - coordinate with Mechanical Contractor;

   c. All control and monitoring devices installed, wired and tested;

   d. Point-to-point check to verify correspondence of control points to control devices verified (provide report);

   e. All operational sequences tested;

   f. Control Panel layout sheets complete with point name, point address, and wire identification number (indicating DDC device), with one copy attached to each respective panel door;

   g. All points and devices permanently tagged with point name, address, and panel number;

   h. As-Built Controls Diagrams and Sequence Documentation reflecting systems as programmed and installed, to be used during inspection.

2. Pre-Functional Inspection: Contractor shall set aside a minimum of two days to conduct a joint Pre-Functional Inspection of Local Controls Building Automation System work with Engineer, Owner and Commissioning Authority. Work will include the following:

   a. Physical inspection of installation for compliance with specifications;

   b. Sample testing of sensors and devices for verification of calibration;

   c. Sample point-to-point checkout to verify correspondence of commanded points to controlled devices;

   d. Testing of central plant cooling sequences including plant enable/disable sequences and call for unoccupied operation;

   e. Testing of central plant heating sequences including plant enable/disable and call for unoccupied operation;

   f. Testing of air handler units operating sequences (sampling) including occupied/unoccupied sequences and call for unoccupied operation;

   g. Testing of zone controls (fan-coil, dx-split, vav-boxes) operating sequences (sampling) including occupied/unoccupied sequences and call for unoccupied operation;

3. Pre-Functional Inspection Report: Commissioning Authority prepares a report detailing deficiencies identified during Pre-Functional Inspection and submits to Engineer so he may evaluate and forward to Contractor.

4. Pre-Functional Re-Inspection(s) Request: Upon completion of items on Pre-Functional Inspection Report, Local Controls subcontractor issues a request for Pre-Functional Re-Inspection and the process is repeated.

5. Pre-Functional Acceptance: Upon completion of all items identified during Pre-Functional Inspection, Commissioning Authority issues an official notification of Pre-Functional Acceptance to Engineer so he may forward to Contractor.

6. When deem advantageous to the project, and depending on system configuration, Pre-Functional Inspection and Functional Testing may be combined into a single activity, at CxA's discretion.

D. FUNCTIONAL TESTING

1. Point Check-out Request: Upon completion of controls installation, the Controls Contractor shall submit documentation and issue written notification to Owner, Engineer, and Commissioning Authority stating that the entire system is ready for Point Check-out, including all graphics.

2. Point Check-out & Report: Commissioning Authority shall inspect system via the Web-based Graphic User Interface (GUI) to verify that all specified points are present, that they are reading properly and that they are accessible, commandable and

overridable as specified. Commissioning Authority will issue a point check-out report listing deficiencies to be corrected.

3. Point Check-out Corrections: Controls contractor shall correct deficiencies listed in the Point Check-out Report and issue written notification when system is ready for Functional Testing.

4. Functional Testing: Upon notification by controls contractor that deficiencies in the Point Check-out Report have been corrected, Engineer, Owner, and Commissioning Authority will meet controls contractor at the project site to conduct Functional Testing as described in Part-4 of this specification.

5. Functional Test Report: Upon completion of Functional Testing, Commissioning Authority shall issue a report listing deficiencies to be corrected.

6. Functional Testing Deficiencies Resolution: Controls contractor shall resolve deficiencies in Functional Test Report. Corrections shall be accomplished within a period of no more than 2 weeks. Upon correction of deficiencies, Contractor shall notify Owner and Commissioning Authority when system is ready for Final Functional Testing.

7. Final Functional Test & Report: Upon receiving notification from Contractor, Owner and Commissioning Authority will verify corrections to controls systems. Commissioning Authority will complete a Final Functional Test Report documenting that systems work as per design intent, and/or outlining any recommendations for future improvement.

E. O&M MANUALS AND AS-BUILT DOCUMENTS

1. Requirements for O&M Manuals and As-Built Documentations are included in Section 230926a.

2. Commissioning Authority shall conduct review of O&M's and As-Builts concurrently with Engineer and track documentation.

F. TRAINING

1. Requirements for training of Owner's personnel are included in Section 230926a.
2. Commissioning Authority shall review training material and attend selected training sessions as deemed useful in order to document adequacy.

PART 2 - PRODUCTS -NOT APPLICABLE

PART 3 - EXECUTION -NOT APPLICABLE

PART 4 - FUNCTIONL TESTING PROCEDURES

4.0 GENERAL

A. Seven (7) Day Performance Test: Contractor shall schedule a seven (7) day period to conduct Functional Testing specified herein. Any upset of system operational functionality greater than (2) hours during the seven (7) day test period shall cause the test to be restarted.

B. Prerequisites for Functional Testing: The following must be complete prior to proceeding with Functional Testing

1. Pre-Functional Testing and Acceptance Notice by Commissioning Authority.

2. End to End Point Checkout by Contractor.

3. Point Checkout Report by Commissioning Authority.

4. Time schedules built and in control of time-controlled equipment.

5. Graphics displays installed and fully operational for each unit, system, and subsystem.

C. Trending: Implement the following trends prior to initiating testing.

1. Each space sensors shall be placed on a five (5) minute trend for 24 hours to document accurate temperature control of room or zone. Trends shall be recorded electronically for inclusion in Commissioning Report.

2. Each control loop measured variable, controlled variable and setpoint if calculated shall be place on a one (1) minute continuous trend for at least twenty-four (24) hours to document stability of loop. Trends shall be recorded electronically for inclusion in Commissioning Report.

3. Runtime totalizer shall be set on selected digital outputs.

4. Additional variables will be trended at the request of Owner/Commissioning Authority.

4.1 FUNCTIONAL TESTING

A. Local Network Testing (BACnet)

1. The fire alarm system shall be enabled at the time of testing to ensure correct action of all fire and smoke sequences that interface with controls.

2. Network traffic for each device channel shall be measured for 24 hours utilizing a protocol analyzer tool. Channel analysis shall include bandwidth utilization, and error

statistics. Reconfigure nodes and/or install additional routers as necessary to maintain traffic at a no more than 60% of channel bandwidth capacity. Backbone channels that contain permanent HMI's shall consume no more than 30% of total bandwidth capacity.

3. Each network control device, intelligent router, and network interface shall be tested and health verified using the protocol analyzer diagnostics application. Test results shall include neuron error log statistics, self-test results and device state information.

4. A power failure for the building shall be simulated and system recovery monitored. A protocol analyzer log shall record the network traffic for each channel for a 60-minute period following building power restoration.

5. Disable all sending (upstream) devices and simulate connection failures for receiving devices (downstream) that implement fail-safe configuration settings. Verify that downstream devices play failsafe values in the event that network variable updates are not detected by downstream devices within the minimum receive update intervals.

6. Test results shall be printed, recorded electronically and submitted to Owner, Engineer and Commissioning Authority.

B. Functional Testing of Sequences and Controls

1. Functional Checklists: Functional Testing forms shall be developed by Commissioning Authority for each specific system or subsystem to be tested, identifying all control and monitoring points that must be active.

2. End-to-End Verification: Proper operation/response of controlled points shall be verified from the Web-based Graphic User Interface (GUI) front-end to the actual physical devices in the field, as follows:

   a. Controlled devices shall be commanded to a value at the GUI and its reaction observed in the field.

   b. Status points shall be changed and observed both in the field and at the GUI.

   c. Selected sensors shall be tested for accuracy and proper placement to ensure that sensors are properly assigned to the area served.

   d. Selected points shall be disabled in the field and the proper alarm/response verified at the GUI.

3. Sequence Verifications: Proper operation of programmed sequences shall be verified for each major system type and sampled for multiple identical systems. Sequence verification will include the following as directed by the CxA:

   a. Response to time schedule commands.

   b. Response to changes in setpoints.

c. Responses to changes in field conditions.

d. Response to loss and restoration of power.

e. Response to loss and restoration of communication.

END OF SECTION 230926c

SECTION 260100 – COMMISSIONING OF ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes commissioning process requirements for electrical systems, assemblies, and equipment.

B. Related Sections:

1. Division 01 Section 016500 – "GENERAL COMMISSIONING REQUIREMENTS" for general commissioning process requirements.

2. Division 22 Section 220100 – "COMMISSIONING OF PLUMBING SYSTEMS".

3. Division 23 Section 230100 - "COMMISSIONING OF MECHANICAL SYSTEMS".

1.3 DEFINITIONS

A. Commissioning Authority (CxA): Independent agent hired by Owner and not associated with General Contractor or its subcontractors, Architect or its sub-consultants, or Construction Administrator or its staff or consultants. Under Owner's direction, and not General Contractor's direction, CA will direct and coordinate day-to-day commissioning activities without assuming oversight responsibilities.

B. Refer to section 016500 - GENERAL COMMISSIONING REQUIREMENTS.

1.4 CONTRACTOR'S RESPONSIBILITIES

A. Refer to section 016500 - GENERAL COMMISSIONING REQUIREMENTS.

B. Perform commissioning tests at the direction of the CxA.

C. Attend construction phase controls coordination meeting.

D. Participate in electrical systems, assemblies, equipment, and component maintenance orientation and inspection as directed by the CxA.

E. Provide information requested by the CxA for final commissioning documentation.

F. Complete project-specific construction checklists and commissioning process test procedures for actual electrical systems, assemblies, equipment, and components to be furnished and installed as part of the construction contract.

G. Direct and coordinate commissioning testing among subcontractors, suppliers, and vendors.

H. Provide test data, inspection reports, and certificates for Systems Manual.

1.5 COMMISSIONING DOCUMENTATION

A. Provide the following information to the CxA for inclusion in the commissioning plan:

1. Plan for delivery and review of submittals, systems manuals, and other documents and reports.
2. Identification of installed systems, assemblies, equipment, and components including design changes that occurred during the construction phase.
3. Process and schedule for completing construction checklists and manufacturer's pre-start and startup checklists for electrical systems, assemblies, equipment, and components to be verified and tested.
4. Certificate of completion certifying that installation, pre-start checks, and startup procedures have been completed.
5. Certificate of readiness certifying that electrical systems, subsystems, equipment, and associated controls are ready for testing.
6. Test and inspection reports and certificates.
7. Corrective action documents.

1.6 SUBMITTALS

A. Certificates of readiness.

B. Certificates of completion of installation, pre-start, and startup activities.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 GENERAL

A. Refer to section 016500 - GENERAL COMMISSIONING REQUIREMENTS.

3.2 PRE-FUNCTIONAL CHECKLISTS

A. To be provided by CxA upon review of 50% CDs.

B. Contractor shall conduct Pre-functional Testing to document compliance with installation and start-up checklists prepared by Commissioning Authority for the Division-26 items.

C. Request verification of Pre-functional checklists by CxA prior to proceeding with system start-up and Functional Testing of systems.

D. Contractor shall participate in Pre-Functional testing activities to document electrical work associated with mechanical and plumbing systems.

E. Refer to Section 016500 - GENERAL COMMISSIONING REQUIREMENTS for issues relating to pre-functional checklists and testing, including list of systems to be commissioned, description of process, details on non-conformance issues relating to pre-functional checklists and test.

3.3 FUNCTIONAL CHECKLISTS

A. To be provided by CxA following review of submittals.

3.4 SYSTEM START-UP, TESTS & INSPECTIONS

A. Contractor is solely responsible for system start-up. CxA may, at his discretion, witness start up procedures, but will not perform any Functional Testing of systems until General Contractor has completed start-up and resolved all operating deficiencies.

B. Contractor is solely responsible for all tests and inspections required by the Authority Having Jurisdiction (AHJ). All test reports and certificates required by the AHJ shall be submitted prior to Functional Testing.

C. Contractor shall provide no less than 48 hours notice prior to conducting tests specified in other sections of the specifications, including:

1. Grounding tests

3.5 FUNCTIONAL TESTING PREPARATION

A. Certify that electrical systems, subsystems, and equipment have been installed, calibrated, and started and are operating according to the Contract Documents.

B. Certify that instrumentation and control systems have been completed and calibrated, that they are operating according to the Contract Documents, and that pretest set points have been recorded.

C. Set systems, subsystems, and equipment into operating mode to be tested (e.g., normal shutdown, normal auto position, normal manual position, unoccupied cycle, emergency power, and alarm conditions).

D. Inspect and verify the position of each device and interlock identified on checklists.

E. Check all notification and initiation devices and interlocks with associated systems during each mode of operation.

F. Testing Instrumentation: Provide instrumentation and personnel as required to conduct tests.

3.6 FUNCTIONAL TESTING PROCEDURES OF SYSTEMS TO BE COMMISSIONED

A. All Electrical and Electrically Powered Equipment
1. Inspect electrical wiring and grounding for proper connections, color coding, and quality of installation.
2. Verify supply voltage, all hot legs.
3. Verify amperage is within allowable limits.
4. Inspect for physical damage, proper installation, anchorage.
5. Verify equipment runs smoothly and quietly.
6. Verify operation of safeties.
7. Verify all required means of disconnect are in place.
8. Verify maintenance and NEC clearances are maintained.

B. Service Grounding Test:
1. CxA will witness ground tests to be conducted by Contractor in accordance with specifications. Contractor will provide CxA a minimum 48 hours advance notice of test so that CxA may be witness, or he shall re-test in CxA's presence. Ground resistance testing is to include lightning protection system as well as electrical power systems.
2. Provide ground test report for review by CxA.

C. Electrical Distribution System
1. Switchboards and Panelboards.
a. Wiring:
1) Verify wiring connections are secure.
2) Verify ground wires properly terminated, panels are grounded.
3) Verify wiring color coding is proper.
4) Verify panel is properly identified.
5) Verify load indicated in circuit directory is actual load served in space (by opening circuit breaker and observing response in space).
6) Verify load identification is adequately descriptive of load.
7) Verify phase rotation
8) Verify phase to phase and phase to neutral volts.
9) Document phase balance.
2. Receptacle and Device Test:
a. Test receptacles with a receptacle circuit tester for proper polarity.
b. Test each receptacle or branch circuit breaker having ground-fault circuit protection.

D. Lighting Systems:
1. Light Fixtures: Verify all lamps work without flicker.
2. Light Switches: Verify switches control lights per design
3. Lighting Controls:
4. Verify that occupancy and vacancy sensors respond appropriately.
5. Verify that lights turn off after specified time.
6. Verify sensor coverage includes entire room area being sensed.

7. Verify sensor does not pick up occupancy outside the area sensed.
8. For ceiling mounted occupancy switches, verify light switches still function in circuit.
9. Verify operation of dimming and daylighting systems
10. Verify operation of exterior lighting photocells and motion sensors.

E. Transformers
1. Verify primary and secondary voltages are within acceptable range and secondary voltage taps (where applicable) are appropriate.
2. Document phase to phase and phase to neutral voltages.
3. Document ground resistance
4. Verify transformers operate without “hum”.

3.7 TRAINING

A. Refer to sections 016500 - GENERAL COMMISSIONING REQUIREMENTS.

3.8 O&M MANUALS

A. Refer to sections 016500 - GENERAL COMMISSIONING REQUIREMENTS and section 017800 CLOSEOUT SUBMITTALS.

END OF SECTION

STRUCTURED CABLING INFRASTRUCTURE - SECTION 271300
REVISION April 06, 2026

REVISION LOG

VERSION	OWNER	REPRESENTATIVE	SUMMARY OF CHANGES	DATE PUBLISHED
2023.06.22	AISD NSS	Greg Violette	Initial Publication	2023.06.30
2025.04.17	AISD NSS	Mark Coldsmith	Revision 1	

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PART 1 - DOCUMENT PURPOSE

1.01 The Austin Independent School District (hereby referred to as Austin ISD) Structured Cabling Infrastructure Standard is a guideline for structured cabling infrastructure and the associated spaces to be applied by the design team when designing telecommunication systems new facilities and renovated facilities alike. Information herein is applicable to the Technology Consultant, Architect, MEP, and contractors, and shall be used as a design guideline for each project by all design team members.

A. These standards set forth parameters for the technical system in addition to the site and building requirements to facilitate a properly installed, standards-compliant structured cable system, organized as follows:

1. Telecommunications Spaces; Architectural Considerations, HVAC, Power, Entrance Pathways and Conduits

2. System Requirements; Cable Management in Telecommunications Spaces, Cable Support in Pathways, Backbone Cabling, Horizontal Cabling, Grounding, Labeling, Testing, and As-Built Documentation.

3. Telecommunications Diagrams

1.02 The standard addresses infrastructure for typical buildings and is not intended for the design of data centers or specialty facilities, of which should be considered on a case- by-case basis.

1.03 Designers shall not deviate from this standard without explicit written approval from the Austin ISD Network Support Services Department.

1.04 Any deviations shall immediately be brought to the attention of the owner's representative in writing for resolution.

1.05 Where means, methods, and best practices are mentioned, contractor shall follow the manufacturer's and owner's requirements, industry standards, or code, whichever is most stringent.

1.06 Basic contractor qualifications are set forth but may be made more stringent as applicable to each project based upon size and scope.

1.07 A Division 27 – Structured Cabling System specification and T-Series drawings for the Structured Cabling System shall be commissioned and issued by the Design Team during the design phases for each facility or project.

PART 2 - DOCUMENT HISTORY

2.01 This document supersedes all previous standards which have been fully reevaluated and described herein by the Austin ISD Network Support Services Department.

2.02 The contents of the standards were derived by the assembly and input from the Austin ISD Network Support Services Department in conjunction with applying current industry standards.

PART 3 - INDUSTRY STANDARDS

3.01 The following industry standards shall be adhered to unless specifically directed otherwise by the Austin ISD Network Support Services Department. The list is not all- inclusive and does not alleviate compliance with the latest applicable standards, codes, and best practices:

A. American National Standards Institute (ANSI)

B. American Society for Testing and Materials (ASTM)

1. ASTM B 1 Standard Specification for Hard-Drawn Copper Wire
2. ASTM B 8 Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
3. ASTM D 1557 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3) (2700 kN-m/m3)
4. ASTM D 709 Laminated Thermosetting Materials

C. Alliance for Telecommunications Industry Solutions (ATIS)

D. Building Industry Consulting Service International (BICSI)

1. Telecommunications Distribution Methods Manual 14th Edition
2. Outside Plant Design Reference Manual 6th Edition
3. ANSI/BICSI Data Center Design and Implementation Best Practices
4. NECA/BICSI 568-D Standard for Installing Commercial Building Telecommunications Cabling
5. NECA/BICSI 607-D, Standard for Telecommunications Bonding and Grounding Planning and Installation Methods for Commercial Buildings

E. Federal Communications Commission (FCC)

1. FCC Part 15, Radiated Emissions Limits
2. FCC Part 68, Connection of Terminal Equipment to the Telephone Network
3. FCC Part 76, Cable Television Service

F. Insulated Cable Design Consultants Association (ICEA)

1. ICEA S-87-640 Fiber Optic Outside Plant Communications Cable
2. ICEA S-98-688 Broadband Twisted Pair, Telecommunications Cable Aircore, Polyolefin Insulated Copper Conductors
3. ICEA S-99-689 Broadband Twisted Pair Telecommunications Cable Filled, Polyolefin Insulated Copper Conductors

G. International Electrotechnical Commission (IEC)

H. Institute of Electrical and Electronics Design Consultants, Inc. (IEEE)

1. IEEE Standard IEEE Guide for Measuring Earth Resistance, Ground Impedance, and Earth Surface Potential of a Ground System
2. IEEE Standard 1100 Recommended for practice for Powering and Grounding Sensitive
3. Electronic Equipment in Industrial and Commercial Power Systems (IEEE Emerald Book)
4. IEEE C2 Errata INT National Electrical Safety Code
5. IEEE Std 100 The Authoritative Dictionary of IEEE Standards Terms

I. International Organization for Standardization (ISO)

1. International Organization of Standardization/International Electrotechnical Commission (ISO/IEC)
2. ISO/IEC 11801, Information Technology-Generic Cabling for Customer Premises,
3. ISO/IEC 14763-1, Information Technology-Implementation and Operation of Customer Premises Cabling-Administration
4. ISO/IEC 11801, Information Technology-Generic Cabling for Customer Premises

5. ISO/IEC 14763-1, Information Technology-Implementation and Operation of Customer Premises Cabling-Administration

J. National Cable Television Association (NCTA)

K. National Electrical Manufacturers Association (NEMA)

1. NEMA C62.61 Gas Tube Surge Arresters on Wire Line Telephone Circuits

L. National Fire Protection Association (NFPA)

1. NFPA-70, National Electrical Code
2. NFPA-75, Protection of Electronic Computer Data Processing Equipment.
3. NFPA-101, Life Safety Code
4. NFPA-297, Guide on Principles and Practices for Telecommunications Systems
5. NFPA-780, Standard for the Installation of Lightning Protection Systems.

M. National Institute Standards and Technology (NIST)

N. Occupational Safety and Health Administration (OSHA)

O. Telecommunications Industry Association (TIA)

1. ANSI/TIA-568-D, Generic Telecommunications Cabling for Customer Premises.
2. ANSI/TIA-568-D, Commercial Building Telecommunications Cabling Standard.
3. ANSI/TIA -568-D, Balanced Twisted-Pair Telecommunications Cabling and Components Standard.
4. ANSI/TIA-568-D, Optical Fiber Cabling Components Standard.
5. ANSI/TIA–569-E Commercial Building Standard for Telecommunications Pathways and Spaces.
6. ANSI/TIA-606-D, Administration Standard for the Telecommunications Infrastructure.
7. ANSI/TIA-607-D, Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises.
8. ANSI/TIA-758-B, Customer-Owned Outside Plant Telecommunications Infrastructure Standard.

P. U.S. Department of Agriculture (USDA)

1. RUS 1755 Telecommunications Standards and Specifications for Materials, Equipment and Construction
2. RUS Bull 1751F-643 Underground Plant Design
3. RUS Bull 1751F-815 Electrical Protection of Outside Plant
4. RUS Bull 1753F-201 Acceptance Tests of Telecommunications Plant (PC-4)
5. RUS Bull 1753F-401 Splicing Copper and Fiber Optic Cables (PC-2)
6. RUS Bull 345-65 Shield Bonding Connectors (PE-65)
7. RUS Bull 345-72 Filled Splice Closures (PE-74)
8. RUS Bull 345-83 Gas Tube Surge Arrestors (PE-80)

Q. Underwriters Laboratories, Inc. (UL)

1. UL 510 Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape
2. UL 910 (NFPA 262) Applicable Flame Test

PART 4 - CONTRACTOR QUALIFICATIONS

4.01 Contractor and staff shall be a current authorized contractor and certified by CommScope to provide and furnish a minimum of a 20-year warranty for structured cabling and connectivity components.

4.02 Contractor and staff shall possess relevant past-experience and references for a minimum of (5) projects of similar size and scope to that of the Austin ISD project being designed.

4.03 Contractor's Project Manager shall be an on-staff full time employee that possesses an RCDD in good standing. The Contractor shall provide Certificate to Austin ISD upon request.

4.04 Contractor shall have a local office within a 30-mile radius of the project site. Any deviations require prior approval from Austin ISD NSS.

4.05 Sub-contractors to the primary structured cabling contractor shall meet the same requirements for the primary structured cabling contractor as identified above. All sub- contractors shall be identified and approved by Austin ISD prior to any bid for work.

PART 5 - WARRANTY ON PARTS AND LABOR.

5.01 The contractor shall furnish a minimum of a 20-year warranty for the structured cabling and connectivity components.

5.02 All labor and workmanship shall carry a minimum warranty period of (1) year from the date of final system acceptance.

5.03 Defects in material or workmanship appearing within this period of time, shall be promptly repaired without cost to Austin ISD.

PART 6 - NOMENCLATURE

6.01 Main Distribution Frame (MDF) – An environmentally controlled centralized architectural space for housing telecommunications equipment that usually serves as the demarcation point for service providers, and houses the backbone terminations for cross-connection and distribution to Intermediate Distribution Frames.

6.02 Intermediate Distribution Frames (IDF) – An environmentally controlled architectural space for housing telecommunications equipment and backbone terminations for cross- connection and distribution to the MDF and end-user workstations.

PART 7 - INFRASTRUCTURE STANDARDS

7.01 Telecommunications Spaces

A. Main Distribution Frame (MDF)

1. Description

a. The MDF is a telecommunications space that serves a building or multi- building facility or campus. There is only (1) MDF on each campus.

b. The MDF houses the entrance conduits, terminations, and cross connections for all incoming inter-building backbone cabling from the IDFs in other buildings on the campus and the intra-building backbone cabling from the IDFs in the building in which it resides, and cross-connects to user workstations.

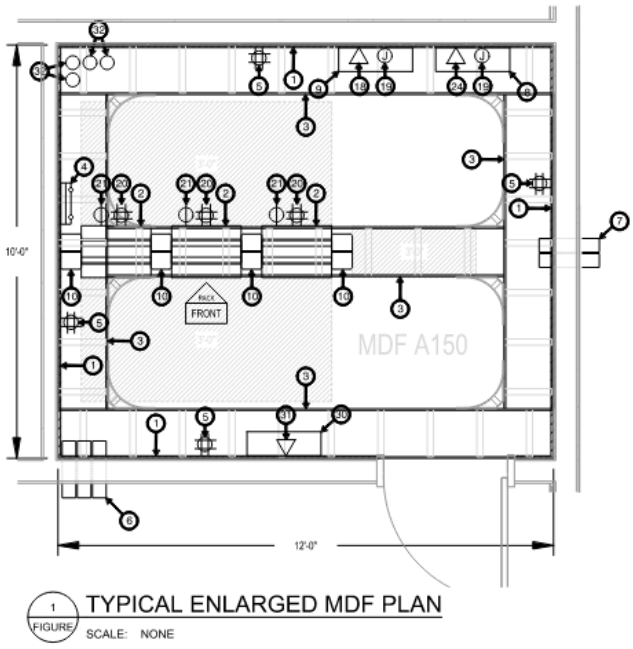
c. Campus distribution network equipment, servers, and other centralized telecommunications related equipment will reside in the MDF.

d. The MDF may share space with other systems such as security panels, paging/clock systems, and Distributed Antenna Systems. Space allocation for other systems shall be coordinated with the applicable disciplines after approval from the Austin ISD Network Support Services Department. All coordination shall be completed prior to installation.

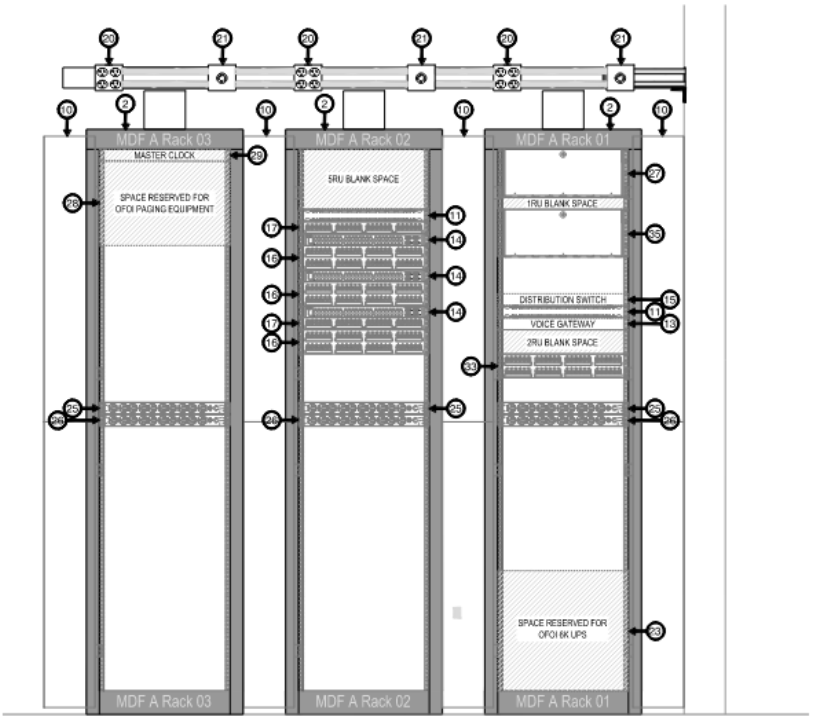
e. The Main Fire Alarm Control Panel shall be located in the Administrative Reception in compliance with all local building codes. Final Location subject to approval by Austin ISD Life Safety. Contractor shall provide 2 data cables from panel location ot the nearest MDF or IDF. One (1) data cable to be terminated on the data patch panel and one (1) cable terminated on the voice panel.

f. The MDF shall not be used for storage, serve as a mechanical or electrical distribution space, nor shall it have within its space main electrical feeds, electrical switch gear, transformers, and water or sprinkler main lines.

g. The layout of cabinets, equipment racks, wall fields, and cable management shall be as indicated Figure 1 and Figure 2 below:



1 FIGURE TYPICAL ENLARGED MDF PLAN
SCALE: NONE



2 FIGURE **TYPICAL MDF RACK ELEVATION**

SCALE: NONE

IDF/MDF KEYED NOTES

1. 4-FEET X 8-FEET X ¾-INCH AC GRADE VOID FREE FIRE RATED PLYWOOD INSTALLED VERTICALLY STARTING AT 24-INCHES ABOVE FINISHED FLOOR. THE PLYWOOD SHALL BE INSTALLED WITH THE "A" GRADE SIDE EXPOSED AND THE "C" GRADE SIDE AGAINST THE BUILDING WALL OR STRUCTURE. FIRE RATED PLYWOOD SHALL BE PAINTED WITH TWO COATS OF FIRE RETARDANT PAINT. FIRE RATED STAMPS SHALL BE VISIBLE FOR INSPECTION AFTER INSTALLATION. (BY DIV. 27)
2. 19-INCH X 84-INCH EQUIPMENT RACK WITH VERTICAL WIRE MANAGERS. (BY DIV. 27)
3. 12-INCH LADDER RACK MOUNTED AT 86-INCHES ABOVE FINISHED FLOOR. (BY DIV. 27)
4. GROUND BUS BAR MOUNTED AT 84-INCHES ABOVE FINISHED FLOOR. (BY DIV. 27)
5. DEDICATED 20 AMP CIRCUIT WITH QUAD RECEPTACLE NEMA 5-20R FLUSH MOUNTED TO THE FINISHED WALL SURFACE AT 48-INCHES ABOVE FINISHED FLOOR. (BY DIV. 26)
6. (3) FOUR INCH EMT WALL SLEEVES/CONDUITS WITH BUSHING ON EACH END AND FIRESTOP AS REQUIRED. SLEEVES ARE FOR HORIZONTAL DATA/VOICE/SECURITY CABLE ONLY. (BY DIV. 26)
7. (2) FOUR INCH EMT WALL SLEEVES/CONDUITS WITH BUSHING ON EACH END AND FIRESTOP AS REQUIRED. SLEEVES ARE FOR HORIZONTAL DATA/VOICE/SECURITY CABLE ONLY. (BY DIV. 26)
8. ACCESS CONTROL PANEL. (BY DIV. 28)
9. INTRUSION DETECTION PANEL. (BY DIV. 28)
10. DOUBLE-SIDED VERTICAL CABLE MANAGER. (BY DIV. 27)
11. DOUBLE-SIDED 1U HORIZONTAL CABLE MANAGER. (BY DIV. 27)
12. RACK MOUNTED 1U FIBER OPTIC ENCLOSURE FOR FIBER BACKBONE CONNECTIVITY FROM MDF. (BY DIV. 27)
13. RACK MOUNTED CISCO VOICE GATEWAY. (OFOI)
14. RACK MOUNTED CISCO NETWORK ACCESS SWITCH. (OFOI)
15. RACK MOUNTED CISCO DISTRIBUTION SWITCH. (OFOI)
16. RACK MOUNTED MODULAR 48-PORT CATEGORY 6A PATCH PANEL FOR DATA. (BY DIV. 27)
17. RACK MOUNTED MODULAR 24-PORT CATEGORY 6A PATCH PANEL FOR DATA. (BY DIV. 27)
18. DATA DROP FOR INTRUSION DETECTION PANEL. (BY DIV. 27)
19. DEDICATED 20 AMP CIRCUIT IN JUNCTION BOX FLUSH MOUNTED TO THE FINISHED WALL SURFACE AT 48-INCHES ABOVE FINISHED FLOOR. (BY DIV. 26)
20. DEDICATED 20 AMP CIRCUIT WITH QUAD RECEPTACLE NEMA 5-20R MOUNTED TO LADDER RACK AT REAR SIDE OF EQUIPMENT RACKS. (BY DIV. 26)
21. DEDICATED 30 AMP CIRCUIT WITH NEMA L6-30R TWIST LOCK RECEPTACLE MOUNTED TO LADDER RACK AT REAR SIDE OF EQUIPMENT RACKS. (BY DIV. 26)
22. RACK MOUNTED 2200VA UPS. (OFOI)
23. RACK MOUNTED 6K UPS. (OFOI)
24. (3) DATA DROPS FOR ACCESS CONTROL PANEL. (BY DIV. 27)
25. RACK MOUNTED HORIZONTAL PDU FOR UPS POWER - AT 22U. (BY DIV. 27)
26. RACK MOUNTED HORIZONTAL PDU FOR HOUSE POWER - AT 21U. (BY DIV. 27)
27. RACK MOUNTED 4U FIBER OPTIC ENCLOSURE FOR INCOMING GAATN SERVICE. (BY GAATN CONTRACTOR)
28. SPACE RESERVED FOR OWNER FURNISHED / OWNER INSTALLED PUBLIC ADDRESS EQUIPMENT. (OFOI)
29. SPACE RESERVED FOR MASTER CLOCK EQUIPMENT. (BY DIV. 27)
30. FIRE ALARM CONTROL PANEL. (BY DIV. 26)
31. DATA DROP FOR FIRE ALARM CONTROL PANEL. (BY DIV. 27)
32. (2) 4-INCH UNDERGROUND CONDUITS FOR INCOMING GAATN SERVICE CONNECTION. CONDUIT SHALL BE PROPERLY SEALED TO PREVENT WATER INFILTRATION. (BY DIV. 26)
33. RACK MOUNTED CATEGORY 6 FLAT 110-STYLE 48-PORT PATCH PANEL FOR COPPER BACKBONE AND VOICE TERMINATIONS. (BY DIV. 27)
34. RACK MOUNTED CATEGORY 6 FLAT 110-STYLE 24-PORT PATCH PANEL FOR COPPER BACKBONE AND VOICE TERMINATIONS. (BY DIV. 27)
35. RACK MOUNTED 4U FIBER OPTIC ENCLOSURE FOR FIBER BACKBONE CONNECTIVITY TO EACH IDF. (BY DIV. 27)

2. Architectural Requirements

a. The MDF shall be a minimum of 120 square feet with minimum clear lineal walls of at least 10 feet by 12 feet. The size of the MDF shall be coordinated with and approved by the Austin ISD Network Support Services Department during the design.

b. All walls inside the MDF shall go to deck.

c. The MDF Room shall be located within the main Administration suite. Final location to be approved by Austin ISD NSS.

d. The MDF Room shall be located on the ground floor of the building.

e. The floor finish shall be sealed bare concrete.

f. The MDF shall not contain windows.

g. The MDF shall not require entry through another space or provide entry to another space.

h. The MDF shall not be located adjacent to or below restrooms or other water- based facilities, or sources of EMI and mechanical vibration.

i. All walls shall be covered with 4-feet x 8-feet x ¾-inch AC Grade Void Free Fire-Retardant Plywood, aligned vertically starting at 12 inches above the finished floor. The plywood shall be installed with the "A" grade side exposed and the "C" grade side against the building or structure. The plywood shall be painted with two coats of fire-retardant paint and one stamp from each sheet shall be masked during the painting and uncovered after the paint has dried so the fire rated plywood stamps are visible for inspection.

j. The minimum ceiling height shall be 9-feet above the finished floor with the following preferences of finishes.

1) No ceiling is the preferred finish.

2) Hard ceiling is acceptable if leaving open to structure is not possible.

3) A lay-in ceiling is not desirable, but in limited circumstances, may be acceptable. If a lay-in ceiling is required, it shall be coordinated and approved by the Austin ISD Network Support Services Department during the design process. If this option is approved, it is recommended the ceiling height inside the MDF room be higher than the ceiling height in the corridor outside the MDF so the cables entering into the MDF do not have to pass through the lay-in ceiling inside the MDF room.

k. Entry to the space shall be through a minimum 36-inch by 80-inch clear door opening that swings outward. Door shall be solid core or steel and shall not have any windows. The door shall open to an interior hallway or space, it is not recommended the door open to the exterior of the building.

l. The MDF door shall be equipped with an access control security system card reader and electrified door hardware.

m. The MDF shall have an Intrusion Detection keypad and be zoned separately from the remainder of the building.

n. Fire suppression for the MDF shall be determined by the specific code requirements for the fire protection scheme of the overall building. A fire suppression system is not otherwise desired in any technology space. If a fire suppression system is designed, it

shall be designed to avoid running distribution over the MDF equipment cabinets, racks and equipment. In the event it is required, the system shall be dry-pipe or pre-action type, and the installation and design shall be coordinated with Austin ISD Network Support Services Department.

3. HVAC Requirements

   a. The MDF shall be a 24/7 cooled environment between 68° and 75° F with relative humidity of 40% - 55%. The MDF shall be cooled via a dedicated unit. Design team shall reference current HVAC requirements in the PDM for additional requirements.

   b. Changes in temperature and humidity shall be kept to +/- 1 percent.

   c. The minimum HVAC load shall be designed to displace 12KW of power, or 3.5 Tons, and shall be coordinated with the Austin ISD Network Support Services Department during the design, and designed to the actual heat load if the known load is greater at the time of design.

   d. It is recommended the MDF maintain the stated temperature and humidity in the event of building power outages or primary HVAC system failure.

   e. Air delivery shall be aligned in the front of the equipment rows and returns at the rear of the equipment rows when possible.

   f. HVAC sensors and controls shall be located in the MDF at 5-ft AFF.

   g. A hard-wired wall mounted thermostat shall be located inside the MDF Room.

   h. HVAC systems shall be alarmed for power loss, high and low temperature, high and low humidity, smoke detection, compression failures and water flooding.

   i. A simplex data drop shall be installed within 12 inches of the unit so it can be incorporated into the Building Automation System (BAS).

4. Lighting Requirements

   a. All light fixtures shall be a minimum of 24-inches above the top of the highest cabinet, rack or cable runway (approximately 84-inches above finished floor). 36-inches above the top of the highest cabinet, rack or cable runway is desired.

   b. Lighting shall be a minimum of 50 foot-candles at 2-feet above the floor in the entire space.

   c. The MDF shall be equipped with emergency lighting to keep the space lit during power outages.

   d. In the event low voltage or LED light fixtures are used in the MDF or remainder of the campus, no control equipment for that system shall be installed in the MDF.

5. Power Requirements

   a. All electrical service outlets shall be labeled with the associated panel and circuit information.

   b. Power shall be in two categories: dedicated and convenience.

   c. Dedicated

      1) The MDF shall be equipped with a minimum of (1) dedicated 208 VAC 30-amp electrical circuit terminated with an L6-30 receptacle and (1) dedicated 120 VAC 20 Amp terminated in a quad L5-20 receptacle, per rack.

a) The 208 VAC circuit shall be mounted at the rear of the rack, firmly affixed to the overhead ladder rack and shall be provided with a NEMA L6-30R receptacle.

b) The 120 VAC circuit shall be mounted at the rear of the rack, firmly affixed to the overhead ladder rack and shall be provided with a female NEMA L5-20P quad receptacle. Receptacles shall be isolated ground type where allowable by NEC.

c) The originating electrical panel shall be properly sized for the loads calculated and shall be located in near the door in the MDF Room.

2) Additional power circuits to be allocated to security, paging service provider equipment shall be dedicated to the equipment being served and coordinated at the time of building design.

3) Power distribution to the cabinets shall be achieved by installing rack mounted Power Distribution Units. All Power Distribution Units shall be furnished and installed by the Owner.

d. Convenience

1) The MDF shall be equipped with 120 Volt 20 Amp duplex NEMA 5-20R receptacles, with a maximum of (3) receptacles on each circuit. The originating electrical panel shall be equipped with a 20 Amp breaker per circuit.

2) A duplex receptacle shall be spaced at least 1 foot from an adjacent wall and every 6 feet thereafter. A minimum of (1) duplex receptacle shall be placed in each wall and be flush mounted to the finished wall surface at 18 inches above finished floor.

6. Equipment Cabinets / Racks and Cable Management Requirements

a. The MDF shall be equipped with a minimum of (3) equipment racks. Coordination with and approval by Austin ISD Network Support Services Department during the design is required to determine the appropriate layout of equipment racks to be utilized.

b. The MDF shall be equipped with cable runway encircling the room at 86 inches above the finished floor and crossing the room above the equipment racks (1) time. In the event the entry door to the MDF is taller than 84”, the design team shall coordinate ladder rack mounting height with Austin ISD Network Support Services Department during design.

1) Cable runway shall be secured to the top of the equipment cabinets.

2) A vertical section of cable runway shall be attached to the plywood wall board to manage backbone and service provider cables as they transition from the entrance conduits to the overhead cable runway.

7. Uninterruptible Power Supply (UPS) Requirements

a. The MDF shall be equipped with 5kVA, Rackmount 4U, 208V and a 5kVA, Rackmount 2U Step-down Transformer Uninterruptible Power Supply to accommodate all equipment in the rack(s). Coordination with the Austin ISD Network Support Services Department will be required during design to ensure the UPS is sized correctly. The UPS shall be provided and installed by the Owner. The Technology Consultant shall allow space at the bottom of each network rack to allow for installation of the UPS.

B. Intermediate Distribution Frame (IDF)

1. Description

a. An IDF is a telecommunications space that resides in each building that requires more than a single telecommunications space from which to terminate horizontal workstation cables. There may be multiple IDFs in each building as required to maintain horizontal cable distances of 295 feet for the permanent link.

b. Each floor of the building with network connected devices shall have at a minimum (1) IDF Room. IDF Rooms shall not serve devices on other floors without explicit direction from Austin ISD Network Support Services.

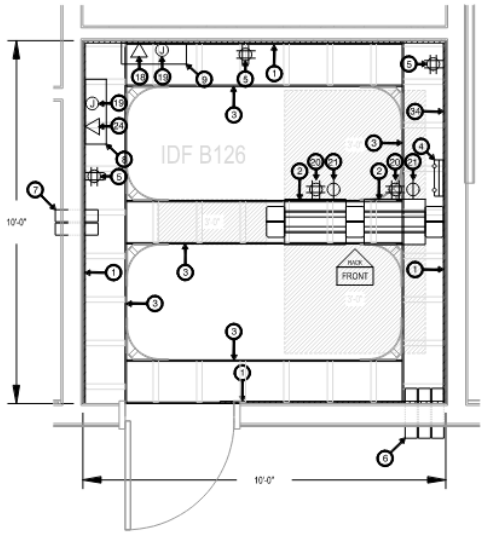
c. An IDF houses the terminations and cross connections for the intra or inter- building cabling from the MDF and the horizontal user workstation cabling in the area of the building that it serves.

d. Building Automation System workstation access network equipment may reside in the IDF. Building Automation System panels and control equipment may take up a maximum of 36” W x 96” H. If Building Automation Equipment requires space beyond that allowed, it shall be relocated to another non- technology space.

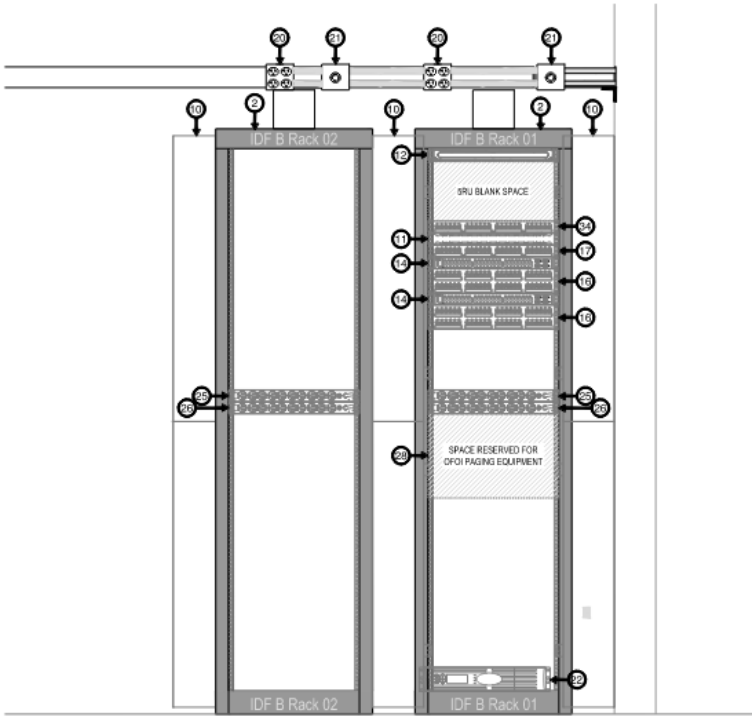
e. The IDF may share space with other systems such as security panels and paging systems. Space allocation for other systems shall be coordinated with the applicable disciplines during design.

f. The IDF shall not be used for storage, serve as a mechanical or electrical distribution space, nor shall it have within its space main electrical feeds, electrical switch gear, transformers, water, or main sprinkler lines.

g. The layout of equipment racks, wall fields, and cable management shall be as indicated In Figure 3 and Figure 4 on the following page:



3 FIGURE TYPICAL ENLARGED IDF PLAN
SCALE: NONE



4 FIGURE TYPICAL IDF RACK ELEVATION

SCALE: NONE

IDF/MDF KEYED NOTES

1. 4-FEET X 8-FEET X ¼-INCH AC GRADE VOID FREE FIRE RATED PLYWOOD INSTALLED VERTICALLY STARTING AT 24-INCHES ABOVE FINISHED FLOOR. THE PLYWOOD SHALL BE INSTALLED WITH THE "A" GRADE SIDE EXPOSED AND THE "C" GRADE SIDE AGAINST THE BUILDING WALL OR STRUCTURE. FIRE RATED PLYWOOD SHALL BE PAINTED WITH TWO COATS OF FIRE RETARDANT PAINT. FIRE RATED STAMPS SHALL BE VISIBLE FOR INSPECTION AFTER INSTALLATION. (BY DIV. 27)
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10. DOUBLE-SIDED VERTICAL CABLE MANAGER. (BY DIV. 27)
11. DOUBLE-SIDED 1U HORIZONTAL CABLE MANAGER. (BY DIV. 27)
12. RACK MOUNTED 1U FIBER OPTIC ENCLOSURE FOR FIBER BACKBONE CONNECTIVITY FROM MDF. (BY DIV. 27)
13. RACK MOUNTED CISCO VOICE GATEWAY. (OFOI)
14. RACK MOUNTED CISCO NETWORK ACCESS SWITCH. (OFOI)
15. RACK MOUNTED CISCO DISTRIBUTION SWITCH. (OFOI)
16. RACK MOUNTED MODULAR 48-PORT CATEGORY 6A PATCH PANEL FOR DATA. (BY DIV. 27)
17. RACK MOUNTED MODULAR 24-PORT CATEGORY 6A PATCH PANEL FOR DATA. (BY DIV. 27)
18. DATA DROP FOR INTRUSION DETECTION PANEL. (BY DIV. 27)
19. DEDICATED 20 AMP CIRCUIT IN JUNCTION BOX FLUSH MOUNTED TO THE FINISHED WALL SURFACE AT 48-INCHES ABOVE FINISHED FLOOR. (BY DIV. 26)
20. DEDICATED 20 AMP CIRCUIT WITH QUAD RECEPTACLE NEMA 5-20R MOUNTED TO LADDER RACK AT REAR SIDE OF EQUIPMENT RACKS. (BY DIV. 26)
21. DEDICATED 30 AMP CIRCUIT WITH NEMA L6-30R TWIST LOCK RECEPTACLE MOUNTED TO LADDER RACK AT REAR SIDE OF EQUIPMENT RACKS. (BY DIV. 26)
22. RACK MOUNTED 2200VA UPS. (OFOI)
23. RACK MOUNTED 6K UPS. (OFOI)
24. (3) DATA DROPS FOR ACCESS CONTROL PANEL. (BY DIV. 27)
25. RACK MOUNTED HORIZONTAL PDU FOR UPS POWER - AT 22U. (BY DIV. 27)
26. RACK MOUNTED HORIZONTAL PDU FOR HOUSE POWER - AT 21U. (BY DIV. 27)
27. RACK MOUNTED 4U FIBER OPTIC ENCLOSURE FOR INCOMING GAATN SERVICE. (BY GAATN CONTRACTOR)
28. SPACE RESERVED FOR OWNER FURNISHED / OWNER INSTALLED PUBLIC ADDRESS EQUIPMENT. (OFOI)
29. SPACE RESERVED FOR MASTER CLOCK EQUIPMENT. (BY DIV. 27)
30. FIRE ALARM CONTROL PANEL. (BY DIV. 26)
31. DATA DROP FOR FIRE ALARM CONTROL PANEL. (BY DIV. 27)
32. (2) 4-INCH UNDERGROUND CONDUITS FOR INCOMING GAATN SERVICE CONNECTION. CONDUIT SHALL BE PROPERLY SEALED TO PREVENT WATER INFILTRATION. (BY DIV. 26)
33. RACK MOUNTED CATEGORY 6 FLAT 110-STYLE 48-PORT PATCH PANEL FOR COPPER BACKBONE AND VOICE TERMINATIONS. (BY DIV. 27)
34. RACK MOUNTED CATEGORY 6 FLAT 110-STYLE 24-PORT PATCH PANEL FOR COPPER BACKBONE AND VOICE TERMINATIONS. (BY DIV. 27)
35. RACK MOUNTED 4U FIBER OPTIC ENCLOSURE FOR FIBER BACKBONE CONNECTIVITY TO EACH IDF. (BY DIV. 27)

2. Architectural Requirements

   a. The IDF shall be a minimum of 100 square feet with minimum clear lineal wall lengths of at least 10 feet by 10 feet.

   b. All walls shall go to deck. When walls are drywall, they shall be double layered drywall on both sides to help reduce the risk of unauthorized entry.

   c. The floor finish shall be sealed bare concrete.

   d. The IDF shall not contain windows.

   e. IDFs shall be arranged in a stacked formation in multi-story buildings, and not be located next to or below restrooms or other water-based facilities, or sources of EMI and mechanical vibration.

   f. All walls shall be covered with 4-feet x 8-feet x ¾-inch AC Grade Void Free Fire-Retardant Plywood, aligned vertically starting at 12 inches above the finished floor. The plywood shall be installed with the "A" grade side exposed and the "C" grade side against the building or structure. The plywood shall be painted with two coats of fire-retardant paint and one stamp from each sheet shall be masked during the painting and uncovered after the paint has dried so the fire rated plywood stamps are visible for inspection.

   g. The minimum ceiling height shall be 9-feet above the finished floor with the following preferences of finishes.

      1) No ceiling is the preferred finish.

      2) A lay-in ceiling is not desirable, but in limited circumstances, may be acceptable. If a lay-in ceiling is required, it shall be coordinated and approved by the Austin ISD Network Support Services Department during the design process. If this option is approved it is recommended the ceiling height inside the IDF room be higher than the ceiling height in the corridor outside the IDF so the cables entering into the IDF do not have to pass through the lay-in ceiling inside the IDF room.

   h. Entry to the space shall be through a minimum 36-inch by 80-inch clear door opening that swings outward. Door shall be solid core or steel and shall not have any windows. The door shall open to an interior hallway or space, it is not recommended the door open to the exterior of the building.

   i. The IDF door shall be equipped with an access control security system card reader and electrified door hardware.

   j. Fire suppression for the IDF shall be determined by the specific code requirements for the fire protection scheme of the overall building. If a fire suppression system is designed, it shall be designed to avoid running distribution over the IDF equipment cabinets, racks and equipment. In the event it is required, the system shall be dry-pipe or pre-action type.

3. HVAC Requirements

   a. The IDF shall be serviced by a dedicated unit that is part of the building's main system and be equipped with Split DX system through the wall above the door which cools only when the building HVAC is inadequate or not running. The unit shall maintain a constant 24/7 cooled environment between 68° and 75° F with relative humidity of

40% - 55%.

1) Design team shall reference all current HVAC requirements as outlined in Project Development Manual, Chapter 5.

b. Changes in temperature and humidity shall be kept to +/- 1 percent.

c. The minimum HVAC load shall be designed to displace 7KW of power, or 2 Tons, and shall be coordinated with the Austin ISD Network Support Services Department during the design, and designed to the actual heat load if the known load is greater at the time of design.

d. It is recommended that the IDF maintain the stated temperature and humidity in the event of building power outages or primary HVAC system failure.

e. Air delivery shall be aligned in the front of the equipment rows and returns at the rear of the equipment rows.

f. HVAC sensors and controls shall be located in the IDF at 5-ft AFF.

g. A hard-wired wall mounted thermostat shall be located inside the IDF Room.

h. HVAC systems shall be alarmed for power loss, high and low temperature, high and low humidity, smoke detection, compression failures and water flooding.

i. A simplex data drop shall be installed within 12 inches of the unit so it can be incorporated into the Building Automation System (BAS).

4. Lighting Requirements

a. All light fixtures shall be at least 24-inches above the top of the highest cabinet, rack or cable runway, 36-inches is recommended.

b. Lighting shall be a minimum of 50 foot-candles at 2-feet above the floor in the entire space.

c. The IDF shall be equipped with emergency lighting to keep the space lit during power outages.

d. In the event low voltage or LED light fixtures are used in the IDF or remainder of the campus, no control equipment for that system shall be installed in the IDF.

5. Power Requirements

a. All electrical service outlets shall be labeled with the associated panel and circuit information.

b. Power for the IDF shall be in two categories: dedicated and convenience.

c. Dedicated

1) The IDF shall be equipped with a minimum of (1) dedicated 208 VAC 30-amp electrical circuit terminated with an L6-30 receptacle and (1) dedicated 120 VAC 20 Amp terminated in a quad L5-20 receptacle, per rack.

a) The 208 VAC circuit shall be mounted at the rear of the rack, firmly affixed to the overhead ladder rack and shall be provided with a NEMA L6-30R receptacle.

b) The 120 VAC circuit shall be mounted at the rear of the rack, firmly affixed to the overhead ladder rack and shall be provided with a female NEMA L5-20P quad receptacle. Receptacles shall be isolated ground type where allowable by NEC.

c) The originating electrical panel shall be properly sized for the loads calculated and shall be located near the door within the IDF Room.

2) Additional power circuits to be allocated to security and paging equipment shall be dedicated to the equipment being served and coordinated at the time of building design.

3) Power distribution to the cabinets shall be achieved by installing rack mounted Power Distribution Units.

d. Convenience

1) The IDF shall be equipped with 20 Amp duplex NEMA 5-20R receptacles, with a maximum of (3) receptacles on each circuit. The originating electrical panel shall be equipped with a 20 Amp breaker per circuit.

2) A duplex receptacle shall be spaced at least 1 foot from an adjacent wall and every 6 feet thereafter. A minimum of (1) duplex receptacle shall be placed in each wall and be flush mounted to the finished wall surface at 18 inches above finished floor.

6. Equipment Cabinets / Racks and Cable Management Requirements

a. The IDF shall be equipped with a minimum of (2) equipment racks. Coordination with and approval by Austin ISD Network Support Services Department during the design is required to determine the appropriate layout of equipment racks to be utilized.

b. The IDF shall be equipped with cable runway encircling the room at 86 inches above the finished floor and crossing the room above the equipment cabinets or racks (1) time. In the event the entry door to the IDF is taller than 84”, the design team shall coordinate ladder rack mounting height with Austin ISD Network Support Services Department during design.

1) Cable runway shall not attach to the top of the equipment cabinets.

2) A vertical section of cable runway shall be attached to the wall board to manage backbone and service provider cables as they transition from the entrance conduits to the overhead cable runway.

7. Uninterruptible Power Supply (UPS) Requirements

a. The IDF shall be equipped with a 2200VA, Rackmount 2U Uninterruptible Power Supply. UPS shall be provided and installed by the Owner.

7.02 Entrance Pathways and Conduits

A. Design Principles

1. Pathways and conduits are described herein regarding capacity, function, and basic design principles and shall be coordinated with AISD Network Support

Services, the Civil Engineering Consultant, the Electrical Engineering Consultant, and any other relevant design consultants in accordance with NESC, NEC and ANSI/TIA-758, Customer-Owned Outside Plant Telecommunications Cabling.

2. All new campuses shall have a minimum of (4) 4-inch incoming conduits for Greater Austin Area Telecom Network (GAATN) Service.

3. Telecommunications Conduit Systems shall:

   a. Be Schedule 40 conduits when placed underground. Contractor to provide Schedule 80 conduits when placed under roadways.

   b. Contain a minimum of (3) 4-inch 3-Cell Maxcell fabric innerducts. Coordination with and approval by the Austin ISD Network Support Services Department is required to determine the exact quantity and size of the Maxcell innerducts inside each conduit.

   c. Contain no more than the equivalent of (2) 90-degree bends between pull boxes.

   d. Maintain a minimum bend radius of 10 times the diameter of the conduit.

   e. Not exceed 40 percent fill ratio.

   f. Be placed at a minimum depth of 36-inches from the top of the conduit to the finished grade with 3-inches of compacted sand above and below the buried conduit and an orange metallic tracer warning tape stenciled “TELECOMMUNICATIONS” 12-inches below grade throughout the entire pathway.

   g. Be interrupted by an adequately sized Maintenance hole or pull box at least every 600 feet for sections containing up to (1) 90-degree of bend, and at least every 350 feet for sections with the equivalent of (2) 90-degree bends.

      1) Maintenance holes and pull boxes shall be of adequate depth for conduits to enter from the side of the pull box and not be required to sweep up into the bottom of box.

      2) Maintenance holes shall be a minimum size of 12’ L x 6’ W x 7’ H.

      3) Pull boxes shall be a minimum of 36” L x 36” W x 30” H.

      4) All accessories such as racking, grounding and bonding, ladders and ancillary equipment shall be provided for in the design.

      5) All covers shall be stenciled with “**AUSTIN ISD COMMUNICATIONS**” unless otherwise noted below.

      6) Maintenance holes and pull boxes shall be designed to ensure proper construction types and load ratings (i.e., traffic bearing) are observed and utilized based on the location of the pull boxes.

      7) All covers and boxes shall be rated for the environment they will be in.

      8) All Maintenance Holes / Handholes shall be flush with final grade.

   h. Stub up into the MDF and/or IDF at 4-inches above the finished floor, no more than 2-inches from the finished wall and installed parallel to the finished wall.

i. Contain a marked pulling tape with 1800 lbs. tension strength, be fitted with bushings, and sealed appropriately at both ends.

j. Have an engraved metallic label at each end with the destination point indicated for all conduits larger than 2-inches in diameter, including incoming service and GAATN conduits. Conduits smaller than 2-inches in diameter shall have a machine printed label firmly affixed to each end with the destination point indicated.

1) As an example, a conduit from the MDF to an IDF shall read at the MDF side "TO IDF-B" and at the IDF side "TO MDF-A".

2) The design team shall coordinate the current GAATN labeling requirements with Austin ISD Network Support Services Division during design.

B. GAATN (Greater Austin Area Telecom Network) Service Conduits

1. Minimum of (4) 4-inch conduits shall route underground from the MDF to the nearest GAATN utility/service pole(s). There shall be (2) discrete conduit paths; One path shall contain (2) 4-inch conduits to support GAATN service coming in,
(2) 4-inch conduits shall be used to support GAATN service going out. Service pole locations shall be coordinated with Austin ISD Network Support Services Division during design. Refer to Section 1 Design Standards for additional information.

2. Shall have MaxCell 4 inch 3 cell fabric innerduct inside the primary conduit. MaxCell innerduct in GAATN pathways to be provide by GAATN-authorized vendor.

3. Shall have a 5-inch (minimum) 3000psi concrete cap covering the entirety of the trench.

4. Manhole/handhole covers shall be stenciled with "**GAATN**".

C. Campus Serving Conduits

1. Minimum of (2) 4-inch conduits shall route underground from the MDF to each IDF on Level 1 of the same building. A minimum of (2) 4-inch conduits shall route underground from the MDF to each IDF in adjacent buildings being served. Additional conduits shall be added as required if fill capacity exceeds 40 percent.

2. Shall have MaxCell 4 inch 3 cell fabric innerduct inside the primary conduit. MaxCell innerduct not required in the spare conduit pathway. MaxCell innerduct to be provided by the Division 27 contractor.

3. Maintenance holes and pull boxes shall be utilized as required for an ANSI, TIA and BICSI compliant conduit distribution system. The conduit, pull boxes/ maintenance holes sizing and construction shall be coordinated with the Austin ISD Network Support Service Department and the applicable service provider on a project by project basis.

4. Where only the first building of a campus is being designed, (2) 4-inch conduits for each additional future building shall route from the MDF to an adequately- sized maintenance hole or pull box at least 30 feet from the exterior of the first building.

7.03 Cable Management in Telecommunications Spaces

A. Equipment Cabinets / Equipment Racks

1. Racks shall be black aluminum Standard Equipment Racks with ANSI/TIA 19- inch rails, 84-inch (45 RMU) overall height and rack mount unit markings engraved on the rails.

2. All racks shall be equipped with vertical cable management as indicated in Appendix A.

3. Racks shall be bolted to the concrete floor and to the overhead cable runway utilizing manufacturer-recommended hardware and methods.

B. Overhead Cable Management

1. Overhead Cable Management shall be a Universal Cable Runway made of 3/8" x 1-1/2" x .065" wall rectangular steel tubing with cross members welded at 12- inch intervals.

a. The MDF and all IDF Rooms shall be provided with a minimum of 12-inch wide Universal Cable Runway.

b. Universal Cable Runway shall encircle the MDF or IDF room at 84-86 inches above the finished floor crossing the room above the equipment cabinets or racks (1) time.

c. The appropriate radius drop shall be installed over the racks or cabinets to provide the proper support for the cabling leaving the runway and entering the rack.

d. Universal Cable Runway shall be installed utilizing appropriate hardware to support, join, or attach sections to structures, and shall be supported at a minimum of 5-foot intervals.

e. A vertical section of cable runway shall be attached to the wall board to manage backbone and service provider cables as they transition from the entrance conduits to the overhead cable runway.

7.04 Cable Support in Pathways

A. Main Cable Pathway

1. Main cable pathway shall be j-hooks installed a minimum of every 5 feet on center. J-hooks shall be installed utilizing appropriate hardware to support, join and attach j-hooks to structures.

2. J-hook sizing and quantity shall be scaled to the application not to exceed 40 percent fill ratio.

3. A separate j-hook shall be provided for each media type:

a. Backbone Fiber

b. Backbone Copper

c. Horizontal Data

d. Horizontal Audio/Visual

e. Horizontal Security

f. LED Lighting

B. Sleeves and Penetrations

1. Sleeves and penetrations are described herein with regard to capacity, function, and basic design principles and shall be designed in accordance with NEC and ANSI/TIA-569-B, Commercial Building Standard for Telecommunications Pathways and Spaces.

2. All sleeves shall be equipped with nylon bushings on each end.

3. All sleeves and penetrations shall be properly fire-stopped to meet local code and to return the wall, floor or structure, back to its original rating.

4. Scale the quantity of sleeves to maintain a 40 percent fill ratio in each sleeve.

5. Above MDF and IDFs install minimum of (3) 4-inch EMT sleeves through the partition wall between the MDF and/or IDF overhead space and the main cabling pathway.

6. Between directly aligned vertically stacked MDF and IDFs install minimum of (2) 4" EMT sleeves through the floor of the upper IDF.

7. Between skewed MDF and IDFs on adjacent floors, install minimum of (2) 4" EMT sleeves through the floor of the upper IDF into the accessible ceiling space below and utilize main cabling pathway to route cabling into the IDF or MDF on the lower floor.

C. Workstation Rough-ins and local power (Typ.)

1. At each flush wall-mounted workstation location, install a 4 11/16 inch by 4 11/16 inch by 2-1/8 inch double-gang back box with single-gang mud ring at 18-inches above the finished floor. Wall mounted phones (if any) shall be mounted at a height that meets ADA front/side reach range requirements. Above- counter/millwork locations shall be mounted at 6-inches above the backsplash, or at the same height as adjacent electrical receptacles.

   a. Install a minimum of (1) 1-inch conduit from the double-gang box to above accessible ceiling in the room where double-gang box is located. If ceiling is not accessible, install conduit to nearest accessible ceiling.

   b. Conduit shall not exceed 40 percent fill ratio.

   c. Terminate the conduit above accessible ceiling and install nylon bushing at the top, throated bushing at the backbox and pull string.

      1) Conduit shall be installed in accordance with ANSI/TIA-569-B, contain no more than the equivalent of (2) 90-degree bends and /or 98.4 feet between pull boxes, and maintain a bend radius of 6 times the diameter of the conduit.

2. At locations where the workstation outlets cannot be installed flush in the wall, a Surface Mounted Raceway that is appropriately sized and designed to meet the specific requirements shall be provided.

   a. When power is provided in the surface mounted raceway a dual-channel surface mounted raceway shall be provided to separate the power from the structured cabling.

   b. The use of surface mounted raceway shall only be considered when no option is available to install the workstation outlets flush in the wall and shall be

approved by the Austin ISD Network Support Services Department during the design or prior to installation.

c. The surface mounted raceway shall be painted to match the surface it is mounted to.

3. At floor-mounted workstation locations, install a floor box or poke-thru specifically designed for the application and environment adequately sized to accommodate the quantity of installed horizontal data cables.

   a. Install a minimum of (1) 1-inch conduit for every (4) cables from the floor box or poke-thru:

      1) For ground floor or on-grade applications, each conduit serving the floor box shall be homerun to the MDF or IDF Room serving the area and stub into MDF or IDF Room serving the location on the same floor.

      2) For Level 2 and above applications, each conduit serving the poke-thru shall be homerun below the slab of the floor being served, and stub into the MDF or IDF Room serving the location on the same floor.

   b. Conduit shall not exceed the 40 percent fill ratio.

4. For modular furniture workstations, a rough-in pathway shall be considered and designed according to the furniture type, quantity of cables, and location as required for each furniture system. The project Technology Consultant shall coordinate furniture termination type and specify the appropriate faceplate and information outlet for the type of furniture being utilized.

   a. The use of power poles shall be considered only on a case-by-case basis. Approval from Austin ISD Network Support Services Division is required prior to using any power poles.

5. For ceiling-mounted outlets above a non-accessible ceiling such as Wireless Access Points or IP Cameras, install a 4 11/16 inch by 4 11/16 inch by 2-1/8 inch double-gang back box with single-gang mud ring suspended from structure with all thread. The data cable will male terminate into a RJ-45 plastic connector with boot inside of the box. For outlets installed in an accessible ceiling, a back box is not required; a tile bridge shall be used as needed to support devices in an accessible ceiling.

   a. For wall-mounted outlets serving Wireless Access Points or IP Cameras, install a 4 11/16 inch by 4 11/16 inch by 2-1/8 inch double-gang back box with single-gang mud ring. All new devices shall be flush mounted to the supporting wall. Coordinate exact mounting height with Austin ISD Network Support Services Division during design.

6. The Electrical Engineer shall design at a minimum (1) quad NEMA 5-15R receptacle within 12” of each workstation outlet location.

7.05 Backbone Cabling

A. Inter-building Backbone Cabling (Campus)

1. Permanent Structures

a. Copper

1) Intra-building Backbone Copper Cabling shall be Category 6A indoor/outdoor plenum UTP home run from the MDF to primary IDF in each of the buildings on the campus. Provide a 10-foot service loop at both ends of each cable stored on the wall above or on the cable runway. Cables shall be secured with Hook-and-loop tie-wraps in the MDF or IDF.

2) Inter-building Backbone Copper Cabling shall terminate on UL-listed Category 6A solid state quick-acting lightning protector module. A tie- cable shall be provided from the lightning protection module to the Cat 6 110 Patch Panel. Design team shall coordinate with Austin ISD Network Support Services Department during design. For use between buildings in a campus environment as a building entrance protector.

b. Fiber

1) Inter-building Backbone Fiber Optic Cabling shall be armored indoor/outdoor 12-Strand single mode home run from the MDF to the primary IDF in each of the buildings on the campus and dressed with fan-out kits as required. Provide a 10-foot service loop at both ends of each cable stored on the wall above or below the cable runway. Provide a 20-foot service loop in each manhole or pull box. Cables shall be secured with Hook-and-loop tie-wraps in the MDF or IDF.

2) All fiber optic terminations shall be fusion spliced to factory provided “pig-tail” LC terminated cables.

B. Intra-building Backbone Cabling

1. Copper

a. Intra-building Backbone Copper Cabling shall be Category 6A indoor/outdoor plenum UTP home run from the MDF to each IDF within a building. Provide a 10-foot service loop at both ends of each cable stored on the wall above or on the cable runway. Cables shall be secured with Hook-and-loop tie-wraps in the MDF or IDF.

b. Intra-building Backbone Copper Cabling shall terminate on Category 6 Flat 110-Style 48-Port Patch Panel (MDF) or a Category 6 Flat 110-Style 24-Port Path Panel (IDF).

c. Design team shall coordinate all analog connections required on the campus, to include Fire Alarm, Elevator Emergency Phones, etc.

2. Fiber

a. Intra-building Backbone Fiber Optic Cabling shall be armored indoor/outdoor plenum rated 12-Strand single mode from the MDF to each of the IDFs in the building. Provide a 10-foot service loop at both ends of each cable stored on the wall above or below the cable runway. Cables shall be secured with Hook- and-loop tie-wraps in the MDF or IDF and in the cable runway.

b. All fiber optic terminations shall be fusion spliced to factory provided “pig-tail” LC terminated cables.

7.06 Horizontal Cabling

A. Workstation Cable

1. Horizontal Data Cabling shall be Category 6 UTP, minimum factory sweep tested to 600 MHz, plenum rated, installed from the patch panel in the MDF or IDF to the workstation location not to exceed 295 feet for the permanent link. Provide a 10' service loop in the MDF or IDF, and 1-foot of slack at the conduit stub-up above the outlet. Cable bundles shall be secured with Hook-and-loop tie-wraps.

2. At the workstation, each Category 6 cable shall be terminated in a Category 6 modular jack insert and snapped into a single or double-gang, faceplate. Jack colors are designated in Appendix A. Faceplates shall be equipped with designation windows for labeling and blank inserts in unused ports.

3. Wall phone workstations shall be equipped with a single-port faceplate capable of accepting a modular jack insert.

4. All faceplate colors shall be coordinated with the Architect or owner at the time of installation. All data faceplates shall match electrical receptacle faceplates.

5. In the MDF or IDF, each Category 6/6A cable shall be terminated on the back of modular rack mounted patch panels which are mounted in the equipment racks.

   a. Cabling for network, wireless access points, security, paging, fire alarm, etc. shall be distributed throughout patch panels and not ganged together by media type on a single patch panel.

6. Category 6/6A cable shall be terminated with the T568B sequence.

7. The following cable jacket colors shall be used:

   a. Network/Workstation – White

   b. Wireless Access Point – Blue

   c. IP Security and IP Cameras – Green

   d. IP Paging System - Yellow

   e. Fire Alarm – Red

   f. Backbone Copper - Black

B. Workstation Configurations

1. Typical Office

   a. Install (1) white Category 6 cable for data at (2) distinct locations (opposing or adjoining walls) walls in each office of approximately 100 sq. ft. Terminate into a single-port single-gang flush faceplate. The white cable(s) shall be terminated with white category 6 modular jacks.

      1) Offices that are smaller or larger shall be designed with consideration given to the size of the office and number of personnel planned for the office.

      2) Modular furniture clusters shall be designed to accommodate the user requirements at the time of construction.

2. Typical Classroom

   a. Install (1) white Category 6 cable for data at (4) distinct locations (opposing and adjoining walls). Terminate into a single-port single-gang flush faceplate. The white cable(s) shall be terminated with white category 6 modular jacks.

   b. Install (1) white Category 6 cable for a wall phone at 42-inches A.F.F. within 10-feet of the entrance door on the Classroom side. Terminate into a single- port single-gang flush faceplate. The white cable(s) shall be terminated with white category 6 modular jacks.

3. Typical Conference Room

   a. Install (2) white Category 6 cable for data in a floor box below the conference table. Terminate into a single-port faceplate compatible with floor box mounting system. The white cable(s) shall be terminated with white category 6 modular jacks.

   b. For renovation projects where a floor box and conduits cannot be cut into the slab or deck, install (2) white Category 6 cables for network access below the conference room display. Terminate into a 2-port faceplate at 18-inches A.F.F. The white cable(s) shall be terminated with white category 6 modular jacks.

4. Typical Small Group Room

   a. Install (1) white Category 6 cable for data at location adjoining flat panel display wall. Terminate into a single-port single-gang flush faceplate. The white cable(s) shall be terminated with white category 6 modular jacks.

5. Wireless Access Point Outlet

   a. Install (1) blue Category 6A cable with 20-foot slack loop at each wireless access point location, terminated with a blue 6A modular jack in a single-port plenum rated surface mount box.

      1) When a Wireless Access Point outlet is installed above the accessible ceiling, the access point shall be directly affixed to the ceiling grid utilizing a ceiling grid support. The contractor shall provide a label on the T-grid directly below the outlet location utilizing a (minimum) 24mm tape with extra strength adhesive. The contractor shall also provide a label on the surface mount box.

      2) When a Wireless Access Point outlet is installed above an open ceiling, provide a 4 11/16 inch by 4 11/16 inch by 2-1/8 inch double-gang back box with single-gang mud ring supported from structure with all thread. Coordinate exact mounting height above finished floor with Austin ISD Network Support Services Department during design.

      3) When a Wireless Access Point outlet is installed above an inaccessible or solid ceiling, provide a 4 11/16 inch by 4 11/16 inch by 2-1/8 inch double-gang back box with single-gang mud ring flush mounted in gypsum. The contractor shall provide a label on the ceiling adjacent to the outlet location utilizing a (minimum) 24mm tape with extra strength adhesive.

4) When a Wireless Access Point outlet is wall mounted, provide a 4 11/16 inch by 4 11/16 inch by 2-1/8 inch double-gang back box with single- gang mud ring mounted at 12-feet above finished floor/grade.

5) The Technology Consultant shall coordinate with the Austin ISD Network Support Services Department to determine quantities and locations of wireless access points during design.

6. IP Camera Outlet

a. Install (1) green Category 6 cable with 20-foot slack loop at each IP camera location, terminated on green category 6 modular jack placed in a surface mounted box and secured to the building structure when mounted above the ceiling.

1) When an IP Camera outlet is installed above the accessible ceiling, the contractor shall provide a label on the T-grid directly below the outlet location utilizing a (minimum) 24mm tape with extra strength adhesive. The contractor shall also provide a label on the surface-mount box.

2) When an accessible ceiling is not available, the outlet for the IP camera shall be terminated in a 1-port single gang flush mounted faceplate located 6-inches below the ceiling not to exceed 12-feet above finished floor.

3) The designer shall coordinate with the Austin ISD Network Support Services Department during design to determine quantities and locations of IP Cameras.

7. IP Paging Speaker

a. Install (1) yellow Category 6 cable with 20-foot slack loop at each IP Paging Speaker location, terminated on a yellow category 6 modular jack placed in a surface mounted box and secured to the building structure when mounted above the ceiling.

1) When an IP Paging Speaker information outlet is installed above the accessible ceiling, a permanent label shall be attached to the ceiling grid directly below the outlet location for future identification of the outlet location.

2) When an accessible ceiling is not available, the outlet for the IP Paging Speaker shall be terminated in a 2-port single gang flush mounted faceplate located 6-inches below the ceiling not to exceed 12-feet above finished floor.

3) The designer shall coordinate with the Austin ISD Network Support Services Department to determine quantities and locations of IP Paging Speakers during design.

8. IP Entry Intercom Station

a. Install (1) green Category 6 cable with 3-foot slack loop at each IP Intercom Station location, terminated on a green category 6 modular jack placed in a surface mounted box and secured to the building structure when mounted above the ceiling.

1) When an IP Intercom Station information outlet is installed above the accessible ceiling, a permanent label shall be attached to the ceiling grid

directly below the outlet location for future identification of the outlet location.

2) The designer shall coordinate with the Austin ISD Network Support Services Department during design to determine quantities and locations of IP Intercom Stations.

C. Patch Cables

1. MDF

a. Fiber Patch Cables – Duplex

1) In the MDF furnish to the Austin ISD Network Support Services Department at the time of substantial completion (1) fiber optic patch cable plus 25 percent spare for each terminated strand.

2) Coordinate with Austin ISD Network Support Services Department for patch cable types, connectors, lengths and colors.

b. Copper Patch Cables

1) In the MDF, furnish to the Austin ISD Network Support Services Department at the time of final substantial completion (1) 6-inch long Category 6/6A patch cable plus 25 percent spare for each terminated cable. Design team shall coordinate total quantity and length of patch cables with Austin ISD Network Support Services Department during design.

2) The following patch cable types and colors shall be used as a basis of design. Patch cables shall be coordinated with Austin ISD Network Support Services Department during design:

a) Category 6 patch cables for each end user workstation outlet (typically 1 per office or classroom) terminated shall be white.

b) Category 6A patch cable for each wireless access outlet terminated shall be blue.

c) Category 6 patch cable for each IP camera outlet terminated shall be green.

d) Category 6 patch cable for each IP Paging Speaker outlet terminated shall be yellow.

e) Category 6 patch cable for each IP (Security) Intercom Station outlet terminated shall be green.

2. IDF

a. Fiber Patch Cables – Duplex

1) In the IDF furnish to the Austin ISD Network Support Services Department at the time of substantial completion (1) fiber optic patch cable plus 25 percent spare for each terminated strand.

2) Coordinate with Austin ISD Network Support Services Department for patch cable types, connectors, lengths and colors.

b. Copper Patch Cables

1) In the IDF, furnish to the Austin ISD Network Support Services Department at the time of final substantial completion (1) 6-inch long Category 6/6A patch cable plus 25 percent spare for each terminated cable. Design team shall coordinate total quantity and length of patch cables with Austin ISD Network Support Services Department during design.

2) The following patch cable types and colors shall be used as a basis of design. Patch cables shall be coordinated with Austin ISD Network Support Services Department during design:

a) Category 6 patch cables for each end user workstation outlet terminated shall be grey.

b) Category 6A patch cable for each wireless access outlet terminated shall be blue.

c) Category 6 patch cable for each IP camera outlet terminated shall be green.

d) Category 6 patch cable for each IP Paging Speaker outlet terminated shall be yellow.

e) Category 6 patch cable for each IP (Security) Intercom Station outlet terminated shall be green.

7.07 Grounding

A. Grounding shall be designed and installed in accordance with ANSI/TIA.

1. Install (1) Telecommunications Main Grounding Busbar (TMGB) in the MDF and (1) Telecommunications Grounding Busbar (TGB) in each IDF.

a. The TMGB and TGB shall be labeled.

2. Install a Telecommunications Bonding Backbone (TBB), sized appropriately for the distance, stranded green insulated copper conductor in a star topology between the TMGB and each TGB in each building. When IDFs are stacked a single TBB can be daisy-chained between TGBs back to the TMGB.

3. Install an Equipment Bonding Conductor (EBC), sized appropriately for the distance, green insulated conductor from the TMGB or TGB as applicable to each cable runway system, equipment rack, cabinet, lightning protector, or multi- pair cable with a metallic element.

a. Install a appropriately sized stranded green insulated copper conductor from the TMGB to the main building electrical service ground in each building.

b. In a metal frame (structural steel) building, where the steel framework is readily accessible within or external to the room; each TGB and TMGB shall be bonded to the vertical steel metal frame using a minimum #6 AWG conductor. The connection to building steel does not eliminate the requirement for the TBB or BC to the service ground.

4. Install a Grounding Equalizer Conductor, sized appropriately for the distance, stranded green insulted copper conductor to interconnect multiple TBBs on the top floor and every 3rd floor when required by ANSI/TIA.

5. When exceeding 13 feet the conductors shall be sized at 2 kcmil per linear foot of

conductor length up to a maximum of 3/0.

7.08 Labeling

1. Coordination with and approval by the Austin ISD Network Support Services Department is required on the specific site labeling schema.
2. All labels shall be typed (not handwritten)
3. Verify room numbers and confirm the final room numbering scheme prior to generating labels.
4. Horizontal Cables shall be labeled within 12 inches from the termination point inside the MDF/IDF.
5. Horizontal Cables shall be labeled within 6 inches from the termination point at the workstation end.
6. Backbone Fiber and Copper Cables shall be labeled within 12 inches of the visible end of the jacket.
7. Fiber Innerduct shall be labeled within 12 inches of the point of entry of the fiber optic enclosure.
8. Cables shall be labeled identically at both ends.
9. MDFs and IDFs Room shall be labeled (signage) with the permanent room designations that match the final building signage for cable labeling.
10. Equipment cabinets or racks in each MDF or IDF shall be labeled in sequential numeric order. Labels shall be centered on the top and bottom front of the equipment rack. The following labeling scheme shall be used:
    a. Location/Campus Code (first 3 digits) – provided by Austin ISD Network Support Services Department
    b. Followed by the letter that represents the closet (MDF-A, IDF1 -B, etc)
    c. Followed by rack and number

Example

11. Fiber optic backbone cable labels shall contain the cable destination room number and fiber strand numbers. (i.e. IDFBA126-48-001-048).

12. Fiber optic couplers panels in fiber enclosures shall be labeled alpha-numeric and indicating the cable origin. A label for each terminated strand shall be securely placed inside each fiber optic enclosure in the following format: “Strand #s” “Type” To “Closet” “Rm#”. (Example – Strands 1-24 SM To IDF-B Rm A126).

13. Copper backbone cables labels shall contain the cable origin room number, the cable destination room number, and cable pairs (i.e. MDFA150-IDFBA126/001- 025).

14. Horizontal cables shall be labeled identically at each end with Room Designator and port number, with a hyphen separator. (i.e. B-101).

15. All horizontal cables and terminations above ceiling shall be labeled on the ceiling grid directly below the outlet location using a minimum of 24mm tape with extra strength adhesive. Labe shall indicate the room designator and port number.

16. Individual ports on each patch panel shall be labeled sequentially with Room Designator (MDF-A, IDF1 -B, etc), port number (three digits, ports numbered consecutively across all patch panels in the room) and device type (IP Camera- C, AP-W, IP Speaker-P). (i.e. B101C).

Example

17. Workstation Faceplates, surface mount boxes and ceiling grids shall be labeled denoting originating Room Designator and port number (i.e. B-101).

7.09 Testing

A. All test results shall be submitted to the owner along with all other final documentation. Test results shall be submitted in both PDF format and the Native Tester format along with the software needed to read the Native Tester Format.

B. Terminated fiber optic strands shall be tested bi-directionally end to end be and certified in accordance with applicable industry standards and manufacturer certifications requirements with an OTDR field and Light Meter tester that is within their calibration period.

C. Terminated backbone copper cable links shall be tested in accordance with applicable industry standards and manufacturer certification requirements for attenuation, continuity, and pin-mapping with approved field tester(s) that are within their calibration period.

D. Terminated Category 6 and Category 6A UTP cable links shall be tested in accordance with applicable industry standards and manufacturer certification requirements for Category 6/6A compliance with approved field tester(s) that are within their calibration period.

7.10 As-Built Documentation

A. Produce drawings depicting the condition of the Structured Cabling System as installed produced in AutoCAD 2010 or higher and provided electronically in .DWG and .PDF format. Include the exact dimensions and locations of MDF and IDF layouts, wall elevations, equipment cabinet elevations, cable runways, cable tray, sleeves, backbone and horizontal cable pathways, workstation locations, and numbering and labeling scheme.

B. A half-size hard copy of the as-built drawings for the applicable region served by the MDF and/or IDFs shall be provided in MDF and each IDF for reference.

C. Produce cable records for the Structured Cabling System as installed to include a list of all horizontal and backbone cables produced in an Excel format and provided in hardcopy and electronic format indicating cable number, unique cable label, cable type, origin and destination, length, termination method, and pass/fail result.

D. Produce soft copy of all test results for each cable, to include technician's name and date stamp, a list of tested cables, and the individual results for each cable tested. Test results shall be furnished to Austin ISD in .PDF and native file format at the conclusion of the project.

PART 8 - SUMMARY OF STANDARDS

8.01 Summary

A. All aspects of this Austin ISD Structured Cabling Infrastructure Standards shall be applied to the design process for new, leased and renovated facilities.

B. A Division 27 specification and T-Series drawings for the Structured Cabling System shall be commissioned and issued by the Architect during the design phases for each facility or project. Drawings and specifications shall be sealed with a current RCDD stamp.

EXHIBIT 1 - ACCEPTABLE MANUFACTURERS / PRODUCTS

A. The following list or manufacturers / products is provided as a basis of design. Life-cycle status of the products below shall be verified by the designer for each project and confirmed with the Austin ISD Network Support Services Department prior to issuing any construction documents.

B. Fiber Optic Backbone Cable

1. Indoor
   a. 9/125µm Single-Mode Indoor/Outdoor Plenum Rated 12 Strand Armored
      1) Berk-Tek Part Number PDPK012AB0707-I/O-C4C5
2. Outdoor Underground
   a. 9/125µm Indoor/Outdoor Single-Mode 12 Strand Single Armored
      1) Berk-Tek Part Number LTRA12B012AB0707
3. Outdoor Aerial
   a. 9/125µm Indoor/Outdoor Single-Mode 12 Strand Single Armored
      1) Berk-Tek Part Number LTRA12B012AB0707
4. Fiber Optic Innerduct
   a. Outdoor (Orange)
      1) MaxCell 2” 3-Cell, Detectable – 250 feet spool – Part Number MXD2003XX250 (XX=color)
      2) Carlon 1” Corrugated HDPE – 1000 feet spool – Part Number A5D2S1JNNB1000

C. Copper Backbone Cable

1. Indoor/Outdoor Plenum
   a. Category 6A LM-RDT I/O Unshielded Twisted Pair (UTP) Plenum (Black Sheath)
      1) Berk-Tek - Part Number 11142753

D. Horizontal Cable

1. Category 6A UTP Plenum
   a. Wireless Access Points (Blue Sheath)
      1) Berk-Tek LANmark-RDT - Part Number 11141650
2. Category 6 UTP Plenum
   a. Network Access (White Sheath)
      1) Berk-Tek LANmark-2000 - Part Number 10167311

b. IP Security (Green Sheath)

1) Berk-Tek LANmark-2000 - Part Number 10170668

c. IP Paging (Yellow Sheath)

1) Berk-Tek LANmark-2000 - Part Number 10167308

3. Category 6 UTP Flooded

a. OSP (Black Sheath)

1) Berk-Tek LANmark-6 OSP - Part Number 10139885

E. Fiber Optic Cable Termination

1. 1RU Fiber Enclosure (IDF)

a. Leviton Opt-X 1000i 1RU Rack Mounted Fiber Optic Panel – Part Number 5R1UM-F03

2. 4RU Fiber Enclosure (MDF)

a. Leviton Opt-X 1000i 4RU Rack Mounted Fiber Optic Panel – Part Number 5R4UM-F12

3. 9µm Single-Mode Fiber Adapter Plate

a. Leviton Fiber Splice Module, 12LC , 900 µm Blue with Pigtails – Part Number SPLCS-12L

4. Fiber Blank Plate

a. Leviton SDX Molded Fiber Adapter Plate, Black, blank – Part Number 5F100-PLT

5. Loose Tube Fiber Fan-Out Kit

a. Leviton Fiber Fanout Kit, 24-inch tubing, 12-fiber – Part Number 49887-12S

F. Copper Cable Termination

1. Building Entrance Terminals

a. Primary Copper Protectors

1) Circa 25-Pair 110 Style Lightning Protection Block – Part Number 1880ENA1/NSC-25

2) Circa 240-Volt Solid State Module with PTC – Part Number 4B1FS-240

3) Category 6 POE Rated Lightning Protection

a) Field End

(1) DITEK Part Number DTK-MRJPOES

b) Equipment Room/Telecommunications Room End

(1) Rack Mount Face Plate up to 12 Ports – DITEK Part Number DTK-RM12NETS

(2) Wall Mount Face Plate up to 6 Ports – DITEK Part Number DTK-VM6WM

(3) Face Plate Module – CAT 6 POE – DITEK Part Number DTK-MRJPOEM

2. Backbone Cable Termination Panels

a. Rack Mounted CAT 6 Flat 110-Style Patch Panel Black

1) Leviton CAT 6 Flat Patch Panel, 48-Port, 2RU (MDF) – Part Number 69586-U24

2) Leviton CAT 6 Flat Patch Panel, 24-Port, 1RU (IDF) – Part Number 69589-U24

3. Horizontal Rack Mounted Patch Panels

a. Leviton QuickPort Modular 24-Port Panel – 1U – Part Number 49255-H24

b. Leviton QuickPort Modular 48-Port Panel – 2U – Part Number 49255-H48

4. Category 6/6A Modular Jacks

a. Wireless Access Points

1) Equipment Room/Telecommunications Room End (Blue)

a) Leviton EXTREME Category 6A UTP Information Outlet – Part Number 6110G-RL6

2) Field End (Blue)

a) Leviton EXTREME Category 6A UTP Information Outlet – Part Number 6110G-RL6

b. Network Access

1) Equipment Room/Telecommunications Room End (White)

a) Leviton EXTREME Category 6 UTP Information Outlet – Part Number 61110-RW6

2) Field End (White)

a) Leviton EXTREME Category 6 UTP Information Outlet – Part Number 61110-RW6

c. IP Security

1) Equipment Room/Telecommunications Room End (Green)

a) Leviton EXTREME Category 6 UTP Information Outlet – Part Number 61110-RV6

2) Field End (Green)

a) Leviton EXTREME Category 6 UTP Information Outlet – Part Number 61110-RV6

d. IP Paging

1) Equipment Room/Telecommunications Room End (Yellow)

a) Leviton EXTREME Category 6 UTP Information Outlet – Part Number 61110-RY6

2) Field End (Yellow)

a) Leviton EXTREME Category 6 UTP Information Outlet – Part Number 61110-RY6

e. Copper Backbone

1) Equipment Room/Telecommunications Room End (Black)

a) Leviton EXTREME Category 6 UTP Information Outlet – Part Number 61110-RE6

2) Field End (Black)

a) Leviton EXTREME Category 6 UTP Information Outlet – Part Number 61110-RE6

5. Telecommunications Faceplates with Designation Window – Coordinate color with Architect prior to ordering (white is recommended).

a. 2-Port Single Gang Flush

1) Leviton Single-Gang QuickPort Wallplate with ID Windows – Part Number 42080-2WS

b. 4-Port Single Gang Flush

1) Leviton Single-Gang QuickPort Wallplate with ID Windows – Part Number 42080-4WS

c. Wall Phone Faceplate

1) Leviton Single-Gang QuickPort Wallplate with ID Windows – Part Number 42080-1WS

6. 1-Port Surface Mount Box

a. Leviton Surface-Mount QuickPort Box – Part Number 41089-1WP

7. 2-Port Surface Mount Box

a. Leviton Surface-Mount QuickPort Box – Part Number 41089-2WP

8. Blank Insert

a. Leviton Blank Insert – Part Number 41084-0BW

G. Equipment Racks, Cabinets, Cable Management, and Accessories

1. Two-Post Rack - 19” x 84” Open Frame (Black)

a. Chatsworth – Part Number 55053-703

2. Four-Post Open Frame Rack – 20.3” x 84” x 29” (Black)
    a. Chatsworth – Part Number 50120-703
3. Wall Mount Cabinet (Black)
    a. Chatsworth CUBE-iT Wall Mounted Cabinet 60” H X 27.3 W X 30” Deep Black
        1) Chatsworth – Part # 13496-760
    b. Power Strip for Wall Mount Cabinet
        1) Chatsworth – Part # 12820-705
    c. Fan Kit for Wall Mount Cabinet
        1) Chatsworth – 12804-701
    d. Filter Kit for Wall Mount Cabinet
        1) Chatsworth – Part # 12805-701
    e. Light for Wall Mount Cabinet
        1) Chatsworth – Part # 12803-701
    f. Vertical Cable Manager for Wall Mount Cabinet for 60” Cabinet
        1) Chatsworth – Part # 13485-760
4. Vertical Cable Managers (Black)
    a. Chatsworth Double Sided Vertical Cabling Section - Part Number 11729-703
5. Horizontal Cable Managers (Black)
    a. Chatsworth Rack Cabling Manager - Part Number 11753-719
6. Vertical Power Strip for 7’ Equipment Rack
    a. Chatsworth 24 Outlet (5-20R) Power Strip with Meter and NEMA 5-20P – Part Number 12848-755

H. Cable Runway (Ladder Type)

1. Universal Cable Runway
    a. 12-inch Chatsworth - Part Number 10250-712
    b. 18-inch Chatsworth - Part Number 10250-718
    c. 24-inch Chatsworth - Part Number 10250-724
2. Cable Runway Radius Drop, Cross Member
    a. 12-inch Chatsworth - Part Number 12100-712
    b. 18-inch Chatsworth - Part Number 12100-718
3. Cable Runway Radius Drop, Stringer

a. Chatsworth - Part Number 12101-711

4. Cable Runway Butt-Splice Kit
   a. Chatsworth - Part Number 11301-701
5. Cable Runway Junction-Splice Kit
   a. Chatsworth - Part Number 11302-701
6. Cable Runway Butt-Swivel Splice Kit
   a. Chatsworth - Part Number 10487-701
7. Rack-to-Runway Mounting Kit
   a. 9 to 12-inch runway Chatsworth - Part Number 10595-712
   b. 15 to 18-inch runway Chatsworth - Part Number 10595-718
   c. 20 to 24-inch runway Chatsworth - Part Number 10595-724
8. Cable Runway Elevation Kit for Racks
   a. Chatsworth - Part Number 10506-706
9. Cable Runway Elevation Kit for Cabinets
   a. Chatsworth - Part Number 10506-706
10. Triangular Support Bracket, Aluminum
   a. 6 to 12-inch runway Chatsworth - Part Number 11312-712
   b. 12 to 18-inch runway Chatsworth - Part Number 11421-718
11. Triangular Support Bracket, Steel
   a. 24-inch runway Chatsworth - Part Number 11746-724
12. Wall Angle Support Kit, Cable Runway
   a. 12-inch runway Chatsworth - Part Number 11421-712
   b. 18-inch runway Chatsworth - Part Number 11421-718
   c. 24-inch runway Chatsworth - Part Number 11421-724
13. 90 Degree Runway-Splice Kit
   a. Chatsworth - Part Number 11314-701
14. 45 Degree Runway-Splice Kit
   a. Chatsworth - Part Number 11313-701
15. Foot Kit, Cable Runway
   a. Chatsworth - Part Number 11309-701

16. Vertical Wall Brackets (pair)
    a. Chatsworth - Part Number 10608-701
17. Threaded Ceiling Kit, Cable Runway
    a. Chatsworth - Part Number 11310-001
18. Threaded Rod Cover
    a. Chatsworth - Part Number 11085-001
19. Protective End Caps for Cable Runway
    a. Chatsworth - Part Number 10642-001
20. End Closing Kit, Cable Runway
    a. Chatsworth - Part Number 11700-712
    b. Chatsworth - Part Number 11700-718
    c. Chatsworth - Part Number 11700-724

I. Pathway Cable Support
1. Panduit J-Mod Cable Support System
2. Erico – CADDY CAT LINKS J-Hook Series
3. Erico – Caddy Adjustable Cable Support Series
4. Panduit Plenum Rated Hook & Loop (Black)
5. Erico – Caddy Grid Support – Part Number – ATA41 or ATS41

J. Grounding and Bonding
1. Grounding Bus Bar, 20”
    a. Chatsworth - Part Number 40153-020
2. Grounding Bus Bar, 12”
    a. Chatsworth - Part Number 13622-012
3. Cable Runway Ground Strap Kit
    a. Chatsworth - Part Number 40164-001
4. Compression Lugs
    a. Chatsworth - Part Number 40162-XXX
        XXX – Determined based on wire size and hole spacing needed
5. Horizontal Rack Ground Bar for Wall Mount Cabinet
    a. Chatsworth - Part Number 10610-019

6. #6 AWG Solid Green Insulation Ground Wire
    a. Superior Essex - Part Number 12-018-04
7. #3/0 Stranded Green Insulation Ground Wire

8. Cable Sheath Bonding Clamp

K. Labeling

1. Permanent Labels for Fiber Optic Cables
    a. Laser/Ink Jet Self Laminating Labels
        1) Panduit Part Number Series – S100X******
        2) Brother equal
2. Permanent Labels for Copper Cables
    a. Laser/Ink Jet Self Laminating Labels
        1) Panduit Part Number Series – S100X******
        2) Brother equal
3. Permanent Labels for Backbone Fiber Optic Cables
    a. Self-Laminating Fiber Optic Cable Marker Tags
        1) Panduit Part Number – PST-FO
        2) Brother equal
4. Permanent Labels for Innerduct
    a. Self-Laminating Fiber Optic Cable Marker Tags
        1) Panduit Part Number – PST-FO
            To be used for Innerduct with fiber installed.
        2) Panduit Part Number – PST-FOBLNK To
            be used for empty spare Innerduct
5. Permanent Labels for Patch Panels
    a. Panduit Component Label
    b. Brother equal
6. Permanent Labels for Faceplates
    a. Panduit Component Label
    b. Brother equal

7. Permanent Labels for Ceiling/T-Grid

a. Brother 24mm tape extra strength adhesive (TZES251, black on white)

b. Panduit equal

L. Fire Stop

1. STI Spec Seal

2. 3M Products

M. Plywood

1. 8’ H x 4’ W x ¾” Sheets of BC grade fire-rated plywood

N. Fire Retardant Paint (White)

O. Fiber Patch Cables

1. Leviton Economy Series Fiber Optic Patch Cord OM4, LC-LC, 1-Meter – Part Number 54DLC-M01

2. Leviton Economy Series Fiber Optic Patch Cord OM4, LC-LC, 2-Meter – Part Number 54DLC-M02

3. Leviton Economy Series Fiber Optic Patch Cord OS2, LC-LC, 1-Meter – Part Number UPDLC-S01

4. Leviton Economy Series Fiber Optic Patch Cord OS2, LC-LC, 1-Meter – Part Number UPDLC-S02

P. Copper Patch Cables

1. Network Access (White)

a. MDF/IDF

1) Leviton Category 6 U/UTP Small Diameter High Flex Patch Cord, RJ45 to RJ45, 4-pair, Non-Plenum, White Jacket – Part Number 6H460-6iW (6- inch length)

a) Patch cords in IDF/MDF shall be 6-inch in length

b) Provide quantity of (5) additional 6-inch patch cords for spare

b. Workstation Outlet

1) Leviton Category 6 U/UTP Small Diameter High Flex Patch Cord, RJ45 to RJ45, 4-pair, Non-Plenum, White Jacket – Part Number 6H460-10W (10’ length)

a) Patch cords at the Workstation Outlet(s) shall be 10’ in length

2) Leviton Category 6 U/UTP Small Diameter High Flex Patch Cord, RJ45 to RJ45, 4-pair, Non-Plenum, White Jacket – Part Number 6H460-20W (20’ length)

a) Provide quantity of (20) total 20’ patch cords for spare

2. Wireless Access Points (Blue)

   a. MDF/IDF

      1) Leviton Category 6A U/UTP Small Diameter High Flex Patch Cord – Part Number H6A1i-06L (6-inch length)

         a) Patch cords in IDF/MDF shall be 6-inch in length

         b) Provide quantity of (5) additional 6-inch patch cords for spare

   b. Workstation Outlet

      1) Leviton Category 6A U/UTP Patch Cord – Part Number H6A10-10L (10’ length)

         a) Patch cords at the Workstation Outlet(s) shall be 10’ in length

3. IP Security (Green)

   a. MDF/IDF

      1) Leviton Category 6 U/UTP Small Diameter High Flex Patch Cord – Part Number 6H46i-6G (6-inch length)

         a) Patch cords in IDF/MDF shall be 6-inch in length

         b) Provide quantity of (5) additional 6-inch patch cords for spare

   b. Workstation Outlet

      1) Leviton Category 6 U/UTP Small Diameter High Flex Patch Cord – Part Number 6H460-10G (10’ length)

         a) Patch cords at the Workstation Outlet(s) shall be 10’ in length

4. IP Paging (Yellow)

   a. MDF/IDF

      1) Leviton Category 6 U/UTP Small Diameter High Flex Patch Cord – Part Number 6H460-6iY (6-inch length)

         a) Patch cords in IDF/MDF shall be 6-inch in length

         b) Provide quantity of (5) additional 6-inch patch cords for spare

   b. Workstation Outlet

      1) Leviton Category 6 U/UTP Small Diameter High Flex Patch Cord – Part Number 6H460-10Y (10’ length)

         a) Patch cords at the Workstation Outlet(s) shall be 10’ in length

5. Fire Alarm (Red)

   a. MDF/IDF

      1) Leviton Category 6 U/UTP Small Diameter High Flex Patch Cord – Part Number 6H46i-6R (6-inch length)

         a) Patch cords in IDF/MDF shall be 6-inch in length

         b) Provide quantity of (5) additional 6-inch patch cords for spare

   b. Workstation Outlet

      1) Leviton Category 6 U/UTP Small Diameter High Flex Patch Cord – Part Number 6H460-10R (10’ length)

         a) Patch cords at the Workstation Outlet(s) shall be 10’ in length

END OF SECTION 271300

SECTION 272100 – DATA COMMUNICATIONS NETWORK SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. Related specification sections

1. 271300 Communications Cable Plant.
2. 273123 VoIP System.

C. Related AISD Documents

1. NSS-5 Network Labeling Standard v3.
2. AISD Guidelines for Completing LAN Install.
3. AISD New Building Installation Checklist.
4. NSS-2 Campus Upgrade Process.
5. NSS-3 General Rack Layout and Design Guidelines.
6. NSS-8 Installation Guidelines for Vendors.
7. Design Standards of the Project Development Manual for GAATN requirements.
8. AISD Network Infrastructure Upgrade.
9. AISD Approved Master Equipment List.
10. Schematic of Campus Physical Links and Cabling.
11. AISD NSS Wireless Design Guidelines

1.2 SUMMARY

A. This document identifies the general Data Communications Network System requirements for the Austin Independent School District, Network Services Support, located in Austin, Texas (“Owner”).

B. All new construction projects will require a new Data Communications Network System.

C. Remodels or renovations will require modifications to connect the new additions and/or renovated space to the existing Data Network Systems.

D. Every elementary campus will be designed to require switches capable of dual 10 Gbps Resilient Ethernet Protocol (REP), for connectivity to the WAN Network (known as GAATN). Middle school campuses will connect with dual 25 Gbps REP. High school campuses will connect with dual 40Gbps REP links.

E. Vendor shall reference AISD NSS Network Design Guideline (refer to Attachment NSS-1) for additional information.

F. Each campus will have an 802.11 based Wireless Local Area Network installed.

G. Vendor shall reference AISD NSS Wireless Design Guideline (refer to Attachment NSS-2) for additional information.

H. Every campus will also have a Voice over IP based phone system utilizing a voice gateway capable of supporting legacy Plain Old Telephone Service (POTS) lines (refer to Attachment NSS-3).

I. Responsible Parties

J. Owner (AISD Network Support Services) will have the final approval for all network components listed in Attachment A, any changes in the project scope, and acceptance of the final installation.

K. Contractor is responsible for the complete Bill of Materials (BOM), installation of a complete functional solution, and 90-day warranty.

L. Technology Consultant:

M. A Technology Consultant is required and will be responsible for coordinating the needs assessments, technology design requirements, equipment requirements, and network designs between Architects, General Contractors, AISD Construction Management, AISD Network Systems and Support, and Technology Vendors.

N. The Technology Consultant will coordinate with the AISD Network Support Services department and the Contractor to validate all aspects of the Data Communications design and installation.

1.3 CONTRACTOR REQUIREMENTS

A. After the successful respondent has been selected via the procurement process by the General Contractor, Architect, AISD or their representative, they will have 10 business days to complete Attachment A and to submit it to the Owner for their approval.

B. After Attachment A has been approved by the Owner there will be a site survey scheduled by the Owner to verify the conditions of the Telecom Rooms and to identify power, space, size, and general conditions of the telecom room spaces.

C. The Contractor is responsible to provide an installation in accordance with the written specifications, the project scope, and guidelines from the products' manufacturer.

D. The data network equipment shall be installed and configured in accordance with the Owner's direction.

E. The Contractor will have all the necessary certifications to support the installation. Additionally, all personnel assigned will have the necessary training to support the installation.

1.4 QUALITY ASSURANCE

A. If a proposed part is no longer manufactured, the Contractor will send the proposed part number in writing to the Owner for final approval. The substituted items must meet or exceed the specifications of the

listed item. The Owner will have final determination of the acceptability of all proposed equipment and must approve submitted equipment prior to installation.

B. Where quantities are not noted, they may be obtained by contacting the Technology Consultant.

C. Any Owner-furnished materials or equipment not installed in the project shall be returned to the Owner at the end of the project.

D. The Contractor shall store all materials and equipment in accordance with manufacturers' instructions in a weather-tight, secure enclosure.

E. The Contractor shall be responsible for safety and security of all Owner-furnished materials until the project is complete and accepted by Owner.

F. All equipment and materials, unless otherwise specified, shall be new, free from any defects, and of the best quality of their respective kinds. All like materials used shall be of the same manufacturer, model, and quality unless otherwise specified.

G. All equipment must be covered with a manufacturer three year, 8x5, next business day, maintenance plan.

1.5 WARRANTY

A. The Contractor shall provide a one-year maintenance contract of all installed system components against defects involving workmanship and material that is not covered by manufacturer’s warranties. All labor and materials shall be provided at no expense to the Owner during normal hours (8 to 5). The maintenance period shall begin on the date of acceptance by the Owner. The Contractor shall provide AISD with documents and contract numbers outlining the equipment covered under the one-year maintenance agreement.

B. The Contractor shall, at the Owner's request, make available a service contract offering continuing factory authorized service of this system after the initial warranty period.

C. The system manufacturer shall maintain engineering and service departments capable of rendering advice regarding installation and final adjustment of the system.

D. Contractor shall list the length of any warranties over one-year for labor and three years on all material associated with the warranty.

PART 2 - PRODUCTS

2.1 LOCAL AREA NETWORK (LAN) COMPONENTS

A. Distribution Layer Switch (MDF): Each new installation should include one (1) distribution layer Ethernet switch which is to be installed in the MDF room at each campus.

1. The distribution switch will deliver up to 800 Gbps capable of layer 2-4 switching.

2. The switch will support Gigabit Ethernet and either 40 Gbps for high schools, 25 Gbps for middle schools, or 10 Gigabit Ethernet for elementary schools with Small Form-Factor Pluggable (SFP) hot-swappable modules.
3. Support Resilient Ethernet Protocol (REP).
4. Supports Multi-VRF technology.
5. Supports AutoQoS (Quality of Service).
6. Supports Multicast Routing.
7. Support for Application Monitoring through SPAN/RSPAN (Switched Port Analyzer and Remote Switched Port Analyzer).
8. Supports Flexible Netflow.
9. Support for CoPP (Control Plane Policing).
10. At a minimum, the distribution switch shall contain the following:
a. Redundant power supply
b. Required SFP modules
11. The switch will include a three-year, 8x5xNext Business Day, advanced shipment manufacturer's warranty.
12. The Contractor shall size the distribution switch so as to provide growth capacity to be defined by the Technology Consultant and AISD NSS.

2.2 Access Layer Ethernet Switches (MDF/IDF & Portable Buildings)

A. The switches shall be fixed-configuration, stackable switches that provide 48 ports and are Multi-Gigabit Ethernet capable.

B. For wiring closets (IDF), the switches shall be provided so as to deliver intelligent services such as rate limiting and security filtering for deployment at the network edge.

C. For Portable Buildings, the switches shall be provided so as to deliver intelligent services such as rate limiting and security filtering for deployment at the network edge.

D. In the MDF/IDF, the switches shall be installed as one (1) or more stacks at each campus and shall be connected to the distribution layer switch via dual 10 Gigabit fiber optic SFP uplinks.

E. In the portable buildings, each standalone switch will be connected to the distribution layer switch via a single Gigabit Ethernet fiber optic trunk uplink.

F. Switch shall support IEEE 802.3at (POE+) with a minimum of 30 Watts of power on all copper ports.

G. Must support a minimum of two (2) multi-mode fiber uplinks.

H. For remodel/renovation projects, the Contractor will include a minimum of 24 extra ports for additional growth.

I. The switch will include a three-year, 8x5xNext Business Day, advanced shipment manufacturer's warranty.

2.3 WIRELESS LOCAL AREA NETWORK (WLAN) COMPONENTS

A. The wireless solution must be an enterprise-class solution that supports systems management, RADIUS authentication, and RADIUS accounting.

B. The wireless components shall support the latest 802.11 wireless standards while maintaining backward compatibility with legacy 802.11 devices.

C. The wireless components shall be WIFI certified and support industry security standards including support for 802.1x and WPA2/AES.

D. The Contractor is responsible to include all necessary licenses for the system including any licenses for the controller.

E. Access Points (AP's) shall be provided with Power over Ethernet (POE) from an access switch.

F. Uninterruptible Power Supply (UPS)
1. Line UPS with a minimum of 60 minutes of battery runtime.
2. System Management software.
3. Network card.

PART 3 - EXECUTION

3.1 INSTALLATION REQUIREMENTS

A. Installation of the Network Switches

1. The Contractor will be responsible for racking equipment as per rack design standards and verifying that the modules are in the correct slots in the chassis as specified by the approved Bill of Materials.
2. The switch must be labeled, inventoried, and asset tagged using AISD templates and asset tags.
3. The Contractor shall be responsible for loading the version of the software and/or firmware specified by AISD Network Support services onto the switch.
4. AISD Network Support Services will provide initial configuration templates and configuration information at the initial meeting. The Contractor shall be responsible for building the configuration file and loading it on the switches.
5. The Contractor shall be responsible for cabling the switch into the network infrastructure and testing connectivity.
6. The Contractor will add descriptions to all access switch interfaces. Descriptions will include School name, room number, and jack ID. The format for description will be provided by AISD in the installation documents.
7. The Contractor will be responsible for installing both fiber and copper patch cables to the new switches. All patch cables must be installed as specified by the Owner.

B. Wireless Access Points

1. The wireless network shall provide for near 100% coverage of all areas of the facility with under 70 Db of signal loss. (Classrooms, offices, hallways, cafeteria, gymnasium, library, etc.).
2. One (1) AP will be installed in every classroom near the center of the room. AP's will be installed in office and common areas as needed.

3. All AP's shall be installed below the lay-in ceiling unless otherwise specified by AISD.
4. They shall be attached to the ceiling grid where possible and as close to the ceiling as possible when not. In locations without lay-in ceilings, the AP shall be placed no higher than 8' - 10' above finished floor level.
5. All AP's shall be installed on the mounting kit appropriate for the location.
6. All APs will be hung in a neat manner appropriately supported by the proper manufacturer's mounting brackets.
7. All APs installed in Gymnasiums shall be properly protected by a hardened plastic enclosure or metal cage (per AISD) rated for the potential impact.

C. Cabling

1. The Cabling Contractor is to provide and install appropriate length copper patch cables to activate copper patch panel ports to access layer switches. Cable lengths must be appropriate to be dressed neatly in cable management on the rack and provide workable slack.
2. Cable labels will be required (for switch-switch) uplink ports, the Contractor will install these labels and verify accuracy.
3. All patch panel to POE/Ethernet switch cables must be patched in a 1-to-1 configuration with patch panel ports 1-24 going to odd-numbered switch ports and patch panel ports 25-48 going to even number switch ports.
4. The contractor must follow AISD patch panel color coding standards (see AISD Patch Cable Color Key.pdf). Data ports should be patched with Gray patch cables. Wireless AP's should be patched with Royal Blue cables. Video cameras should be patched with Green cables. Classroom AV multimedia systems should be patched with Yellow cables.

3.2 ACCEPTANCE

A. The Contractor shall participate in a general site inspection attended by the Owner, or their representative, the General Contractor, Technology Consultant, and all other interested parties to document observations, issues, and punch list items.

B. Prior to the general site inspection, the Contractor shall be responsible for performing a site inspection to detect and resolve any issues or punch list items concerning his/her responsibilities.

C. All systems must be installed and functional, and test results, documentation, drawings and maintenance information provided prior to any site being accepted.

D. Upon completion of testing, the manufacturer or his representative shall issue to the Owner a letter of Certification attesting to the fact he has tested and adjusted the system, that all components are properly installed and free of defects and that the system is installed in compliance with this specification and manufacturer requirements.

E. The "as-built" documentation should include all technology data drop locations, cable pathways, etc. on a technology layer within the overall campus CAD

F. The Owner will not accept a school as complete until all as-built documentation is correct and delivered to Owner.

G. The Owner will not accept a school as finished until all purchased equipment has been assigned to a maintenance contract.

END OF SECTION 272100

SECTION 274116 – INTEGRATED AUDIO-VIDEO SYSTEMS AND EQUIPMENT FOR STUDIOS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This document covers the general requirements for the design and installation of the Integrated Audio-Video Systems and Equipment for Classrooms, herein referred to as the Presentation Systems for Austin Independent School District (AISD) in Austin, Texas.

1.3 SCOPE OF WORK

A. The Contractor shall provide complete, turnkey audiovisual (AV) systems performing all of the services and functions described herein, together with all other apparatus, software, programming, cable, materials, labor, tools, transportation, and any other resources necessary to provide a complete system conforming to the design intent for AISD.

B. Specifically, the work shall include, but is not limited to:

1. Coordination

a. Communicating and coordinating directly with the Owner, Architect (if applicable) and other trades, complying with all requirements as defined under this Scope of Work and elsewhere, to fulfill all requirements of the Specification.
b. Scheduling installation operations in sequence required in order to obtain best completion results.
c. Coordinating installation of different components to assure maximum accessibility for required maintenance, service and repair.

2. Documentation

3. Design Verification and Acceptance

4. Cabling, Equipment and Installation

a. The Contractor is responsible for providing and installing all required equipment, cabling, mounting hardware, connectors, jacks, wall plates, etc. for complete, working systems as outlined in the AV drawings and specifications.
b. Any Owner furnished materials or equipment provided to the contractor but not installed in the project shall be returned to the Owner.

5. Furniture

a. All furniture will be by others unless specifically noted under Part 2 Products in this specification.

6. Coordination with Owner's Network

a. No device shall be connected to Owner's network without the express permission of the Owner.
b. Configuration parameters such as DHCP, IP addresses, subnet information, VLAN setup and authorization must be obtained from AISD NSS department prior to installation.
c. Data and network connectivity shall be subject to the respective specification sections 271300 Communications Cable Plant and 272100 Data Communications Network

7. Control System Programming

8. Testing, Training, Acceptance and Warranty

9. Inspections

a. Two periodic inspections, at no expense to the Owner, shall be made by the installer within the first year's guarantee period to ensure satisfactory operation of the system.

1.4 SUBMITTALS

A. Bill of Materials

1. AV Contractor shall provide in addition to Division 1 requirements, an itemized listing of all equipment, materials and labor required for the installation of the systems as specified herein. Listing shall contain: Part Number, Description, Unit of Measure and Quantity, to provide a complete and functional AV system as specified herein. "Attachment A" shall be provided to the Architect/Owner within thirty (30) days after notification to proceed and again as part of the formal submittal process.

B. Product Data Binders

1. Minimum number of Sets: four (4). Submit simultaneously with Shop Drawings.
2. Timetable

a. Submit within forty-five (45) days after award of contract.
b. Allow minimum of ten (10) business days for review. All sets minus one (1) will be returned with review comments. If a resubmit is required, resubmit total quantity of complete sets. If second resubmit is required, Contractor shall reimburse Owner for expenses incurred during additional review process.

3. Review and approval of Product Data is required before equipment purchase and installation.
4. Bind product data sheets together either in GBC or 3-ring type binders.

C. Shop Drawings

1. Minimum Number of Sets: four (4).
2. Timetable

a. Submit within forty-five (45) days after award of contract.

b. Submit simultaneously with Product Data Binders.
c. Allow minimum of ten (10) business days for review. All sets minus one (1) will be returned with review comments. If a resubmit is required, resubmit total quantity of complete sets. If second resubmit is required, Contract shall reimburse Owner for expenses incurred during additional review process.

3. Description:

a. Shop Drawings shall be used for coordination between trades and updated as final record drawings.
b. Bind all Shop Drawings together to form set. Loose drawings will not be accepted.
c. Each drawing shall include: Project, Building, Location, Contractor Name, Architect, AV Consultant, Date and Revision Number.
d. Number and title each drawing in logical manner as a set.
e. Include cover sheet with listing of all drawings included in bound set.
f. Ensure that labeling on Shop Drawings match labeling on equipment.
g. Minimum Scale:

1) Floor Plans: 1/8 inch = 1 foot.
2) Rack Elevations: 1-½ inch = 1 foot.
3) Plate/Panel Details: 6 inches = 1 foot.
4) Loudspeaker Details: 1 inch = 1 foot.

h. Include as a minimum:

1) Floor plans indicating locations of all AV devices, vertical risers, pull boxes, and exposed wiring.
2) Schematic diagram showing all primary and secondary devices, interconnectivity and signal flow.
3) Plate details showing size, material, finish, connectors, engraving, etc.
4) Mounting detail drawings of loudspeakers, racks, and overhead equipment. Hire services of professional structural engineer, licensed by the appropriate governing authority, to review shop drawings, building structural drawings, and any existing structures from which equipment is to be suspended. Include Structural Engineer's stamped report with shop drawing submittal. Report shall include:

a) List of items reviewed by the Structural Engineer.
b) Confirmation that proposed methods of suspending equipment as shown on the shop drawings conform to required safety factors.
c) Confirmation that building structure from which equipment is to be suspended will support equipment including required safety factors.

5) Rack elevations.
6) Complete schematic diagram. One-line diagram with detailed descriptions of product inputs and outputs is acceptable. Include terminal strip details and cable label information. If wiring diagram spans more than three (3) sheets, provide simplified block diagram of entire system on one (1) sheet.
7) Electrical power wiring diagram. Include circuit, switching, and control details.
8) Wiring diagram of grounding and shielding scheme.
9) Drawings for custom-fabricated items (i.e., plates, panels, cables, and assemblies).
10) General construction drawings necessary for completion of work.

D. Operation and Maintenance Manuals

1. Minimum number of Sets: four (4).
2. Bind Operation and Maintenance Manuals using either GBC or 3-ring binders.
3. Format and Minimum Information below:

a. Section 1 – System Operation.

1) Introduction/overview to system components and their functions and locations. Include a brief listing of basic system functions.
2) Complete but simple system operating instructions to accomplish basic system functions, written for non-technical personnel.
3) Certificate indicating names of Owner personnel trained by AV Contactor, date of training, name of AV Contractor representative that provided training, and name of project.

b. Section 2 – System Documentation.

1) Simplified system one-line schematic diagram showing changes made during construction.
2) Complete inventory of system components including serial numbers. Identify location (equipment rack, over stage, stored in control room, etc.) of each component.
3) Cable and terminal strip documentation including cable numbers, functions, originating locations, terminating locations, and signal levels.
4) All Shop Drawings corrected to reflect as-built conditions.
5) Other data and drawings required during construction.
6) Initial Tests and Adjustments data.
7) Final Tests and Adjustments data.
8) Electronic files including all utilized manufacturer's software and saved copies of software configurations (configurations as established during Final Tests and Adjustments). Format of e-files to be determined by the Owner.

c. Section 3 – Manufacturer's Documentation.

1) For each equipment model at no additional costs to Owner, even if manufacturer does not include costs of such documentation with purchase of equipment item.
2) Manufacturer's Product Data.
3) Operating instructions.
4) Installation instructions.
5) Service information.
6) Schematic diagrams.
7) Replacement parts list.

d. Section 4 – Maintenance Information.

1) Preventive maintenance schedule letter clearly stating target dates of six month and end-of-warranty preventative maintenance inspections, and list of maintenance tasks performed.
2) Maintenance instructions including manufacturer's recommended maintenance, recommended maintenance schedule and information concerning proper inspection, testing, and replacement of components.
3) Troubleshooting information complete with instructions for procedures during equipment failure.

e. Section 5 – Warranty Information

1) System warranty letter.

4. Provide three (3) sets via Owner directed electronic format that include all material in Operation and Maintenance Manuals in PDF format except for copyrighted material.

5. Submit one (1) set of Operation and Maintenance Manuals at least ten (10) days before Final Tests and Adjustments procedures (minus data from Final Tests and Adjustments). This set will be reviewed by Owner and returned to Contractor. Re-submit after Final Tests and Adjustments and include data. NOTE: Do not schedule Final Tests and Adjustments or perform training of Owner personnel before submitting Operation and Maintenance Manual.
6. Submit remaining number of complete manuals as required by General Conditions within ten (10) days after return of reviewed set(s). Include Final Tests and Adjustment data, warranty period letter, and any other data not included in first submission.

E. Samples

1. Request for Samples – Upon request, furnish samples (at no additional cost) to Owner and/or General Contractor of submitted items proposed as substitutes for specified items. Products will be reviewed to determine if proposed substitute items meet required function and quality.
2. Product Tests
a. Products submitted as samples may require testing by independent laboratory. Testing at expense of Contractor.
b. Obtain written approval of tested products before incorporating into system.

1.5 QUALITY ASSURANCE

A. AV Contractor Qualifications

1. Be established AV System Contractor, regularly engaged in designing, furnishing and installing AV systems. NOTE: Electrical or general contracting firms responsible for completion of this work, but not meeting above requirement, shall employ services of approved AV Contractor as subcontractor to perform work described herein.
2. Be experienced in designs and installations of similar size and scope within last five (5) years. Submit list of four (4) (minimum) jobs of similar magnitude, completed within last five years. For verification, submit complete information, including project name, project address, contact person, daytime telephone number plus month and year of project completion. At Owner's request, accompany Owner, or Owner's representative, on a visit to any or all completed projects submitted as examples.
3. AV Contractor to be Authorized Dealer for all major lines of equipment listed in Part 2 must have at least one permanent staff member who is factory trained in the installation and maintenance of each major product line offered.
4. Employ personnel (at all levels of work) experienced in projects of similar size and scope. Provide list of key personnel to be responsible for each of the following aspects of work: Project Management, Technical Documentation, Control System programming, DSP programming and Leadership of Field Work (one who is present for all field work). For each identified employee, indicate number of years employed by contractor, number of years' experience in assigned responsibilities, and list of previously completed projects where similar responsibilities were required.
5. Project manager assigned to this project must have a minimum of five (5) years' experience in designing, installing and integrating AV systems of similar scale. Project Manager shall also have either an AVIXA CTS-I or CTS-D certification or a current industry standard certification as approved by the Owner.

B. Codes and Regulations

1. Comply with terms and conditions of Americans with Disabilities Act, especially regarding provisions for hearing impaired and wheelchair access in control areas.

2. Execute work in accordance with AV system installation best practices as defined by Infocomm International and The Association for Quality in Audio Visual Technology, Inc., National Electrical Code, National Board of Fire Underwriters and applicable state and local codes, ordinances, and rules. If, in the opinion of the AV Contractor, there is anything in the plans or specifications that will not strictly comply with the above laws, ordinances, and rules, the matter shall be referred to the attention of the Architect/Engineer for a decision before proceeding with that part of the work.

1.6 DELIVERY, STORAGE AND HANDLING

A. Power up any electronic equipment to ensure its proper functioning before its arrival onsite.

B. Ensure that materials (especially electronic and electro-acoustic devices) are protected against physical, environmental, and electronic damage until final acceptance by Owner.

C. Schedule delivery to minimize delays in the project.

D. Provide storage protection against temperature and humidity extremes, theft, vandalism, physical damage, and environmental damage.

E. AV contractor maintains ownership/responsibility of equipment, including Owner furnished equipment provided to the contractor, components and materials until systems are accepted and have received official sign-off by Owner. Liability for loss or damage is the responsibility of the AV Contractor during this time.

1.7 WARRANTY

A. Warranty – Submit letter providing warranty covering labor and materials supplied under this contract. Bind in Operation and Maintenance Manuals. Terms as described in General Conditions. Minimum terms as follows:

1. System – Systems shall be free of manufacturing or installation defects for a minimum period of two (2) years from the date of final acceptance. Clearly designate begin and end dates of system warranty period.
2. Parts and Labor – Provide parts and labor to repair defects in materials and workmanship during system warranty period.
3. Response Time – Within system warranty period, provide initial on-site service response within one (1) business day of service call. Provide resolution to any system defects within 72 hours or within 48 hours of receipt of repaired or replaced product from manufacturer.
4. Replacement Products – If any item must be removed for repair during system warranty period, provide replacement item of similar quality at no charge.
5. Repair Limit – Do not repair any piece of equipment found defective during installation or system warranty period more than two (2) times. After second repair, replace defective item with similar approved item at no additional cost to Owner.
6. Extended Manufacturer’s Warranties – Identify products with manufacturer’s warranties extending beyond one (1) year. Provide terms and conditions of such warranties.
7. Service Personnel Information – Provide name(s) and telephone number(s) of service personnel to be contacted regarding repair and maintenance.

B. Extended Warranty – Provide cost to extend complete AV system warranty from two (2) years to three (3) years. Included a list of all provided services including maintenance schedules.

C. System Certification – Upon completion of testing, the Contractor shall issue to the Owner a letter of Certification attesting to the fact they have tested and adjusted the system, that all components are properly installed and free of defects, and that the system is installed in compliance with this specification and manufacturer requirements.

PART 2 - PRODUCTS

2.1 GENERAL

A. All active AV equipment in a learning space shall be furnished by AV Contractor who is selected by the Owner.

B. All active AV equipment not in a learning space (PAC, Auditorium, Delco Center, Etc.) shall be furnished by AV Contractor who is selected by the Construction Management.

C. Infrastructure Products – All conduits, basket tray/cable tray, pull boxes and associated parts required for infrastructure shall be installed by the electrical contractor unless specifically excluded in these specifications or drawings.

D. Performance – Regardless of completeness of descriptive paragraphs herein, each device shall meet its manufacturer's published specifications. Verify performance of all devices prior to installation.

E. Contract Documents – Drawings and specifications are to be used in conjunction with one another and to supplement one another. In general the specifications determine the nature and quality of the materials, and the drawings establish the quantities, details, and give characteristics of performance that should be adhered to in the installation of the AV system components. If there is an apparent conflict between the drawings and specifications, the items with the greater quantity or quality shall be provided and installed. Clarification with the owner about these items shall be made prior to the ordering and installation. No change in the plans – specifications, drawings or construction documents – shall be made without full consent in writing from the Owner.

F. Quantities – All quantities are indicated on AV drawings or in Part 2 Products list. Confirm quantities on final Contract Documents. If Contract Documents do not include quantities necessary to deliver complete working system, provide notification of disparity, and install required quantity of devices for complete working system.

G. Small Parts – Systems are described in terms of major products. Even if not specifically mentioned, provide and install patch cables, connectors, hardware, converters, power supplies, labels, terminals, mounting accessories etc. necessary for complete and working system meeting design intent of specifications.

H. Balanced Lines – Unless specifically directed otherwise, wire all line and microphone level circuits as balanced with respect to signal ground. For products without balanced inputs or outputs, provide high quality balancing transformers with proper level, shielding, and impedance characteristics. Assure all audio

levels arriving and leaving matrix and routing switchers are equal to the manufacturer's recommended input audio level. If required use products for level matching.

I. Keys – Provide five (5) sets of keys for any AV system product requiring keys.

J. Condition – Provide and install products listed in this section in factory new condition, conforming to applicable provisions of American National Standards Institute.

K. Designations – Each major product item is given unique designation (such as MIX1 for mixer number 1). The product designations are unique in this section only and may be repeated in other specification sections.

L. Security Screws – Use Middle Atlantic HSK Guardian Series button-head screws and bits to secure rack components, LCD mounts, Projector mounts and any other location deemed necessary by Owner. Use nylon washers (not provided by Bryce) to protect equipment surfaces. Account for appropriate tip wear when ordering quantity and do no use a bit beyond the manufacturer's recommendations. Provide ten (10) additional unused driver bits and deliver to the customer after completion.

M. AV Electrical Power – Ensure that "Star" ground configuration is properly implemented by the Electrical Contractor. Ensure that ground wires from each outlet are isolated from conduit, neutrals, and each other and are each home-run back to the dedicated breaker panel for AV systems.

N. Wireless Microphones – Coordinate frequency selection with other radio-frequency sources in the area and with manufacturer's recommendations.

O. Control System Programming:

1. Program each panel to provide simple, intuitive control of all basic AV functions including: per zone program and speech volume levels, video source and destination routing, AV system power, media player transport functions and CATV tuner control (including channel guide, navigation, last channel, channel select (up, down and manual input) and channel presets).
2. Utilize Infocomm International's "Dashboard for Controls" concept for touch panel layout unless directed otherwise by Owner.
3. AV management software shall be installed on Owner furnished computer(s) with adequate specifications per manufacturer's recommendations.
4. Provide layout of each and every touch panel and hard-button panel pages in the product data submittal for approval by Owner.
5. Provide web-control for each touch panel in AV system. Include page tracking, and track current button feedback between touch panel and web-control panel.
6. Staff member certified by control system manufacturer shall program control system. Control programming must be done by in-house personnel. Programming cannot be subbed out to another contractor or individual.
7. After programming is approved, all control system code and programming, including touch panel code and graphics, will become property of Owner. AV Contractor shall provide Owner both raw and compiled code via Owner directed electronic format.

P. Audio System Programming – Owner shall coordinate layout and logical branching of DSP audio system. Include screen layout and menu branching drawings in AV submittal. After AV system is approved, all audio control system code and programming will become property of Owner. AV Contractor shall provide Owner both raw and compiled code via Owner directed electronic format.

Q. EDID Configuration – The variety of resolutions of laptops and other computer devices that may be connected to these systems is unknown. Set preferred EDID settings to 1920x1080, 60Hz, 2-channel audio.

R. AV Racks:

1. Provide blank faceplate in any area marked BLANK in drawings.
2. Provide shelf for mounting of any device for which a rack mount kit is not available.

S. AV Floor Boxes and Poke-Thru Devices:

1. Clean floor boxes and poke-thru devices of all dust and debris prior to installation of any active or connectorized plate.
2. Any floor box or poke-thru with active or connectorized AV plates found to have any dust, debris or water in bottom of box are subject to replacement of all plates and components. A re-test of all associated components must be completed.
3. Provide blank plates for all unused compartments in the AV floor boxes and poke-thru devices.

2.2 CABLES

A. Interconnect Wiring – All AV cables will be plenum rated per NEC.

1. Audio Cable – one (1) pair 22-gauge conductors with a foil or braided shield and drain wire.
2. Loudspeaker Cable: one (1) pair 14-gauge conductors. Use 12-gauge for large rooms and when connecting multiple rooms together.
3. CAT Cable: Use shielded category cable. Use cable designated by the equipment manufacturer.
4. HDMI and VGA Interconnect Cables: Professional grade, flexible pre-made cables

B. Connectors – Connectors shall be of the quantity and type as required for proper and durable operation, and signal transmission of the electrical characteristics for associated circuitry. Provide strain relief for each and every connector.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General Guidelines

1. Quality of Work – Perform labor to accepted industry standards and state and local codes to accomplish complete and working system.
2. Material and Labor – Provide specified products and other incidental materials, appliances, tools, and transportation required for complete and functioning systems. Provide personnel to perform labor who are skilled in techniques and can demonstrate technical knowledge AV infrastructure system installations.

AV Contractor is responsible for all personnel related travel and travel related expenses as well as the transport and delivery of all equipment, materials, tools, etc. necessary to complete the project.

3. Documents at Job Site – Keep following documents at job site during entire construction period:

a. Complete Specifications and Drawings.
b. Approved Shop Drawings.
c. Approved Product Data.
d. Progress Set of Project Record Documents.

4. Mounting – Mount equipment and enclosures plumb and square. Ensure that permanently installed equipment is firmly and safely held in place. Design equipment supports to support loads imposed with project safety factor of five (5) or greater. For devices hung overhead, obtain review by Structural Engineer licensed by the appropriate governing authority prior to installation.
5. Dimension Verification – Verify dimensions and space requirements to assure that proper mounting, clearance, and maintenance access space is available for system components.
6. Clean-Up – Leave project clean each day. Place debris where designated by General Contractor/Owner. Debris includes but not limited to: solder splatter, cable ends, stripped insulation, spent crimp connectors, gypsum board and ceiling tile dust, and product wrappings and cartons. After completion of installation, thoroughly clean areas worked, including non-visible areas such as equipment rack interiors, rack top panels, and inside lockable floor and wall boxes.
7. Coordinate installation of AV infrastructure and equipment with other trades in order to follow project schedule.
8. Maintain any licensing required by the appropriate governing authority to install and terminate low voltage systems.
9. Obtain any permits, keys and/or badges necessary to complete the project.

B. Labeling

1. Equipment Labels – AV Contractor shall provide engraved lamicoid labels on front and rear of rack-mounted equipment. Mount labels plumb and square. Include schematic reference design, item name, and system or area controlled by labeled component. On program preamps and mixers, provide label for each input indicating which source is controlled by labeled channel. Unless otherwise indicated, provide permanently-mounted black labels engraved with 1/8-inch white block characters. Handwritten, self-laminating, or embossed plastic (Dymo) labels are not acceptable. Provide labels for major equipment with two (2) lines (minimum) of engraving, coded as follows:
a. Line 1: Generic name of device, such as MIXER AMPLIFIER.
b. Line 2: Schematic designation of device, such as AV-MSW-1.
2. Control Labels – AV Contractor shall provide engraved label over each user-operated control that describes the function or purpose of control. Provide label of proper size to fit available space.
3. Terminal Strip Labels – AV Contractor shall label each terminal strip with unique identification code in addition to numerical label (Cinch MS series) for each terminal. Show terminal strip codes on system schematic drawings included with Project Record Documents.
4. Rear Equipment Labels – AV Contractor shall provide adhesive label on rear of equipment where cables attach, to indicate designation of cable connected at each point.
5. Cable and Wire Labels – Label cables and wiring logically, legibly and permanently for easy identification. Labels on cables shall be adhesive strip type, covered with clear heat shrink tubing. Factory stamped heat shrink tubing may be used. Hand-written or self-laminating type labels are not acceptable.
6. Cable Label Codes and Locations – Each cable is to have a unique label. Cables are to be labeled with two fields with a dash between the fields. The first field will identify the type of connection (e.g. HDMI, VGA), and the second field will be a two (2) digit number corresponding to the input (e.g. VGA-

01, HDMI-03). Locate cable designation at start and end of each cable run, within twelve (12) inches of termination point. For cable runs that have intermediate splice points, label cable with same designation throughout, with additional suffix to indicate each segment of run. Provide cable designation codes with the schematic drawings included with Project Record Documents and Operation and Maintenance Manuals.
7. Wall Plate Labels – Wall plate connection points to be clearly labeled. Affix labels directly above the drops they represent. The plate label should correspond to the cable label for each connection point.

C. Power and Grounding

1. Power Coordination – Coordinate final connection of power and ground wiring to rack. Electrical contractor will provide power to audio visual systems. Before installation, verify load requirements for systems as accepted.
2. Bus Bars – Install 1-inch by ¼-inch copper ground bus bar, top to bottom in floor mounted AV racks. Ground and bond equipment chassis of each rack-mounted component without three-pin grounding plug to bus bars with #12 AWG insulated green wire using 6-32 or larger nuts, bolts, lock-washers, and appropriate NEMA connectors. Electrical Contractor (Division 16) shall provide and connect #4 AWG green insulated wire from Bus Bars to ground point in AV technical electrical panel.

D. Equipment Racks

1. Ventilation – Provide ventilation adequate to keep temperature in rack below 85 degrees Fahrenheit. Use “whisper” type ventilation fans in racks, adjusted to come on when temperature in rack rises above 85 degrees Fahrenheit, only if adequate cooling cannot be provided by Owner.

E. Wiring

1. Wiring Standards – Execute wiring in strict adherence to best AV engineering practices. This includes ensuring all cables are neatly bundled and routed, fully supported and have proper strain relief.
2. Field Connection Devices – Connect cable to active components through screw terminal connections and spade lugs when appropriate.
3. Run cable in ceiling plenums neatly parallel to building walls, supported every three feet to structure with plenum rated ties.
4. Raceways – Run vertical wiring inside rack in Panduit (or equivalent) plastic raceways with snap-on covers, sized to allow at least 50% future wiring. Mount raceways on full length ¾-inch flat black plywood backboards, attached to rack sides. If between-rack wiring chases are provided, Panduit raceways are not required. Horizontal wiring in rack shall be neatly tied in manageable bundles with cable lengths cut to minimize excess cable slack, but still allow for service and testing. Provide horizontal support bars if cable bundles sag. Individually bundle excess AC power cable away from rack mounted equipment with plastic cable ties. Electrical tape and adhesive backed cable tie anchors are not acceptable.
5. Accessibility – Ensure that wiring and connections are completely visible and labeled in rack. Mount termination resistors, if required, on terminal strips, fully visible and not concealed within equipment or connectors.
6. Loudspeaker Polarity – Connect loudspeakers electrically in phase, using same wire color for loudspeaker wiring throughout project.
7. Physical Damage Prevention – Take necessary precautions to prevent physical damage to cables and equipment. Damaged cables or equipment will not be accepted. Separate, organize, and route cables to restrict channel crosstalk and feedback oscillation.
8. Racks – Looking into the rack from the rear, locate AC power, control, data and speaker wiring on the left; line level audio, control, video, and RF wiring on the right. Keep several inches of space between power cables and other signals.

9. Hum Prevention – Ensure that electromagnetic and electrostatic hum is at inaudible levels. For line level signals, float cable shields at the output of the source device. Do not cut or remove shield conductors; fold back unconnected shields over cable jacket and cover with clear heat-shrink tubing. Do not obstruct cable labels.
10. Other Connections – Make connections using rosin core solder or approved mechanical connectors. Where spade lugs are used, crimp properly with ratchet type crimping tool. Solder spade lugs mounted on #22 AWG or smaller cable after crimping.

3.2 INITIAL TESTS

A. Purpose – These tests are to ensure that the AV system is installed and functioning as specified, and to ensure the system is ready for Final Tests and Adjustments (described later).

B. Testing Standards – Perform testing in accordance with ANSI standards.

C. Inspection – Verify prior to beginning actual tests and adjustments on systems:
1. Proper grounding of all electronic components (through third prong of power connector or separate connection between component chassis and ground bus bar).
2. Cables dressed, routed, and labeled, connected with proper polarity.
3. Insulation and shrink tubing in place.
4. Dust, debris, solder splatter, etc. removed.
5. Proper frequency settings (or modules) at crossovers and controllers.
6. All equalizer bands and tone controls set for flat frequency response.
7. Survey temperatures of each piece of equipment after four (4) hours use (minimum). Note and report any hot equipment.

D. Electrical Power Quality – While all sound and AV system components are unplugged from electrical power outlets, Contractor shall turn on power to outlets, and confirm proper voltages at each outlet across the following pairs of terminals: hot and neutral, hot and ground, and neutral and ground (zero volts across neutral and ground). Contractor to document measurements.

E. General Function Tests – Test each piece of equipment to ensure that it performs its intended function. Include all portable equipment in tests. Intent of initial tests is to verify complete, functioning system before Final Tests and Adjustments. Correct problems found during initial testing before beginning Final Tests and Adjustments. Document whether all pieces performed intended functions; note any unresolved malfunctions.

F. General Adjustments – Adjust, balance, and align equipment for optimum quality, meeting manufacturers published specifications.

G. Initial Tests and Adjustments Data – Submit written report of Initial Tests and Adjustments data upon completion to Owner. Include printed name(s) of technician(s) performing tests, date(s) and time(s) of tests, model and serial numbers of test equipment, results of each initial test, descriptions of problems encountered and their solutions, and statement that system is ready for Final Tests and Adjustments. Initial Tests and Adjustments Data to include signatures of technician(s) performing tests.

3.3 FINAL TESTS AND ADJUSTMENTS

A. Purpose – These tests are to be witnessed by Owner to determine if system is complete and functioning as designed and specified. Also, Owner will perform listening and viewing tests and witness adjustments of all images for optimum clarity.

B. Timetable – Coordinate with Owner and General Contractor to schedule Final Tests and Adjustments after submittal of Initial Tests and Adjustments data.

C. System and Site Conditions – Owner will witness Final Tests and Adjustments. Have systems fully functional and ready for observation and testing upon Owner's arrival. Coordinate with all trades for quiet conditions throughout the listening areas and for the duration of the test schedule. If upon Owner's arrival, systems do not meet criteria, site is not sufficiently quiet, or if Owner is required to make additional trips to job site to witness additional testing or perform additional reviews of installed equipment, Contractor shall reimburse Owner for labor and expenses incurred by having incurred costs deducted from payments to contractor.

D. Test Labor – Provide technician familiar with this project's AV systems and operation of test equipment to perform testing. Provide additional technician to assist in the tests and to perform troubleshooting, repairs, and adjustments. Include labor for these technicians to be present for one (1), eight (8)-hour day during Final Tests and Adjustments.

E. Tools – Provide standard hand tools including screwdrivers, pliers, wire strippers, nut drivers, soldering iron, and other tools appropriate for troubleshooting system problems.

F. Ladders and Scaffolds – Provide ladders and scaffolds to inspect/adjust loudspeakers and rigging points.

G. Verification of Initial Tests and Adjustments – Verify that Initial Tests and Adjustments have been performed and meet criteria. During Final Tests and Adjustments, Owner may require portions of the Initial Tests and Adjustments to be repeated. Repeat measurements as requested without claim for additional payment.

3.4 FINAL ACCEPTANCE BY OWNER

A. Certificate – Submit Certificate of Final Acceptance form signed by Owner verifying complete installation and proper operation of systems upon fulfillment of all requirements and upon recommendation by Owner.

B. Input/Output Jack Demonstration – Demonstrate proper performance and phase of each system input and output jack (all audio input and output jacks) as received at AV and network systems.

C. Inventory – Inventory all installed and portable equipment for correct quantities.

D. Functional Demonstration – Demonstrate operation of each function of each major piece of equipment.

E. Other Tests – Perform any other tests on any part of the AV system as requested by Owner.

F. Final Equipment Settings – Record final settings of all IP/MAC addresses, equalizer bands, tone controls, filters, delays, limiters, etc., including those established through computer software settings. Include descriptions of settings (including software settings) in Operation and Maintenance Manual. Include software copy of configuration file(s) in Operation and Maintenance Manual.

G. Security Inspection – Inspect equipment for security from tampering (covers, shaft-locks, etc.).

H. Review of Labels – Review installed labels on cables, equipment, controls, and terminal strips.

I. Final Acceptance and Payment- Final acceptance will occur upon completion of all Owner generated punch list items. Payment may be requested upon receipt of closeout documentation and final system acceptance by Owner.

3.5 OWNER TRAINING

A. Provide Owner training as described in General Conditions. As a minimum, provide twenty-four (24) hours instruction (within six (6) trips to site) regarding AV Systems operation to Owner-designated personnel. Schedule instruction time(s) with Owner to occur after completion of Final Tests and Adjustments. Coordinate with Owner in advance to schedule instruction time. Document date, time, and attendees of the training session and include documentation in Operation and Maintenance Manuals to serve as record of trained personnel.

3.6 SUPPORT DURING OWNER'S FIRST USE OF COMPLETED SYSTEM

A. Provide personnel familiar with design, installation, and operation of each system to be present at Owner's first use of each completed system (up to twelve (12) hours total in two sessions). During first use of each system, respond to Owner requests for troubleshooting, adjustments, and additional training. If no one contractor employee or representative can provide expertise in all aspects of the system, provide multiple personnel for the twelve (12) hours per session as required. Schedule presence of personnel in advance with Owner. Should significant elements of the new system be operational prior to final completion, Owner may elect to schedule contractor presence for Owner function prior to final completion of system. Should Owner exercise this option, contractor presence will not be required at first use following final completion.

END OF SECTION 274116

SECTION 275313 – CLOCK SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Contractor shall provide all materials, equipment and labor necessary to provide a complete and functional Industry Standard Wireless Correcting Clock System regardless of any materials and/or equipment not listed or described in this specification and/or supplementary drawings.

1.3 INFORMATION SUBMITTALS

A. Provide an itemized listing of all equipment and material required to meet the specifications for the Clock System. This listing shall include Part Number, Description, Unit of Measure and Quantity.

1.4 CLOSEOUT SUBMITTALS

A. Submit an electronic copy of the of the labeling system correlation chart.

B. Submit an Excel cut sheet in hard and soft copy listing all information related to the cross-connections, PA programming, i.e., annunciation point, cable identification, clock identification, location, room number, test results, etc. Sample may be obtained from A.I.S.D. Telecommunications

1.5 CONTRACTOR QUALIFICATIONS

A. The Contractor shall be a Certified partner of the Clock System for which they are submitting a proposal for the work.

B. The Contractor shall possess all relevant Manufacturer Certifications for the company and all installers prior to submitting a proposal for the work.

C. Installers shall be trained on the specific installation, configuration and testing of the systems as specified prior to submitting a proposal for the work.

1.6 WARRANTY

A. Upon completion of testing, the manufacturer or his representative shall issue to the Owner a letter of Certification attesting to the fact he has tested and adjusted the system, that all components are properly installed and free of defects and that the system in installed in compliance with this specification and manufacturer requirements.

B. The Contractor shall provide a one-year warranty of the installed system against defects in material and workmanship. All labor and materials shall be provided at no expense to the Owner during normal hours. The warranty period shall begin on the date of acceptance by the Owner.

C. The Contractor shall, at the Owner's request, make available a service contract offering continuing factory authorized service of this system after the initial warranty period.

D. The system manufacturer shall maintain engineering and service departments capable of rendering advice regarding installation and final adjustment of the system.

E. Contractor shall list the length of any warranties over one-year and all components associated with the warranty.

F. AISD expects the warranty coverage will be no less than the services provided in a full maintenance program at no additional cost to AISD. This includes parts, labor, and on-site maintenance with manufacturer-certified personnel.

G. The Contractor shall provide a one-year warranty of the installed system against defects in material and workmanship. All labor and materials shall be provided at no expense to the Owner during normal hours. The warranty period shall begin on the date of acceptance by the Owner.

H. The Contractor shall, at the Owner's request, make available a service contract offering continuing factory authorized service of this system after the initial warranty period.

I. The system manufacturer shall maintain engineering and service departments capable of rendering advice regarding installation and final adjustment of the system.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Contractor shall verify conditions and dimensions at the job site prior to installation.

B. Contractor shall provide installation in accordance with these written specifications and the installation requirements, recommendations and guidelines of the product’s manufacturer.

C. Contractor shall provide in addition to Division 1 requirements, an itemized listing of all equipment, materials and labor required for the installation of the Clock System as specified herein. Listing shall contain: Part Number, Description, Unit of Measure and Quantity, to provide a complete and functional Clock System as specified herein..

D. All new construction will require a complete Clock System while existing facilities receiving additions and/or renovations will require modifications to the existing Clock System.

E. The Wireless master clock shall synchronize all secondary clocks. The Master Clock shall control multiple events throughout the facility, such as automatically adjusting for seasonal events, holidays and daylight-savings time.

F. The Master Clock shall supervise the accuracy of the clock system by transmitting data every minute for 24 VAC clocks and every 2 to 4 hours on battery operated wireless clocks.

G. Digital clocks shall be wireless 450-930MHZ, 4" Digit display, 4 digit, White Display, Surface Wall Mount. All Analog clocks shall be round with a powder coated metal case and glass crystal, with bold, black numerals and minute markers on a non-yellowing white dial. Hour and minute hands shall be aluminum with a black finish and a red sweep second hand.

H. Wire guards shall be provided to protect the clocks from inadvertent damage in applicable areas. Wire guards shall be plated and clear coated for corrosion resistance and optimal appearance. The finish on the guards shall be designed to protect them wherever they are used, internal or external. Guards shall be hinged for easy access to the clocks.

2.2 SYSTEM REQUIREMENTS

A. Master Clock with Wireless Transmitter, Rack Mount, Wall Mount Antenna, 4 Programmable Relays/ Zones

B. All clocks shall be Digital or analog.

C. All Digital Clocks shall be Wireless 4" Digit display, 4 Digit, 24v, White Display Surface Wall Mount.

D. All Analog clocks shall have a metal case with brass clock mechanism.

E. All Clocks in new construction shall be surface mounted.

F. All Classrooms shall be provided with a 12" Analog, Wireless, Battery operated Clock.

G. Existing facilities shall receive a Master Clock capable of correcting existing wired clocks as well as new wireless clocks simultaneously.

H. All Clocks in existing facilities receiving additions and/or renovations shall be wireless correcting Digital or Analog.

I. The Master Clock/ Wireless Transmitter must be able to get Time Synchronization using Global Positioning Satellites (GPS) or Network Timeserver (NTP) receiver.

J. The Clock system shall be designed so the clocks in each applicable MDF and/or IDF wiring boundary are 24 VAC cabled from the applicable MDF and/or IDF.

K. All MDF and/or IDF rooms shall be provided with a power supply.

L. No power supply shall serve more than 10 clocks in a single system. If more than 10 clocks are present, an additional power supply shall be provided in the applicable MDF and/or IDF.

M. All Clocks installed in hallways shall be installed approximately every hundred (100) feet. The exact location and placement of the clocks shall be coordinated with the design of the applicable facility/area where the clocks are being installed.

N. All Clocks installed in the gymnasiums and other applicable areas (Elementary School Cafeterias, exterior locations, etc.) shall be installed with a wire guard to protect them from inadvertent damage.

O. The mounting height of all clocks shall be coordinated with the design of the applicable facility/area where the clocks are being installed.

P. The exact quantity and location of all clocks shall be coordinated with the design of the applicable facility/area where the clocks are being installed.

Q. At a minimum, the following spaces shall be provided with the following:

1. Corridors: Digital Clock Wireless Correcting, 4” Digit display, 4 Digit, 24v, White Display Surface Wall Mount
2. Gymnasiums: Analog 15”, wireless correcting 24v, round surface mount with wire guard.
3. Cafeteria, Dining Area: Digital Clock Wireless Correcting, 4” Digit display, 4 Digit, 24v, White Display Surface Wall Mount
4. Cafeteria, Serving Line Area: Digital Clock Wireless Correcting, 4” Digit display, 4 Digit, 24v, White Display Surface Wall Mount
5. Libraries: Digital Clock Wireless Correcting, 4” Digit display, 4 Digit, 24v, White Display Surface Wall Mount
6. Admin Areas: Digital Clock, Wireless Correcting, 4” Digit display, 4 Digit, 24v, White Display Surface Wall Mount
7. Studios and Learning Spaces: 12” Analog, Wireless Correcting, Battery operated Clock

2.3 CLOCK CORRECTION SIGNAL

A. A Master clock shall be installed in the MDF room to provide wireless clock correction and shall be synced to the District time server.

1. The Clock system shall be designed so the clocks in each applicable MDF and/or IDF wiring boundary are cabled from the applicable MDF and/or IDF.

2. Clocks with built in clock correcting repeaters may be installed to extend clock correcting signal throughout main building and additions

3. A Wireless clock correcting repeater may be installed to provide clock correction to outside additions & portables

2.4 CLOCK SYSTEM LABELING

A. All clocks shall be labeled with the same designation as the clock cables.

B. The clock system designation shall consist of four fields with a dash between each field.
1. The first field shall identify the wiring closet origination of the cable. This field will be a letter of the alphabet with the MDF always being A, IDF 1 being B, IDF 2 being C, IDF 3 being D, etc.
2. The second field shall be a 1 – 3 digit cable number that is unique for a particular wiring closet. The first cable in a wiring closet shall be 1, the second cable shall be 2, the third cable shall be 3, etc.
3. The third field shall be a 1 – 5 character alphabetic field to identify the system the cable supports. For the clock system, it will be C.
4. The fourth field will be a numeric character to identify a particular daisy-chained cable within that daisy-chained group.

Example:

	1st	2nd	3rd	4t
MDF ------clock--------clock---------clock-------clock				
A-1-C	A-1-C-1	A-1-C-2	A-1-C-3	A-1-C-4

PART 3 - EXECUTION

3.1 INSTALLATION

A. The Clock System shall be installed in accordance with the manufactures recommendations and instructions.

B. The Clock System shall be installed and configured in accordance to the District's direction.

3.2 CERTIFICATION

A. Upon completion of testing, the manufacturer or his representative shall issue to the Owner a letter of Certification attesting to the fact he has tested and adjusted the system, that all components are properly installed and free of defects and that the system in installed in compliance with this specification and the manufacturer requirements.

3.3 LABELING

A. A labeling system correlation chart shall be posted in the each MDF next to the PA system punch down blocks. This chart shall map each clock system cable number to the clocks installed on the cable. The chart shall also match the clock cable number to a room number or area description i.e., Library, Corridor # 100, Admin Area, Cafeteria, Gymnasium, etc.

3.4 ACCEPTANCE

A. All systems must be installed and functional, test results, documentation, drawings and warranty information provided prior to any site being accepted.

B. Test each device and record results in Project Closeout Documentation cut sheet. Test plan will be provided prior to cutover.

END OF SECTION 275313

SECTION 271300 - PUBLIC ADDRESS SYSTEM

Project design teams shall utilize this "Standards" document to create Specifications 275319 for each project. Coordinate final draft with Owner.

AUSTIN Independent School District

Public Address Standards

for

New Facility Construction or Renovations

Version 2023.06.28

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REVISION LOG

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PART 1 - DOCUMENT PURPOSE

1.01 The Austin Independent School District (hereby referred to as Austin ISD) Public Address Standard is a guideline for public address hardware, cabling and the associated rough-in to be applied by the design team when designing public address systems in new facilities and renovated facilities alike. Information herein is applicable to the Technology Consultant, Architect, MEP, and contractors, and shall be used as a design guideline for each project by all design team members.

1.02 Designers shall not deviate from this standard without explicit written approval from the Austin ISD Network Support Services Department.

1.03 Any deviations shall immediately be brought to the attention of the owner's representative in writing for resolution.

1.04 Where means, methods, and best practices are mentioned, contractor shall follow the manufacturer's and owner's requirements, industry standards, or code, whichever is most stringent.

1.05 Basic contractor qualifications are set forth but may be made more stringent as applicable to each project based upon size and scope.

1.06 A Division 27 – Public Address System specification and T-Series drawings shall be commissioned and issued by the Design Team during the design phases for each facility or project. Drawings and specifications shall depict speaker and call button locations, device types, cabling required, rough-in required and speaker zoning.

PART 2 - DOCUMENT HISTORY

2.01 This document supersedes all previous standards which have been fully reevaluated and described herein by the Austin ISD Network Support Services Department.

2.02 The contents of the standards were derived by the assembly and input from the Austin ISD Network Support Services Department in conjunction with applying current industry standards.

PART 3 - CONTRACTOR QUALIFICATIONS

3.01 Contractor shall have been in business, installing public address systems, for a minimum of 5-years preceding this project.

3.02 Contractor and staff shall possess relevant past-experience and references for a minimum of (5) projects of similar size and scope to that of the Austin ISD project being designed.

3.03 Contractor shall submit a certification from the manufacturer for the product specified indicating that the installing company is an authorized installer/dealer and is capable of providing a manufacturer's warranty.

3.04 Contractor shall have a local office within a 30-mile radius of the project site.

3.05 Sub-contractors to the primary public address contractor shall meet the same requirements for the primary public address contractor as identified above. All sub-contractors shall be identified and approved by Austin ISD prior to any bid for work.

PART 4 - WARRANTY ON PARTS AND LABOR.

4.01 The contractor shall furnish a minimum of a (1) year warranty for the public address system and associated components.

4.02 All labor and workmanship shall carry a minimum warranty period of (1) year from the date of final system acceptance.

4.03 Defects in material or workmanship appearing within this period of time, shall be promptly repaired without cost to Austin ISD.

PART 5 - PUBLIC ADDRESS STANDARDS

5.01 Acceptable manufacturers shall be as follows:

A. New Construction or Replacement Facilities – Rauland TelecenterU Hybrid IP

B. Renovated Facilities – Telecor XL or eSeries Hybrid IP

1. Description

a. Provide a programmable and addressable system to every occupied space and to the exterior of the building.

b. Provide for 2-way communications to every interior occupied space. Exterior spaces do not require 2-way communication.

c. Provide activation of security monitoring functions on a per room basis and per zone basis. Amplified two-way voice communications shall be available from any dial phone in the system, through any speaker in the system. This shall allow hands-free communication to any classroom or any individual loudspeaker unit. A programmable pre-announce tone shall sound immediately before the intercom path is open and a supervisory tone shall sound at regular intervals when speaker monitoring is active.

d. The public address system shall provide for bell changes and shall be capable of storing events, schedules, programmable holidays, bells silenced, etc.

e. Provide for integration with the synchronized wireless clock system.

f. Provide for integration with the audio | visual systems allowing for “Priority Page Override” capability.

g. Integrate with AISD’s VoIP phone system (Cisco).

2. All new or replacement facilities shall have a Rauland TelecenterU hybrid IP public address system, consisting of interior and exterior speakers, call buttons and associated cabling.

a. Common areas such as corridors, toilet rooms/restrooms, cafeterias, libraries, gymnasiums, reception and similar shall have analog paging speakers, cabled in a daisy-chain fashion, with a maximum of (8) speakers on one zone. Speakers shall be a maximum of 30-feet apart (on center).

b. Exterior areas such as bus loops for loading/unloading of students, parent drop-off, common exterior learning areas and playgrounds shall have flush-mounted exterior speakers on an exterior paging zone. Speakers shall be a maximum of 100-feet apart (on center).

c. Classrooms, studios, private offices, conference/huddle/small group rooms, PLC's and other learning spaces shall have an IP paging speaker (one minimum, additional as required) and call button that supports both a normal call (to the administrative area), and an emergency call (in support of SB838), adjacent to the teaching location. All call buttons locations shall have a single-gang backbox with single-gang mud ring and 1-inch EMT conduit recessed in the wall.

3. All existing facilities shall be an expansion of the existing Telecor XL analog or eSeries hybrid IP public address system (depending on campus), consisting of interior and exterior speakers, call buttons and associated cabling.

a. Common areas such as corridors, toilet rooms/restrooms, cafeterias, libraries, gymnasiums, reception and similar shall have analog paging speakers, cabled in a daisy-chain fashion, with a maximum of (8) speakers on one zone. Speakers shall be a maximum of 30-feet apart (on center).

b. Exterior areas such as bus loops for loading/unloading of students, parent drop-off, common exterior learning areas and playgrounds shall have flush-mounted exterior speakers on an exterior paging zone. Speakers shall be a maximum of 100-feet apart (on center).

c. Classrooms, studios, private offices, conference/huddle/small group rooms, PLC's and other learning spaces shall have an IP paging speaker (one minimum, additional as required) and call button that supports both a normal call (to the administrative area), and an emergency call (in support of SB838), adjacent to the teaching location.

4. Cabling and Rough-in Requirements

a. All analog speaker zones shall be cabled to the nearest MDF/IDF with 2-pair shielded cabling with a yellow cable jacket. Cabling shall be terminated on a wall mounted 66-block at the MDF/IDF side.

b. All IP speakers shall be cabled to the MDF/IDF Room serving the area with a Category 6 UTP cable with a yellow cable jacket, terminated on a yellow Category 6 modular jack at the speaker side, and on a yellow Category 6 modular jack at the patch panel side.

c. All public address system cabling shall be installed following the same pathway and requirements as the Division 27 Communications.

d. All pathways shall be sized according to the manufacturer specifications and provide for 30% growth without exceeding the 40% fill rate.

e. All cabling shall be properly supported from the structure using j-hooks.

f. J-hooks shall be installed every 4-5 feet on center starting at the end of the wire basket cable tray.

g. J-hooks shall be installed utilizing appropriate hardware to support, join and attach j-hooks to structures.

h. No grid wire shall be utilized for support. J-Hooks shall be mounted to the structure.

i. Provide spare conduits at bulk heads, furr downs and at hard ceiling areas separating sections of buildings. Intent is to provide a future cabling pathway through inaccessible areas.

j. All labels for public address system cabling shall be typed (not handwritten).

k. All speakers installed in drop or acoustical-type ceiling tiles (2x2 grid) shall be installed in a tile replacement fashion and supported from the structure above with grid wire.

l. All speakers installed in a gypsum or hard lid ceiling shall be installed in a manufacturer approved baffle box, appropriately supported from the gypsum, or structure above.

m. All speakers installed in interior walls shall be flush mounted to the wall surface and utilize a Quam ES-8 speaker backbox recessed within the wall cavity or CMU, with 1-inch EMT conduit stubbed to nearest accessible ceiling.

n. All speakers installed in exterior walls shall be flush mounted to the wall surface and utilize an Atlas 161RES speaker backbox recessed within the masonry, with 1-inch EMT conduit stubbed to nearest accessible ceiling.

o. All call buttons locations shall have a single-gang backbox with single-gang mud ring and 1-inch EMT conduit recessed in the wall.

5. Power Requirements

a. All electrical service outlets shall be labeled with the associated panel and circuit information.

b. Power shall be dedicated to the paging system head-end.

1) The MDF shall be equipped with a minimum of (1) dedicated 120 VAC 20 Amp circuit at the paging amplifier location.

2) Each IDF shall be equipped with a minimum of (1) dedicated 120 VAC 20 Amp circuit at the paging amplifier location.

5.02 Labeling

1. Coordination with and approval by the Austin ISD Network Support Services Department is required on the specific site labeling schema.

2. All labels shall be typed (not handwritten).

3. Verify room numbers and confirm the final room numbering scheme prior to generating labels.

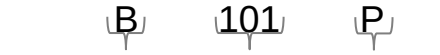
4. Horizontal Cables shall be labeled within 12 inches from the termination point inside the MDF/IDF.

5. Horizontal Cables shall be labeled within 6 inches from the termination point at the speaker/call button end.

6. Horizontal 2-pair cables shall be labeled identically at each end with origin room number, destination room number, and pair numbers, under each pair termination. (i.e. MDFA150-STUDIOB133-PR 3-4)

7. Horizontal Category 6 cables shall be labeled identically at each end with Room Designator and port number, with a hyphen separator. (i.e. B-101).

8. Individual ports on each patch panel shall be labeled sequentially with Room Designator (MDF-A, IDF1 -B, etc), port number (three digits, ports numbered consecutively across all patch panels in the room) and device/port type (IP Speaker-P). (i.e. B101C).



Example

9. 66-type blocks shall contain the destination room number and speaker number under each pair termination. (i.e. STUDIOB133-SP1). 66-type block labels shall be printed on product-specific label strips and placed into label holders.

5.03 Testing

A. All test results shall be submitted to the owner along with all other final documentation. Test results shall be submitted in both PDF format and the Native Tester format along with the software needed to read the Native Tester Format.

B. Terminated Category 6 UTP cable links shall be tested in accordance with applicable industry standards and manufacturer certification requirements for Category 6 compliance with approved field tester(s) that are within their calibration period.

C. Terminated 2-pair cable shall be tested for polarity.

5.04 As-Built Documentation

A. Produce drawings depicting the location of Public Address System components and zoning as installed, produced in AutoCAD 2010 or higher and provided electronically in .DWG and .PDF format. Include the exact locations of head-end equipment in the MDF/IDF Room(s), horizontal cable pathways, speaker/call button locations, and numbering and labeling scheme.

B. A half-size hard copy of the as-built drawings for the applicable region served by the MDF and/or IDFs shall be provided in MDF and each IDF for reference.

C. Produce soft copy of all test results for each cable, to include technician's name and date stamp, a list of tested cables, and the individual results for each cable tested. Test results shall be furnished to Austin ISD in .PDF and native file format at the conclusion of the project.

PART 6 - SUMMARY OF STANDARDS

6.01 Summary

A. All aspects of this Austin ISD Public Address Standard shall be applied to the design process for new, leased and renovated facilities.

B. A Division 27 specification and T-Series drawings for the Public Address System shall be commissioned and issued by the Architect during the design phases for each facility or project.

END OF STANDARD

CONDUCTORS AND CABLES FOR SECURITY SYSTEMS
SECTION 280510

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Division 1 – General Requirements shall apply to this section. Unless this section contains statements which are more definitive than those contained in the General Requirements, this section shall not be interpreted as waiving or overruling any requirements expressed in the General Requirements.

B. This Section is a Division 28 Security System Basic Materials and Methods section and shall apply to each section making reference to Work specified herein.

1.02 REFERENCES

A. City of Austin and State of Texas Building, Life Safety, and Fire Codes

B. Underwriter's Laboratories (UL) Applicable Standards

C. National Electrical Code (NEC)

D. Insulated Cable Engineers Association (ICEA)

E. Institute of Electrical and Electronics Engineers (IEEE)

F. Electronic Industries Alliance (EIA)

G. Telecommunications Industry Association (TIA)

H. ETL Testing Laboratories (ETL)

I. Canadian Standards Association (CSA)

1.03 SUMMARY

A. Provide wire and cable for electronic security systems.

1.04 RELATED WORK

A. Coordinate the installation with the following related Sections.

1. Division 26 – Electrical

2. Section 27 13 00 – Communications Cable Plant

3. Division 28 Security System Basic Materials and Methods sections including the following:

a. Section 28 05 30 – Pathways for Security Systems

b. Section 28 05 55 – Identification for Security Systems

c. Section 28 08 10 – Submittals for Security Systems

d. Section 28 08 40 – Acceptance Testing of Security Systems

4. Section 28 13 00 – Access Control System

5. Section 28 16 00– Intrusion Detection System

6. Section 28 23 00– Video Surveillance System

1.05 QUALITY ASSURANCE

A. Contractor Qualifications

1. The Contractor providing structured data and voice communication cables shall meet requirements of specification 271300.

2. The Contractor shall provide factory-certified technicians. Certified technicians shall install and supervise installation, commissioning, and maintenance of the Work. All installing personnel shall be licensed as required by local and/or state jurisdictions.

3. The Contractor shall have a minimum of five years experience in the installation of conductor and cable systems of similar complexity as specified herein.

4. The Contractor shall have installed the specified products in at least three projects of the type and complexity specified herein.

5. The Contractor shall ensure compliance with and have a thorough understanding of all local codes and contract conditions pertaining to the Work.

6. The Contractor shall have local in-house engineering and project management capabilities consistent with the requirements of the Work.

B. Product Standards

1. Materials shall be new and shall fully comply with the latest published specifications and versions of the manufacturer.

2. Equipment, components and materials provided by the Contractor shall meet or exceed the performance characteristics and technical specifications for referenced components.

3. The Contractor shall provide complete and detailed technical information for materials. The Owner or its representatives will reject proposed materials in the event that submitted technical information is not sufficient to readily confirm that proposed materials will meet or exceed the performance and

technical specifications. The Owner or its representatives shall make the final decision as to whether proposed materials are acceptable. In no case shall acceptance by the Owner or its representatives of proposed materials relieve the Contractor of his/her responsibility to produce completed systems, which comply with this Section.

1.06 WARRANTY

A. Furnish a one-year warranty for the Work. The Warranty shall begin after acceptance of the Work by the Owner.

B. If, within one year after the date of final acceptance of the Work or within such longer period of time as may be prescribed by law, or by the terms of any applicable special warranty required by the Contract Documents or provided by a manufacturer, any of the Work or equipment is found to be defective or not in accordance with the Contract Documents, the Contractor shall correct it promptly including all parts and labor after receipt of notice from the Owner to do so unless the Owner or its representative has previously given the Contractor a written acceptance of such condition. This obligation shall survive termination of the Contract. The Owner will give notice of such conditions promptly after discovery. Owner representatives shall furnish such notice either verbally or in writing.

C. Nothing contained in the Contract Documents shall be construed to establish a shorter period of limitation with respect to any other obligation which the Contractor might have under the Contract Documents or any manufacturer's warranty.

D. The establishment of the time period of one year after the date of final acceptance of the Work or such longer period of time as may be prescribed by law or by the terms of any warranty required by the Contract Documents, relates only to the specific obligation of the Contractor to correct the Work or equipment, and has no relationship to the time within which its obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to its obligations other than specifically to correct the Work or equipment.

1.07 SEQUENCE AND SCHEDULING

A. The Contractor shall review the construction and completion schedules and shall coordinate execution of the Work as defined in the Contract Documents with all other contractors and service providers engaged by the Owner and their representatives for the Work.

PART 2 - PRODUCTS

A. Minimum Specifications

1. Conductors and cable shall be UL approved for its intended application and shall meet all national, state, and local code requirements for its application.

2. Conductors and cable shall meet individual security system manufacturer specifications.

3. Provide plenum rated conductors and cable as required by code.

4. Provide cable specifically designed for direct burial applications where cable must be run in underground conduit.

5. Conductors and cable shall conform to the minimum requirements of ICEA standards.

6. Conductors and cable shall comply with the applicable requirements of the latest edition of the NEC for construction and usage.

7. Conductors shall be copper and have conductivity in accordance with the standardization rules of the IEEE. Each conductor shall be round and free of kinks and defects.

8. Provide shielded conductors and cable as required by the manufacturer or as required to provide for interference-free signals.

9. Conductor and cable insulators shall be rated for a minimum of 300 volts.

10. Color coding shall be accomplished by using solidly colored insulation. Grounding conductors, where insulated, shall be colored sold green or identified with green color as required by NEC.

11. Patch Cables

    a. Provide pre-manufactured patch cables (cable, connectors, boots, etc.) as required to connect security systems.

    b. Patch cables shall be certified for their specific use to meet or exceed applicable industry specifications (e.g. EIA/TIA, ETL, UL, CSA, etc.).

    c. Provide cable lengths as necessary to neatly route cables through cable management systems and other cable organization systems.

    d. Provide connectors as required for proper termination. Provide boots for connectors where applicable to prevent snagging.

    e. Cable jacket color shall be white.

B. Minimum Conductor and Cable Types and Sizes

1. Low Voltage Power Cable

    a. 18 AWG, twisted, stranded, insulated, jacketed, and shielded to prevent interference or signal contamination of adjacent signal circuits.

    b. Increase conductor size to be consistent with circuit current ratings and manufacturers' recommendations.

2. Card Reader Cable

    a. 22 AWG, stranded, individually shielded twisted pairs, insulated, and jacketed.

3. Keypad Cable

    a. 18 AWG (6 conductors minimum), stranded, insulated, and jacketed.

4. Alarm Point Monitoring Cable

    a. 22 AWG (4 conductors minimum), stranded, insulated, and jacketed.

5. Siren, Speaker, and Control Point Cable

    a. 18 AWG, stranded, insulated, and jacketed.

    b. Increase conductor size to be consistent with circuit current ratings and manufacturers' recommendations.

6. Addressable Data Cables

    a. 18 AWG (6 conductors minimum), unshielded, twisted, insulated, and jacketed.

    b. Portable Buildings: 22 AWG (4 conductors minimum), unshielded, twisted, insulated, and jacketed.

7. Closed Circuit Television Cameras

    a. Interior Dome Cameras

        1) Provide one data cable in accordance with Section 27 13 00.

    b. Exterior Dome Cameras

        1) Provide one data cable in accordance with Section 27 13 00.

8. Coaxial Cable

    a. Coaxial cables shall only be used in applications where analog cameras with coaxial termination must be used.

    b. Provide coaxial cable no more than two feet from the camera to the unshielded twisted pair converter (e.g. network interface, twisted pair cable interface, etc.).

    c. Coaxial cables with copper coated steel center conductors shall not be acceptable.

    d. Coaxial cable connectors shall consist of three-piece crimp BNC connectors.

PART 3 - EXECUTION

3.01 COORDINATION

A. Coordinate The following:

1. Final termination locations and installation and operational requirements.

2. Cable and conductor labeling.

3. Cable jacket and conductor insulator colors.

3.02 INSTALLATION

A. Wire installation is not specifically detailed in the Contract Documents. Determine conductor requirements for each device in accordance with the Contract Documents.

B. Install cable in accordance with security system manufacturer requirements and NEC.

C. Color code conductors consistently as follows:

1. Red for positive and black for negative DC power leads.

2. White for positive and green for negative alarm loop conductors.

D. Wiring above accessible ceilings may be run exposed, any other wire shall be in conduit.

E. Arrange cables within access panels to allow for removal of the access panel and access to equipment within the panel.

F. Neatly route cables parallel or perpendicular to building lines.

G. Provide J hooks and other cable support systems (spaced at **regular** intervals) within accessible ceiling spaces. Fasten cables to the cable support systems and provide strain relief to protect cables and ensure compliance with required cable bends.

H. Cable trays may be used where available and code allows.

I. Provide plenum rated cable within accessible ceiling and raised floor plenum spaces.

J. Provide cable specifically designed for direct burial applications where cable must be run in underground conduit.

K. Keep cable not run in conduit a minimum of 18” from high voltage (120 VAC and above) circuits (e.g. light fixtures, wire run parallel with conduit, transformers, electric panels, etc.).

L. Run cables at least six inches from the communications cable plant, intercom wires, light fixtures, and 120 VAC power wires, input/output wires, and siren wires.

M. Route wire and cable as required to prevent interference and signal contamination of both Security Systems cable and cable associated with other systems. Coordinate the routing of wire and cable requiring isolation from power, radio frequency (RF), telephone, etc. with the Architect.

N. Provide sleeves and code compliant fire proofing techniques for all penetrations of fire rated partitions, masonry walls, and slabs, where the penetrations are made by or used for installation of Security Systems.

O. Separate high voltage (120 VAC and above) cables from low voltage cables within enclosures.

P. Provide wire ties to neatly bundle and wrap all wire and cable and to firmly attach control cables (keyboard, mouse, etc.) to prevent unintentional disconnection.

Q. Fasten cables to the building structure at least every 5 feet where not in conduit. Do not lay or fasten cables to electrical conduits, light fixtures, piping, mechanical equipment, or ceiling grids.

R. Run wire and cable continuous from device location to the final point of termination. No mid-run cable splices will be allowed except where cables must transition from one type to another (e.g. underground cable to plenum cable). Provide the following where cable transitions are required:

1. Provide terminal strips inside lockable cabinets at cable transition locations and document locations in the submittals.

2. Label terminal cabinets and document labels in record documentation.

3. Provide the same number of conductors and insulator colors for each cable type from the security device to the DGP location.

S. Visually inspect wire and cable for faulty insulation prior to installation.

T. Provide bushings, grommets, and strain relief material where necessary to avoid abrasion of wire and excess tension on wire and cable.

U. Make solderless device connections mechanically and electrically secure in accordance with the manufacturers' recommendations.

V. Fiber Optic Cable

1. Furnish and install fiber cable to provide ample slack at the device terminating end of the cable to provide service access. Bundle and wrap extra cable (approximately 5 feet).

2. At no time shall any fiber optic cable be subjected to a bend less than a six-inch radius or as recommended by the cable manufacturer.

W. Component Connections

1. Prepare wire ends for attachment to components in accordance with manufacturer recommendations.

2. Wire nuts shall not be an acceptable means of connecting wire and cable.

3. Make cable connection for device terminations with crimp type connectors. Connectors shall provide a hermetic seal and test probe access such that the circuit may be checked without breaking the connection.

3.03 TESTING

A. Test all conductors for continuity, grounds, and shorts.

B. Test and document all data and voice communications cable in accordance with Section 271300.

1.

END OF SECTION 280510

PATHWAYS FOR SECURITY SYSTEMS
SECTION 280530

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Division 1 – General Requirements shall apply to this section. Unless this section contains statements which are more definitive than those contained in the General Requirements, this section shall not be interpreted as waiving or overruling any requirements expressed in the General Requirements.

B. This Section is a Division 28 Security System Basic Materials and Methods section and shall apply to each section making reference to Work specified herein.

1.02 PERMITS

A. The Contractor shall ensure compliance with an understanding of all local codes and contract conditions and obtain all permits necessary pertaining to the Work.

1.03 REFERENCES

A. City of Austin and State of Texas Building, Life Safety, and Fire Codes.

B. Underwriter's Laboratories (UL) Applicable Standards

C. National Electrical Code (NEC)

1.04 SUMMARY

A. Provide pathways for electronic security systems.

1.05 RELATED WORK

A. Coordinate the installation with the following related Sections.

1. Division 26 – Electrical

2. Section 27 13 00 – Communications Cable Plant

3. Division 28 Security System Basic Materials and Methods sections including the following:

a. Section 28 05 10 – Conductors and Cables for Security Systems.

b. Section 28 05 55 – Identification for Security Systems.

c. Section 28 08 10 – Submittals for Security Systems.

d. Section 28 08 40 – Acceptance Testing of Security Systems.

4. Section 28 13 00 – Access Control.

5. Section 28 16 00 – Intrusion Detection.

6. Section 28 23 00 – Video Surveillance.

1.06 QUALITY ASSURANCE

A. Product Standards

1. Materials provided by the Contractor shall meet or exceed the performance characteristics and technical specifications for referenced materials.

2. The Contractor shall provide complete and detailed technical information for materials. The Owner or its representatives will reject proposed materials in the event that submitted technical information is not sufficient to readily confirm that proposed materials will meet or exceed the performance and technical specifications. The Owner or its representatives shall make the final decision as to whether proposed materials are acceptable. In no case shall acceptance by the Owner or its representatives of proposed materials relieve the Contractor of his/her responsibility to produce completed systems, which comply with this Section.

1.07 WARRANTY

A. Furnish a one-year warranty for the Work. The Warranty shall begin after acceptance of the Work by the Owner.

B. If, within one year after the date of final acceptance of the Work or within such longer period of time as may be prescribed by law, or by the terms of any applicable special warranty required by the Contract Documents or provided by a manufacturer, any of the Work or equipment is found to be defective or not in accordance with the Contract Documents, the Contractor shall correct it promptly including all parts and labor after receipt of notice from the Owner to do so unless the Owner or its representative has previously given the Contractor a written acceptance of such condition. This obligation shall survive termination of the Contract. The Owner will give notice of such conditions promptly after discovery. Owner representatives shall furnish such notice either verbally or in writing.

C. Nothing contained in the Contract Documents shall be construed to establish a shorter period of limitation with respect to any other obligation which the Contractor might have under the Contract Documents or any manufacturer’s warranty.

D. The establishment of the time period of one year after the date of final acceptance of the Work or such longer period of time as may be prescribed by law or by the terms of any warranty required by the Contract Documents, relates only to the specific obligation of the Contractor to correct the Work or equipment, and has no relationship to the time within which its obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor’s liability with respect to its obligations other than specifically to correct the Work or equipment.

E. Furnish written notice to the Owner documenting any Work performed during the warranty period, including any preventive maintenance Work performed.

F. The Owner reserves the right to expand or add to the system during the warranty period using firm(s) other than the Contractor for such expansion without affecting the Contractor’s responsibilities, provided that the expansion is done by a firm which is an

authorized dealer or agent for the equipment or system being expanded. Contractor shall not be responsible for maintenance of equipment installed by other firms.

1.08 SEQUENCE AND SCHEDULING

A. The Contractor shall review the construction and completion schedules and shall coordinate execution of the Work as defined in the Contract Documents with all other contractors and service providers engaged by the Owner and their representatives for the Work.

PART 2 - PRODUCTS

A. Provide security system raceways in accordance with Division 28 Basic Materials and Methods requirements.

PART 3 - EXECUTION

3.01 COORDINATION

A. Coordinate the following:

1. Device backbox locations.

2. Raceway locations and installation requirements.

3. Raceway sizes and termination points.

4. Installation and aesthetic details.

3.02 INSTALLATION

A. Conduit Rough In

1. Provide conduit rough in for card reader controlled doors as indicated in the Drawings.

2. Provide pull strings in all conduits.

3. Conceal conduits within walls, floors, and ceilings.

4. Where surface mounted conduit must be used, coordinate conduit requirements and installation with the Architect. Surface mount conduit installations shall be approved by the Architect.

5. Renovation

a. Coordinate with the security contractor to provide adequate raceways for security systems.

b. For interior public areas where surface mounted conduit must be provided, provide Wiremold or equal metallic surface mounted raceways. Provide fittings and connectors as necessary to connect backboxes and other conduit systems. Fasten raceways in accordance with manufacturer recommendations.

c. For wall mounted devices located in exterior public areas, provide concealed raceways (poke-through conduits, sleeves, cores, etc.) from device backboxes to interior spaces.

d. Coordinate surface mount conduit applications with the Architect for approval.

B. Provide conduit between 120 VAC power sources provided under a separate section and low voltage power supplies.

C. Provide conduit from interface terminal cabinets to security pull boxes.

D. Attach conduit and boxes to structural components with hangers and fittings designed specifically for the purpose.

E. No exposed conduit shall be installed unless approved by the Owner/Architect.

F. Carefully install conduit, properly and adequately support conduit as required to comply with the requirements specified herein, within Division 28, and as required by the NEC, and provide a neat, workmanlike installation. Neatly route conduit parallel or perpendicular to building lines. Support horizontal conduit runs with clamps, pipe straps, special brackets, or heavy iron ties secured to building structure.

G. Drill required inserts and saw cut or core drill openings required through concrete or masonry with tools specifically designed for this purpose.

H. Swab out and remove all burrs from conduit before pulling any wires. Provide bushings on conduit ends to protect cables.

I. Lay out and install conduit runs to avoid proximity to hot pipes. In no case shall a conduit be run within three inches of such pipes, except where crossings are unavoidable, and then the conduit shall be kept at least two inches from the covering of the pipe crossed.

J. Provide fire stops where conduits penetrate fire rated walls and/or floors.

K. The Owner/Architect shall approve all conduit installation prior to installation.

L. Provide tamper resistant screws or fasteners for junction boxes located in accessible and/or public areas.

END OF SECTION 280530

IDENTIFICATION FOR SECURITY SYSTEMS
SECTION 280555

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Division 1 – General Requirements shall apply to this section. Unless this section contains statements which are more definitive than those contained in the General Requirements, this section shall not be interpreted as waiving or overruling any requirements expressed in the General Requirements.

B. This Section is a Division 28 Security System Basic Materials and Methods section and shall apply to each section making reference to Work specified herein.

1.02 SUMMARY

A. Provide identification for Security Systems

1.03 RELATED WORK

A. Coordinate the installation with the following related Sections.

1. Section 08 71 00 – Finish Hardware
2. Section 27 13 00 – Communications Cable Plant
3. Division 28 Security System Basic Materials and Methods sections including the following:
    a. Section 28 05 10 – Conductors and Cables for Security Systems.
    b. Section 28 05 30 – Pathways for Security Systems.
    c. Section 28 08 10 – Submittals for Security Systems.
    d. Section 28 08 40 – Acceptance Testing of Security Systems.
4. Section 28 13 00 – Access Control.
5. Section 28 16 00– Intrusion Detection.
6. Section 28 23 00– Video Surveillance.

1.04 SEQUENCE AND SCHEDULING

A. The Contractor shall review the construction and completion schedules and shall coordinate execution of the Work as defined in the Contract Documents with all other contractors and service providers engaged by the Owner and their representatives for the Work.

PART 2 - PRODUCTS

A. CONDUCTOR AND CABLE LABELS

1. Provide T&B Shrink-Kon Type HVM or equal labels.

2. Labels shall be computer generated and fastened to conductors/cables with transparent heat shrink material. Hand-written labels shall not be accepted.

3. See Communication Cable Plant 271300 for cabling color coding requirements

B. EQUIPMENT LABELS

1. Engraved plastic with contrasting letter colors.

2. Fasten labels with permanent adhesive.

PART 3 - EXECUTION

3.01 COORDINATION

A. Coordinate identification requirements with the Owner.

3.02 LABELING

A. Label cables, equipment, panels, enclosures, addressable modules, and power supplies with permanent markings to indicate system zone, partition, and circuit, and coordinate labels with Record Documentation.

B. Label wires and cables as follows:

1. Mark all wire and cable in common at both ends.

2. Place wire identification numbers 12 inches from the ends of each cable by using sleeve type, heat shrinkable markers.

3. Install markers to be readable from left to right or top to bottom. Locate labels near termination points.

4. Install labels when wire and cables are installed.

5. Labeling shall agree with record documentation.

C. Cable Labeling Scheme

1. General

a. The labeling scheme shall identify the type of cable (Access Control, CCTV, and Security), the MDF/IDF where the cable terminates, and a unique cable number.

b. The labeling scheme shall not utilize room names and/or numbers as designations.

2. Label Definition

   a. The method for labeling each type of cable is given below with an example.

      1) Label cables with by three fields with a dash between each field.

      2) The first field shall consist of a single letter designation to identify the IDF/MDF Closet where the cable terminates.

      3) The second field shall consist of a one to three digit unique cable number.

      4) The third field shall consist of a one to five character alphabetic field to identify the cable type.

      5) Examples

         a) Cable number A-100-ACS where:

            (1) A represents the MDF Room

            (2) 100 is the unique cable number and

            (3) ACS represents an access control system cable.

         b) Cable number B-103-CCTV where:

            (1) B represents IDF B

            (2) 103 is the unique cable number and

            (3) CCTV represents a video surveillance system cable.

         c) Cable number C-110-IDS where:

            (1) C represents IDF C

            (2) 110 is the unique cable number and

            (3) IDS represents an intrusion detection system cable.

END OF SECTION 280555

SUPPLEMENTARY SUBMITTAL REQUIREMENTS
SECTION 280810

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Division 1 – General Requirements shall apply to this section. Unless this section contains statements which are more definitive than those contained in the General Requirements, this section shall not be interpreted as waiving or overruling any requirements expressed in the General Requirements.

B. This Section is a Division 28 Security System Basic Materials and Methods section and shall apply to each section making reference to Work specified herein.

1.02 SUMMARY

A. Provide pre-fabrication submittals and record documentation for Security Systems.

1.03 RELATED WORK

A. Refer to Division 1 for submittal schedule and quantity requirements and submittal procedures.

B. Coordinate the installation with the following related Sections.

1. Section 27 13 00 – Communications Cable Plant.

2. Division 28 Security System Basic Materials and Methods sections including the following:

a. Section 28 05 10 – Conductors and Cables for Security Systems.

b. Section 28 05 30 – Pathways for Security Systems.

c. Section 28 05 55 – Identification for Security Systems.

d. Section 28 08 40 – Acceptance Testing of Security Systems.

3. Section 28 13 00 – Access Control.

4. Section 28 16 00– Intrusion Detection.

5. Section 28 23 00– Video Surveillance.

1.04 SEQUENCE AND SCHEDULING

A. The Contractor shall review the construction and completion schedules and shall coordinate execution of the Work as defined in the Contract Documents with all other contractors and service providers engaged by the Owner/Architect and their representatives for the Work.

PART 2 - PRODUCTS

2.01 PRE-FABRICATION SUBMITTALS

A. General Description and Requirements

1. Refer to Division 1 for submittal quantity requirements. Submit a minimum of three copies.

2. Pre-fabrication submittals shall consist of Product Data, Shop Drawings, Samples, and a detailed completion schedule. Partial submittals will not be accepted without prior written approval of the Owner/Architect.

3. Review of the pre-fabrication submittals by the Owner/Architect is for purposes of tracking the Work and contract administration, and shall not relieve the Contractor of responsibility for any deviation from the Contract Documents, or from providing equipment and / or services required by the Contract Documents which were omitted from the pre-fabrication submittals.

B. Product Data

1. Electronic submittals shall include the following as applicable:

a. Equipment schedules listing all system components, the manufacturer, model number, and quantity of each.

b. Point charts defining all inputs and outputs, including descriptors of each device on the system.

c. Manufacturer’s literature sheets for all system components, including warranty information. Clearly mark items included in the Work on literature sheets containing more than one device or component model number.

d. Completed system programming forms that identify programming parameters that must be completed by AISD to connect and communicate with other AISD equipment.

e. A complete list of cable and wiring types and sizes, as well as the manufacturer and model number for each.

f. A complete list of finishes and graphics.

g. Manufacturer certification certificates and Contractor licenses.

C. Shop Drawings

1. Produce shop drawings using the latest version of AutoCAD.

2. Do not reproduce Contract Documents for use as shop drawings. Contract Documents shall not be acceptable as shop drawings.

3. Shop drawings shall utilize the same scales as the contract documents.

4. Shop drawings shall include the following as applicable:

    a. A drawing legend sheet describing all symbols used on the drawings and containing a description of each device, complete with manufacturer name and model number.

    b. Floor Plan Drawings

        1) Floor plan drawings indicating device locations, wire runs and wire designations. Show wire runs as single lines. Tag wire runs to indicate type, gauge, conduit size, and conductor quantity. Tally wire quantities as they are combined when traveling together in single conduit runs. Conduit fill capacities shall comply with the NEC.

        2) Floor plan drawings shall not illustrate Work for other systems or trades.

    c. System riser diagram with all devices, wire runs and wire designations.

    d. Schematic block diagrams showing all equipment (typical), interconnects, data flow, etc.

    e. Point to point wiring diagrams identifying all equipment and defining the interconnection of all inputs, outputs, connections, zones, and addresses for all equipment. Diagrams shall indicate exact equipment counts.

    f. Wiring diagram for fail-safe release of electric locking mechanisms where applicable.

    g. End of line device requirements, locations, and resistances for each device condition (secure, alarm, trouble, etc.).

    h. Battery requirements and sizing calculations.

    i. Fabrication shop drawings for all custom equipment.

    j. Plans and elevations of security closet layouts showing panel locations including power supply locations, conduit wire ways, wire molds and all other equipment to be mounted at each location.

D. Samples

1. Submit Samples of the following:

    a. Finish samples for each custom trim plate

    b. Artwork samples for custom graphics

2. Submit samples of any equipment upon specific request of the Owner/Architect.

2.02 RECORD DOCUMENTATION

A. General Description and Requirements

1. Record documentation shall consist of as-built drawings and operation and maintenance manuals.

2. Record documents shall include all information required in the pre-fabrication submittals but revised to reflect “as installed” conditions.

3. Record documents shall include all information beneficial to the Owner for future planning and technician troubleshooting.

4. Record documents shall include final schedules and configurations with IP addresses, ports, switches, subnet masks, gateways, and other information that identifies specific equipment connections to the Owner’s network.

5. Record documents shall include revised equipment rack elevations (provided by the Owner) that include all installed security system equipment and the equipment locations.

6. Refer to Division 1 for submittal quantity requirements.

B. As-built Drawings

1. As-built drawings shall, at a minimum, include the following (as applicable):

a. Floor plan drawings indicating device locations, with device legends indicating manufacturers and model numbers for each device.

b. Floor plan drawings indicating wire routes. Identify wire routing in straight-line runs and tag with cable identification and terminal strip numbers to coincide with the installation.

c. Mounting details for all equipment and hardware.

d. Functional block diagrams for each subsystem.

e. Identify termination points cable junctions.

f. Wiring details showing rack elevations, equipment wiring and terminations, and inter-rack wiring.

g. Wiring diagrams for all custom circuitry including interfaces to various control output controlled devices (e.g. automatic door operators, elevators, fire alarm systems, etc.).

h. Wiring diagrams for each data gathering panel (DGP). Wiring diagrams shall be identical to those located with each DGP.

i. Typical point to point wiring diagrams for each piece of equipment and groups of equipment within the system.

j. Layout details for each riser location, including panels, power supplies, junction boxes, conduit and any other security related equipment.

k. 120 VAC circuits, circuit breaker, and breaker panel locations.

C. Operation and Maintenance Manuals

1. Operation and maintenance manuals shall apply to all security related devices, equipment and software modules.

2. Submit electronically and one hard copy manual as formated as follows:

a. Bind each manual in a hard-back loose-leaf binder.

b. Identify each manual's contents on the cover.

c. Provide a table of contents and tabulated sheets for each manual. Place tab sheets at the beginning of each chapter or section and at the beginning of each appendix.

d. Clearly mark models implemented in the Work for hardware manuals demonstrating more than one model number.

3. Operation and Maintenance Manuals shall include, at a minimum, the following:

a. Operational description of system.

b. Detailed programming descriptions, including step by step procedures with illustrations identifying how screens will appear after each entry.

c. Explanations of relationships with other systems. Explanations shall include operations of each system, operations unique to the interfaces between each of the systems, and possible conflicts that may occur with the interfaces.

d. Power-up and power-down procedures for each subsystem.

e. Setup procedures for each component of the subsystems.

f. A list of manufacturers, their local representatives and subcontractors that have performed Work on the Project. The list shall include contact names, phone numbers and addresses for each.

g. Installation and service manuals for each piece of equipment.

h. Maintenance schedules for all installed components. Schedules shall include inspections and preventive maintenance schedules, and documentation of all repaired or replaced equipment.

D. Programming Disks

1. Provide data programming disks as required with software and programming information for the system.

2. The disks shall include the final program information upon completion and provide for system restart after failure.

E. Warranty Letter

1. Provide a signed warranty letter.

2. The letter shall identify the completion date, warranty start date, and warranty completion date.

3. The Owner will verify the warranty dates to ensure dates begin upon acceptance of the System by the Owner.

PART 3 - EXECUTION

3.01 GENERAL

A. Submit in accordance with Division 1 requirements.

B. Submit a letter of transmittal with pre-fabrication submittals identifying the name of the Project, Contractor's name, date submitted for review, and a list of items transmitted.

C. Produce submittal drawings using the latest version of AutoCAD.

D. During systems installation and at all times when the Work is actively in progress, maintain up-to-date and accurate as-built drawings. Keep this set of drawings current and neat at all times. The progress set shall provide for reference only and shall not be used for installation purposes.

3.02 PRE-FABRICATION SUBMITTALS

A. Submit pre-fabrication submittals within 30 days after award of contract or as dictated by the construction schedule (whichever period of time is shorter).

B. No portion of the Work shall commence nor shall any equipment be procured until the Owner has approved the pre-fabrication submittals in writing. All Work shall be in accordance with the Contract Documents.

3.03 RECORD DOCUMENTATION

A. Prior to the final acceptance of the Work, submit two draft sets of the as-built drawings portion of record documentation to the Security Consultant. The Security Consultant will use a draft copy during the final acceptance testing.

B. Update record documentation to reflect changes or modifications made during final acceptance testing as required.

3.04 FIELD EQUIPMENT DOCUMENTATION

A. Provide termination documentation within each DGP, power supply, and termination cabinet. Documentation shall include information necessary to maintain and service the cabinet including, but not limited to device terminations, connected field devices and locations/descriptors, communication connections, and 120 VAC power circuits, breakers, and locations.

3.05 PROCEDURE FOR RESUBMITTING

A. Refer to Division 1 for re-submittal quantity requirements.

B. Make corrections or changes in product data, shop drawings, and / or samples as required by the Owner/Architect and resubmit when the Owner's/Architect's stamp requires resubmission.

C. Clearly identify changes on shop drawing re-submittals. Only identified changes will be reviewed when resubmitting.

D. Clearly identify drawing sheets added to the resubmitted shop drawings. Do not change the sheet numbering scheme for previously issued shop drawings.

E. Submit a letter of transmittal with re-submittals identifying the name of the Project, Contractor's name, date submitted for review, and a list of items transmitted.

F. The Contractor shall be responsible for any delays caused by rejected submittals and the resubmission process.

END OF SECTION 280810

ACCEPTANCE TESTING OF SECURITY SYSTEMS
SECTION 280840

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Division 1 – General Requirements shall apply to this section. Unless this section contains statements which are more definitive than those contained in the General Requirements, this section shall not be interpreted as waiving or overruling any requirements expressed in the General Requirements.

B. This Section is a Division 28 Security System Basic Materials and Methods section and shall apply to each section making reference to Work specified herein.

1.02 SUMMARY

A. Provide acceptance testing of security systems.

1.03 RELATED WORK

A. Coordinate the installation with the following related Sections.

1. Section 27 13 00 – Communications Cable Plant.

2. Division 28 Security System Basic Materials and Methods sections including the following:

a. Section 28 05 10 – Conductors and Cables for Security Systems.

b. Section 28 05 30 – Pathways for Security Systems.

c. Section 28 05 55 – Identification for Security Systems.

d. Section 28 08 10 – Submittals for Security Systems.

3. Section 28 13 00 – Access Control.

4. Section 28 16 00– Intrusion Detection.

5. Section 28 23 00– Video Surveillance.

1.04 SEQUENCE AND SCHEDULING

A. The Contractor shall review the construction and completion schedules and shall coordinate execution of the Work as defined in the Contract Documents with all other contractors and service providers engaged by the Owner and their representatives for the Work.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 COORDINATION

A. Coordinate acceptance testing with the Owner and Architect.

3.02 ACCEPTANCE TESTING

A. The Owner or its representatives will conduct acceptance testing of the Work in phases. The following requirements shall apply to each phase.

1. Prior to acceptance testing, the Contractor shall submit two sets of preliminary (draft) record drawings to the Owner. The Owner will use preliminary record drawings to conduct the system acceptance test.

2. Submit a paragraph-by-paragraph completion matrix indicating completion or delinquency for each item included in this section and all subsequent addenda and bulletins as part of the Work. Indicate completion of the requirement by the word “Completed” following each paragraph number. Indicate delinquency for the requirement by the words “To Be Completed” following the applicable paragraph number. For work in progress, indicate the extent (or lack thereof) of completion to date and the proposed date of completion.

3. Conduct a complete test of the entire system and provide the Owner with a written report on the results of that test. During the course of this test, place the integrated Security Systems in service, and calibrate and test all equipment.

4. Following completion of the initial testing and correction of any noted deficiencies, conduct a five-day burn-in test to prove the Security Systems. During the burn-in the Security System shall be fully functional and programmed such that all points, interfaces, controls, reports, messages, prompts, etc. can be exercised and validated. Record and correct any system anomaly, deficiency, or failure noted during the burn-in.

5. Deliver a report to the Owner describing the results of functional tests, burn-in tests, diagnostics, calibrations, corrections, and repairs. The report shall include written certification that the installed complete Security Systems have been calibrated, tested, and is fully functional. Upon an acceptable review of the report, the Owner will schedule the acceptance test.

6. Prior to the acceptance test, coordinate with the Construction Manager for security related construction clean-up and patch work requirements. Security equipment closets and similar areas shall be free of accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, remove all waste materials, rubbish, the Contractor’s and it’s subcontractors’ tools, construction equipment, machinery and all surplus materials.

7. During the course of the acceptance test, the Contractor shall demonstrate that the completed and integrated system complies with the Contract Documents, initial training is complete, and the system is fully operational (including system interfaces).

8. Equipment shall be on and fully operational during testing procedures. Provide personnel, equipment, and supplies necessary to perform all site testing. Provide a minimum of two employees familiar with the system for the acceptance test. One employee shall monitor and verify alarms while the other will demonstrate the function of each device. Supply at least two two-way radios and spare batteries for use during the test. The Contractor shall make no adjustments, repairs, or modifications during the test without the permission of the Owner.

9. A manufacturer's representative may be present on site to answer any questions that may be beyond the technical capability of the Contractor's employees, if the Contractor so elects or by specific request of the Owner, at no additional charge.

10. Upon successful completion of the acceptance test (or subsequent punch list retest) the Owner will issue a letter of acceptance.

11. The Owner retains the right to suspend and / or terminate testing at any time when the system fails to perform as specified. In the event that it becomes necessary to suspend or repeat the test, all of the Owner's expenses related to the suspended test will be deducted from the Contractor's retainage.

END OF SECTION 280840

ACCESS CONTROL SYSTEM
SECTION 281300

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Division 1 – General Requirements shall apply to this section. Unless this section contains statements which are more definitive than those contained in the General Requirements, this section shall not be interpreted as waiving or overruling any requirements expressed in the General Requirements.

B. The requirements specified in Division 28 Security System Basic Materials and Methods shall apply to the Work of this Section.

1.02 CONFIDENTIALITY

A. All drawings, specifications, and other documents and information about the Work are confidential information and shall remain secure and confidential at all times. Confidential information shall not be deliberately or inadvertently disclosed to anyone other than the Contractor's personnel and subcontractors who require disclosure to perform the Work.

B. The Contractor shall keep track of all confidential information at all times and shall ensure that all copies are accounted for at all times. The Contractor shall not permit any persons to have access to the confidential information of the Work unless and until the Contractor has assured itself of the trustworthiness of such persons.

1.03 CONTRACT DOCUMENTS

A. Contract documents shall consist of:

1. AISD Front End Documents.
2. Division 1.
3. Section 27 13 00 – Communications Cable Plant (applicable to provision of telephone and data cables).
4. Section 27 31 13 – Private Branch Exchange (PBX) System (applicable to provision of hands-free telephones and remote door control devices.
5. Division 28 Security System Basic Materials and Methods sections.
6. This Section.
7. Appendix A – Project Description and Scope of Work.
8. Appendix B – Access Control System Schedule

1.04 PERMITS

A. The Contractor shall ensure compliance with and an understanding of all local codes and contract conditions and obtain all permits necessary pertaining to the Work.

B. The Contractor shall be responsible for submitting to the local authority having jurisdiction (AHJ) the electric lock/electronic lock procedure submittal for permitting as required. The Contractor shall only be responsible for lock permitting of electric locks controlled by the Access Control System.

1.05 REFERENCES

A. Americans with Disabilities Act – ADA

B. City of Austin and State of Texas Building, Life Safety, and Fire Codes.

C. Underwriter's Laboratories (UL) Applicable Standards

D. Factory Mutual (FM)

E. National Electrical Code (NEC)

1.06 SUMMARY

A. Owner Security System Description

B. The Project consists of the installation and start-up of equipment connected to the Owner's existing Security System. The existing Security System consists of the following.

1. Access Control System

2. Intrusion Detection System (as required)

3. Video Surveillance System (as required)

C. Scope of Work

1. Reference Appendix A- Project Description and Scope of Work.

D. Provide complete turnkey systems including all software, hardware, equipment, peripherals, programming, interfaces with other systems, conduits, boxes, and raceways, power, wire and cable, carpentry, demolition, patching, refinishing, and relocation. Include the cost of all other trades necessary to install the complete system, whether specifically mentioned or not, in the Bid Proposal.

E. The Drawings indicate approximate locations. The Contractor shall determine final equipment layouts and exact equipment locations to ensure coverage that fully satisfies the intent of the Contract Documents.

F. Where the Work affects or overlaps existing systems and equipment, the existing systems shall remain operational until the Owner accepts the Work unless directed otherwise by the Owner or its representatives.

1.07 RELATED WORK

A. Coordinate the installation with the following related Sections.

1. Section 087100 – Finish Hardware

2. Section 271300 – Communications Cable Plant (as applicable).

3. Section 273113– Private Branch Exchange (PBX) System (as applicable).

4. Division 28 Security System Basic Materials and Methods sections including the following:

a. Section 280510 – Conductors and Cables for Security Systems.

b. Section 280530 – Pathways for Security Systems.

c. Section 280555 – Identification for Security Systems.

d. Section 280810 – Submittals for Security Systems.

e. Section 280840 – Acceptance Testing of Security Systems.

f. Section 282300– Video Surveillance.

1.08 QUALITY ASSURANCE

A. Contractor Qualifications

1. The Contractor shall have a service facility and organization with staffing capable of providing comprehensive maintenance and service for the specified systems within the Greater Austin Area.

2. The Contractor shall be a certified installer and properly licensed to install, modify, and service the specified systems.

3. The Contractor shall provide factory-certified technicians. Certified technicians shall install and supervise installation, commissioning, and maintenance of the Work. All installing personnel shall be licensed as required by local and/or state jurisdictions.

4. The Contractor shall have a minimum of five years experience in the fabrication, assembly, and installation of systems of similar complexity as specified herein.

5. The Contractor shall have installed the specified systems in at least three projects of the type and complexity specified herein.

6. The Contractor shall ensure compliance with and have a thorough understanding of all local codes and contract conditions pertaining to the Work.

7. The Contractor shall have local in-house engineering and project management capabilities consistent with the requirements of the Work. The Contractor shall provide a team managed by a project manager responsible for submittals, installation, scheduling, manpower, testing, record documents, subcontractors, etc.

8. By submitting a Bid Proposal, the Contractor certifies that it is qualified in all areas pertaining to the Work. In the event the Contractor becomes unable to complete the Work in accordance with the Contractor Documents, or the satisfaction of the Owner or its representatives due to a lack of understanding of the equipment, systems, or services required by the Contract Documents, the Contractor shall retain the services of the applicable manufacturer's representatives to expeditiously complete the Work in accordance with the construction schedule at no additional cost to the Owner.

9. Bidders shall submit documentation with the Bid Proposal as required to demonstrate compliance with Contractor Qualifications. References shall include contact information for end users familiar with the installation and continued operation of the systems, and the Contractor's work.

B. Product Standards

1. Materials included in the completed security system installation shall be new and shall fully comply with the latest published specifications and versions of the manufacturer.

2. Unless otherwise specified, components included in the completed security system shall be standard, unmodified production models.

3. Equipment, components and materials provided by the Contractor shall meet or exceed the performance characteristics and technical specifications for referenced components.

4. The Contractor shall provide complete and detailed technical information for equipment, components and materials. The Owner or its representatives will reject proposed equipment in the event that submitted technical information is not sufficient to readily confirm that proposed equipment, components, and materials will meet or exceed the performance and technical specifications. The Owner or its representatives shall make the final decision as to whether proposed equipment, components and materials are acceptable. In no case shall acceptance by the Owner or its representatives of proposed equipment, components and materials relieve the Contractor of his/her responsibility to produce completed systems, which comply with this Section.

5. Within the technical specifications for the system, certain manufacturers may be specified. These manufacturers are preferred by the Owner to ensure compatibility with existing equipment. The Contractor may substitute manufacturers and models that may be more cost effective or readily available than those specified. Substitutions shall meet or exceed the minimum functional and technical specifications and shall be fully compatible with existing equipment. Acceptance of such substitutions is at the discretion of the Owner or its representatives.

6. The systems (including software, hardware and firmware) proposed for this project shall have been installed in at least two projects of similar size and nature and shall have been in beneficial use for at least six months prior to submission of the bid proposal. Provide a compliance statement from each manufacturer along with references as part of the Bid Proposal.

1.09 WARRANTY

A. Furnish a one-year warranty for the Work. The Warranty shall begin after acceptance of the Work by the Owner.

B. If, within one year after the date of final acceptance of the Work or within such longer period of time as may be prescribed by law, or by the terms of any applicable special warranty required by the Contract Documents or provided by a manufacturer, any of the Work or equipment is found to be defective or not in accordance with the Contract Documents, the Contractor shall correct it promptly including all parts and labor after receipt of notice from the Owner to do so unless the Owner or its representative has previously given the Contractor a written acceptance of such condition. This obligation shall survive termination of the Contract. The Owner will give notice of such conditions promptly after discovery. Owner representatives shall furnish such notice either verbally or in writing.

C. Nothing contained in the Contract Documents shall be construed to establish a shorter period of limitation with respect to any other obligation which the Contractor might have under the Contract Documents or any manufacturer's warranty.

D. The establishment of the time period of one year after the date of final acceptance of the Work or such longer period of time as may be prescribed by law or by the terms of any warranty required by the Contract Documents, relates only to the specific obligation of the Contractor to correct the Work or equipment, and has no relationship to the time within which its obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to its obligations other than specifically to correct the Work or equipment.

E. Furnish written notice to the Owner documenting any Work performed during the warranty period, including any preventive maintenance Work performed.

F. The Owner reserves the right to expand or add to the system during the warranty period using firm(s) other than the Contractor for such expansion without affecting the Contractor's responsibilities, provided that the expansion is done by a firm which is an authorized dealer or agent for the equipment or system being expanded. Contractor shall not be responsible for maintenance of equipment installed by other firms.

1.10 SEQUENCE AND SCHEDULING

A. The Contractor shall review the construction and completion schedules and shall coordinate execution of the Work as defined in the Contract Documents with all other contractors and service providers engaged by the Owner and their representatives for the Work.

PART 2 - PRODUCTS

2.01 SYSTEM DESCRIPTION

A. The Access Control System (ACS) shall consist of data gathering panels, network interface devices, card readers, electric locking mechanism interfaces, power supplies, and other input and output devices connected to the Owner's existing Continental Instruments system.

B. Interface the ACS equipment to the Owner's existing Continental Instruments system over the Owner's TCP/IP network. Provide interface equipment and software as required.

C. Locate ACS equipment including, but not limited to DGPs, power supplies, network interface devices, etc. within key-lockable cabinets. Provide Continental Instruments standard keys for all cabinets.

D. Existing System Integration

1. Unless otherwise directed in writing, provide network connections, hardware, etc. to integrate with the Owner's existing Continental Instruments system. Route network connections to the data gathering panel. Network connections shall be Systimax compliant and shall comply with Section 27 13 00 requirements.

2. Where provision of connections is not included in the Work, interface to network connections provided under a separate contract. Provide hardware and equipment necessary to interface to the network and integrate with the Owner's existing Continental Instruments system. Another section will provide the terminated cables with a service loop above the accessible ceiling above control panel location. Pull the cable through the 1 inch conduit to the control panel.

E. Card Reader Controlled Doors

1. Provide card reader, system workstation, and time schedule control of electric locking mechanisms.

2. Interface to electric locking mechanisms and power transfer devices provided under a separate section.

3. Interface electric locking mechanisms to the fire alarm system for fail-safe release where required by code.

4. Provide one door position switch in each controlled leaf of a card reader controlled door. Program the card reader controlled door to automatically relock when the door opens.

5. Video Call/Intercom System at Main Entries

a. See Internal Safety and Security Guidelines referenced in Chapter 5 – Safety and Security.

6. Infrastructure

a. Provide one card reader cable, one alarm point cable, and one low voltage power cable from each card reader controlled door to the DGP location.

F. EQUIPMENT REQUIREMENTS

1. Data Gathering Panel

a. Provide the following Continental Instruments controllers as required to provide for card reader control of doors:

1) Two card reader Super Two Controller.

2) Eight card reader Superterm or Accelaterm 8 Controller.

b. Provide input and output modules as required to interface all equipment. DGPs shall be fully compatible the Owner's existing Continental Instruments system.

c. Interface the DGPs to the Owner's existing Continental Instruments ACS through the Owner's TCP/IP network. Provide network interface equipment as required. Coordinate interface requirements with the Owner. Program new equipment as required to connect to the Owner's existing Continental Instruments system and demonstrate specified operation and functionality. The Owner will program system descriptors, time schedules, and other information the system.

2. Power Supplies

a. Provide Alarm Saf model CPS800C-UL/CSA power supplies with Alarm Saf APD8-UL distribution boards for all ACS equipment.

b. Provide battery chargers for all power supplies. Provide batteries for all power supplies except for electric locking mechanisms.

c. Provide batteries as required to provide a minimum of 4 hours of battery backup for a fully loaded power supply, regardless of the connected load.

d. Provide for monitoring power supplies through existing ACS workstations as follows:

1) Monitor secondary output voltage of power supply to annunciate power failures.

2) Monitor batteries to annunciate low battery voltage and battery failure conditions.

3) Provide power distribution boards with independently fused outputs for each connected device.

4) Minimum Specifications

a) UL listed, power limited power supply.

b) 120VAC input voltage.

c) Output rating of 150% of the actual connected load.

d) Individual low battery and power fail alarm outputs.

e) Key-lockable steel enclosure. Key all power supplies alike and on the same key as other ACS cabinets.

3. Card Reader

a. Provide HID Multiclass ThinLine II Series black proximity card readers.

b. Provide HID Multiclass MiniProx Series black proximity card readers for mullion mount applications.

c. Card readers shall be fully compatible with the Owner's existing access cards and readers.

d. Coordinate card reader colors with the Owner.

4. Door Position Switches

a. Provide GRI AA/AC 180 wide gap recessed door position switches to monitor the secure status of doors.

b. Provide GRI 4400A industrial wide gap door position switches to monitor the secure status of gates, hatches, and doors.

c. Provide GRI 4532 Series floor mounted door position switches to monitor the secure status of overhead doors. Provide optional magnet where required.

5. Electric Locking Mechanisms

a. Unless noted otherwise**,** another section will provide electric locking mechanisms.

b. Interface with electric locking mechanisms and power supplies to provide for ACS control as specified.

c. Provide power supplies for electric locking mechanisms except for mechanisms with electric latch retraction. Locate power supplies adjacent to the DGP.

PART 3 - EXECUTION

3.01 COORDINATION

A. Owner Coordination

1. Coordinate programming information required to interface systems with the Owner's existing systems.

2. Coordinate final device locations and installation and operational requirements.

3. Coordinate equipment labeling.

4. Coordinate cable jacket colors.

5. Coordinate training curriculum, syllabus, and schedule.

6. At a minimum, coordinate the following with the Architect:

    a. Equipment finishes and colors. Submit finishes and graphics for equipment in public areas to the Architect for approval prior to installation.

    b. Locations of all devices prior to installation.

7. Verify that adequate conduit is provided and that equipment backboxes are adequate for system installation.

8. Verify that adequate power has been provided and properly located for the security system equipment. Coordinate circuit, breaker, and panel locations and identify locations in record documents.

9. Verify that doors and door frames are properly prepared for electric locking hardware and door position switches.

3.02 INSTALLATION

A. General

1. Coordinate equipment installation requirements with other trades prior to installation.

2. After installation, protect equipment to prevent damage during the construction period. Close openings in conduits and boxes to prevent the entrance of foreign materials.

3. Make equipment connections in accordance with the approved submittal drawings and manufacturer specifications.

4. Seal exterior devices to protect against weather conditions including heat, cold, moisture, dust, and sand.

5. Site Observation

    a. Continuously verify that the site conditions are in agreement with the Contract Documents. Submit a report to the Owner or its representatives documenting changes to the site or conditions that affect the performance of the system to be installed. For those changes or conditions, which affect system installation or performance, provide (with the report) specification sheets, or written functional requirements to support the findings, and a cost estimate to correct the deficiency. No deficiency shall be corrected without written permission from the Owner or its representatives.

    b. The Owner or its representatives will conduct random site observation visits during the project and prepare reports noting observations. Correct deficiencies noted on the site visit reports. All work shall comply with the Contract Documents, applicable codes, regulations and local Authorities whether or not a particular deficiency has been noted in a site visit report.

B. Equipment

1. Field-verify specific equipment locations to provide the best fit and function. Verify locations with the Owner or its representatives as necessary.

2. Install equipment in accordance with manufacturer specifications.

3. Install equipment to allow adequate clearance for testing and maintenance.

4. Locate end of line devices within the device housing.

5. Provide tamper resistant screws and fasteners for equipment located in accessible and/or public areas.

6. Remove dirt, packaging, wiring scraps, and other debris from equipment, boxes, and cabinets at the end of each work day.

7. Wherever possible, remove contractor and manufacturer equipment logos from security field devices.

C. Existing Equipment

1. Replace ceiling tiles with matching new tiles when removing ceiling mounted devices.

2. Restore surfaces where removed equipment was located. Provide covers, patching, painting, and other remedies to match surface finishes.

D. Programming

1. Program IP addresses and other basic information necessary for the Owner to communicate with and complete programming of the System.

2. The Owner will complete programming of the system.

3.03 SURGE PROTECTION

A. Provide protection against spikes, surges, noise, and other line problems for all system equipment and components sourced by unregulated power supplies including 120VAC branch circuit inputs.

B. Provide surge protection for all power circuits, telephone, network, and other communication circuits, and electronic modules on wiring entering the premises to minimize lightning induced transients.

3.04 POWER REQUIREMENTS

A. Provide 120 VAC power circuits dedicated for the system. Power connections shall comply with NEC and shall be installed by a licensed electrical contractor.

B. Provide and label circuit breakers, conduit, wiring, receptacles, and installation hardware as necessary to provide 120 VAC power for the system.

C. Connect to the AC power and provide duplex receptacles within dedicated locked cabinets. Provide UL listed power supplies and transformers with plug type connectors to distribute low voltage power to the system components as required. Plug transformers into duplex receptacles within locked cabinets only. 120 VAC power connections shall not be made within Security System cabinets. Locate receptacles as necessary to ensure power supply cord lengths shall not exceed six feet.

D. Equipment power wiring shall directly feed the associated equipment and shall not feed through other equipment or cabinets.

E. Grounding

1. Establish an isolated, reference ground connection at each security equipment location. The intent of the ground is to prevent ground loops within Security System circuits, ensure proper communications between system components and devices, and isolate security equipment from building electrical system noise.

2. Under no circumstances shall the AC neutral be used for a reference ground.

3. Provide all necessary hardware and cable to properly ground security equipment.

4. Ground all equipment in strict accordance with manufacturer recommendations.

5. The Contractor shall be responsible for equipment damage or communications problems that may occur due to improper grounding.

3.05 PROJECT COMPLETION PROCESS

A. System Programming

1. The contractor shall install and program the system to communicate with dispatch.

2. Owner will only program Microkey.

B. Project Completion and Final Acceptance Testing

1. Install the security system in accordance with the project schedule.

2. Three Weeks Prior To Security System Final Acceptance Testing

a. Provide a two week completion notice the Architect and the Owner.

b. Provide notice of the pending final acceptance testing to the Architect, the Owner, and the Security Consultant.

c. Coordinate final network (ports, IP addresses, programming, etc.) and telephone (ports, extensions, remote control codes, programming, etc. as applicable) requirements with the Architect and the Owner.

d. The Owner will complete system programming and communication to the security systems within those two weeks.

3. One Week Prior To Security System Final Acceptance Testing

   a. Test the security system devices, communications, and programming.

   b. Prepare a downloadable test program for the System. The test program shall allow the Contractor to demonstrate proper operation of the System and each device and shall be used to perform System testing if programming or communications work by the Owner is not complete.

   c. Coordinate with the Owner to resolve any programming and communication problems that arose during the test.

   d. Submit a system completion report detailing the installation and test dates of installed devices to the Security Consultant.

   e. Submit one copy of draft as-built drawings to the Security Consultant. The draft asbuilts will be used for acceptance testing only.

   f. Upon completion of the Security Contractor testing and coordination, the Owner and the Security Consultant will conduct a final acceptance test.

   g. The Security Consultant will prepare a punch list of items identified during the test that require correction.

END OF SECTION 281300

APPENDIX “A”
Project Description and Scope of Work

PROJECT DESCRIPTION AND SCOPE OF WORK

APPENDIX “B”
Access Control System Schedule

INTRUSION DETECTION SYSTEM
SECTION 281600

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Division 1 – General Requirements shall apply to this section. Unless this section contains statements which are more definitive than those contained in the General Requirements, this section shall not be interpreted as waiving or overruling any requirements expressed in the General Requirements.

B. The requirements specified in Division 28 Security System Basic Materials and Methods shall apply to the Work of this Section.

1.02 CONFIDENTIALITY

A. All drawings, specifications, and other documents and information about the Work are confidential information and shall remain secure and confidential at all times. Confidential information shall not be deliberately or inadvertently disclosed to anyone other than the Contractor's personnel and subcontractors who require disclosure to perform the Work.

B. The Contractor shall keep track of all confidential information at all times and shall ensure that all copies are accounted for at all times. The Contractor shall not permit any persons to have access to the confidential information of the Work unless and until the Contractor has assured itself of the trustworthiness of such persons.

1.03 CONTRACT DOCUMENTS

A. Contract documents shall consist of:

1. AISD Front End Documents.
2. Division 1.
3. Section 271300 – Communications Cable Plant (applicable to provision of telephone and data cables).
4. Division 28 Security System Basic Materials and Methods sections.
5. This Section.
6. Appendix A – Project Description and Scope of Work.
7. Addenda, change orders, drawings, and associated correspondence as may be authorized in writing and issued by the Owner or its representatives to interpret, clarify, or modify the Contract Documents.

B. The Specification and Drawings shall be complementary and of equal authority and priority. Refer conflicts and differences within the Contract Documents to the Owner or its representatives prior to the submission of a Bid Proposal. If any such differences or conflicts are not called to the Owner's or its representatives' attention prior to submission

of Bid Proposals, the Owner or its representatives shall decide which of the conflicting requirements will govern, and the Contractor shall perform the Work at no additional cost to the Owner or its representatives in accordance with the decision.

C. Should the Drawings disagree in themselves or other Contract Documents, the greater quantity of Work or materials shall be furnished and performed.

1.04 PERMITS

A. The Contractor shall ensure compliance with and an understanding of all local codes and contract conditions and obtain all permits necessary pertaining to the Work.

1. The Contractor shall be responsible for submitting to the local authority having jurisdiction (AHJ) the electric lock/electronic lock procedure submittal for permitting as required. The Contractor shall only be responsible for lock permitting of electric locks controlled by the Access Control System.

1.05 REFERENCES

A. Americans with Disabilities Act – ADA

B. City of Austin and State of Texas Building, Life Safety, and Fire Codes.

C. Underwriter's Laboratories (UL) Applicable Standards

D. Factory Mutual (FM)

E. National Electrical Code (NEC)

1.06 SUMMARY

A. Owner Security System Description

1. The Project consists of the installation and start-up of equipment connected to the Owner's existing Security System. The existing Security System consists of the following.

a. Access Control System (as required)

b. Intrusion Detection System

c. Video Surveillance System (as required)

B. Scope of Work

1. Reference Appendix A- Project Description and Scope of Work.

2. Provide complete turnkey systems including all software, hardware, equipment, peripherals, programming, interfaces with other systems, conduits, boxes, and raceways, power, wire and cable, carpentry, demolition, patching, refinishing, and relocation. Include the cost of all other trades necessary to install the complete system, whether specifically mentioned or not, in the Bid Proposal.

3. The drawings indicate approximate locations. The Contractor shall determine final equipment layouts and exact equipment locations to ensure coverage that fully satisfies the intent of the Contract Documents.

4. Where the Work affects or overlaps existing systems and equipment, the existing systems shall remain operational until the Owner accepts the Work unless directed otherwise by the Owner or its representatives.

1.07 RELATED WORK

A. Coordinate the installation with the following related Sections.

1. Section 271300 – Communications Cable Plant (applicable to provision of telephone and data cables).

2. Division 28 Security System Basic Materials and Methods sections including the following:

a. Section 280510 – Conductors and Cables for Security Systems.

b. Section 280530 – Pathways for Security Systems.

c. Section 280555 – Identification for Security Systems.

d. Section 280810 – Submittals for Security Systems.

e. Section 280840 – Acceptance Testing of Security Systems.

3. Section 281300 – Access Control (as required).

4. Section 282300– Video Surveillance (as required).

1.08 QUALITY ASSURANCE

A. Contractor Qualifications

1. The Contractor shall have a service facility and organization with staffing capable of providing comprehensive maintenance and service for the specified systems within the Greater Austin Area.

2. The Contractor shall be a certified installer and properly licensed to install, modify, and service the specified systems.

3. The Contractor shall provide factory-certified technicians. Certified technicians shall install and supervise installation, commissioning, and maintenance of the Work. All installing personnel shall be licensed as required by local and/or state jurisdictions.

4. The Contractor shall have a minimum of five years experience in the fabrication, assembly, and installation of systems of similar complexity as specified herein.

5. The Contractor shall have installed the specified systems in at least three projects of the type and complexity specified herein.

6. The Contractor shall ensure compliance with and have a thorough understanding of all local codes and contract conditions pertaining to the Work.

7. The Contractor shall have local in-house engineering and project management capabilities consistent with the requirements of the Work. The Contractor shall provide a team managed by a project manager responsible for submittals, installation, scheduling, manpower, testing, record documents, subcontractors, etc.

8. By submitting a Bid Proposal, the Contractor certifies that it is qualified in all areas pertaining to the Work. In the event the Contractor becomes unable to complete the Work in accordance with the Contractor Documents, or the satisfaction of the Owner or its representatives due to a lack of understanding of the equipment, systems, or services required by the Contract Documents, the Contractor shall retain the services of the applicable manufacturer's representatives to expeditiously complete the Work in accordance with the construction schedule at no additional cost to the Owner.

9. Bidders shall submit documentation with the Bid Proposal as required to demonstrate compliance with Contractor Qualifications. References shall include contact information for end users familiar with the installation and continued operation of the systems, and the Contractor's work.

B. Product Standards

1. Materials included in the completed security system installation shall be new and shall fully comply with the latest published specifications and versions of the manufacturer.

2. Unless otherwise specified, components included in the completed security system shall be standard, unmodified production models.

3. Equipment, components and materials provided by the Contractor shall meet or exceed the performance characteristics and technical specifications for referenced components.

4. The Contractor shall provide complete and detailed technical information for equipment, components and materials. The Owner or its representatives will reject proposed equipment in the event that submitted technical information is not sufficient to readily confirm that proposed equipment, components, and materials will meet or exceed the performance and technical specifications. The Owner or its representatives shall make the final decision as to whether proposed equipment, components and materials are acceptable. In no case shall acceptance by the Owner or its representatives of proposed equipment, components and materials relieve the Contractor of his/her responsibility to produce completed systems, which comply with this Section.

5. The systems (including software, hardware and firmware) proposed for this project shall have been installed in at least two projects of similar size and nature and shall have been in beneficial use for at least six months prior to submission of the bid proposal. Provide a compliance statement from each manufacturer along with references as part of the Bid Proposal.

1.09 WARRANTY

A. Furnish a one-year warranty for the Work. The Warranty shall begin after acceptance of the Work by the Owner.

B. If, within one year after the date of final acceptance of the Work or within such longer period of time as may be prescribed by law, or by the terms of any applicable special warranty required by the Contract Documents or provided by a manufacturer, any of the Work or equipment is found to be defective or not in accordance with the Contract Documents, the Contractor shall correct it promptly including all parts and labor after receipt of notice from the Owner to do so unless the Owner or its representative has previously given the Contractor a written acceptance of such condition. This obligation shall survive termination of the Contract. The Owner will give notice of such conditions promptly after discovery. Owner representatives shall furnish such notice either verbally or in writing.

C. Nothing contained in the Contract Documents shall be construed to establish a shorter period of limitation with respect to any other obligation which the Contractor might have under the Contract Documents or any manufacturer's warranty.

D. The establishment of the time period of one year after the date of final acceptance of the Work or such longer period of time as may be prescribed by law or by the terms of any warranty required by the Contract Documents, relates only to the specific obligation of the Contractor to correct the Work or equipment, and has no relationship to the time within which its obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to its obligations other than specifically to correct the Work or equipment.

E. Furnish written notice to the Owner documenting any Work performed during the warranty period, including any preventive maintenance Work performed.

F. The Owner reserves the right to expand or add to the system during the warranty period using firm(s) other than the Contractor for such expansion without affecting the Contractor's responsibilities, provided that the expansion is done by a firm which is an authorized dealer or agent for the equipment or system being expanded. Contractor shall not be responsible for maintenance of equipment installed by other firms.

1.10 SEQUENCE AND SCHEDULING

A. The Contractor shall review the construction and completion schedules and shall coordinate execution of the Work as defined in the Contract Documents with all other contractors and service providers engaged by the Owner and their representatives for the Work.

PART 2 -

A. SYSTEM DESCRIPTION

1. The Intrusion Detection System (IDS) shall consist of control panels, zone expansion modules, control keypads, power supplies, sirens, door position switches, motion sensors, temperature sensors, duress/panic switches, and other input and output

devices, and other auxiliary components installed, wired, and connected to and monitored from the Owner's existing Central Station Monitoring System.

2. The IDS shall provide for field programming and configuration through the control keypads and/or portable computers and shall not require special tools to program and configure the System.

3. The IDS shall not include any programming sequences, codes, or passwords to prevent the Owner from accessing programming and operating functions.

4. Provide programming equipment, software, passwords, codes, manuals, adapters, and other equipment as required to program the IDS.

5. Central Station Monitoring

    a. The IDS shall integrate to the Owner's existing system to provide for Central Station monitoring and control.

    b. Interface the control panels to the Owner's network to provide for primary communication with the Owner's Central Station Console. Provide analog telephone line from security panel to MDF/IDF voice gateway to provide for alarm communication via the owner's network VoIP phone lines.

    c. Interface the control panels to the AISD network. Control panels shall support network connections with the AISD Network utilizing Napco Netlink Panel Module (NL MOD).

    d. Provide one analog telephone line for alarm communication for each control panel located within a permanent building to the appropriate voice gateway located in a MDF/IDF room.

    e. Central Station Integration

        1) Unless otherwise directed in writing, provide telephone lines, network connections, hardware, etc. to integrate with the Owner's Central Station and Network. Network and telephone connections shall comply with Section 27 13 00 requirements.

        2) Where provision of connections is not included in the Work, interface to telephone and network connections provided under a separate contract. Provide hardware and equipment necessary to interface to the network and telephone connections and connect to IDS panel.

    f. The Owner will program the Central Station system to provide monitoring of the IDS. Coordinate programming requirements with the Owner.

B. EQUIPMENT REQUIREMENTS

1. Control Panel

    a. Provide control panels as follows:

        1) High School: Napco GEM-X255.

2) Middle School: Napco GEM-X255.

3) Elementary School: Napco GEM-X255.

4) Portable Classroom: Napco GEM-P3200 (One per portable classroom).

5) Kitchen: Napco GEM-P3200.

b. The control panel shall provide the following minimum features and functions:

1) Communications via DTMF telephone lines.

2) NetLink Module (NL-MOD) to fully integrate the IDS with the Owner's existing Network.

3) Independent annunciation of each connected device.

4) Reporting IDS power, battery, tamper, supervision and line cut alarms to the Central Station.

5) Independent annunciation and control of each connected device.

6) Supervision

a) Provide supervision of each input device to report trouble conditions (e.g. open circuit, short, fault, etc.).

b) Install end of line resistors as specified by the IDS manufacturer within the input device cabinet.

c) Provide telephone line cut supervision.

7) Zones

a) Connect each input device as an independent input zone. Provide zone expansion modules as necessary.

c. Cabinets

1) Locate control panels, power supplies, zone expansion modules, relay modules, siren drivers, batteries, and other control panel equipment within lockable, hinged, steel cabinets.

2) Key all cabinets alike and to standard Napco N277 cabinet key systems.

2. Control Keypad

a. Provide Napco GEM-RP1CAe2 control keypads.

b. The keypad shall be manufactured by the control panel manufacturer.

c. The keypad shall include a programmable LCD display and buttons to program and control the IDS.

d. Keypads shall not be used to provide for zone expansion.

3. Door Position Switches

    a. Provide – GRI AA/AC 180 wide gap recessed door position switches to monitor the secure status of doors.

    b. Provide – GRI 4400A industrial wide gap door position switches to monitor the secure status of gates, hatches, and doors.

    c. Provide – GRI 4532 Series floor mounted door position switches with magnet to monitor the secure status of overhead doors.

4. Motion Sensors

    a. Provide motion sensors motion sensors at all exterior doors and first floor rooms with exterior windows. Provide and locate motion sensors as necessary to provide detection within the entire protected room.

    b. Provide Bosch ISC-BDL2-PW12G (PIR and Microwave Detector, 40’X40’ Cvg) for wall mount applications. Seal wire penetrations and openings in the sensor to prevent insects and dust from contaminating the sensor.

    c. Where wall mount motion sensors cannot be installed, and written approval from LSS has been given, provide Bosch DS936 Low Profile Panoramic PIR motion sensors for ceiling mount.

    d. Submit ceiling mount applications to AISD-Life Safety for approval prior to installing.

    e. Fasten motion sensors directly to back boxes, walls, and ceilings.

5. Gas Sensor

    a. Provide Macurco GD-2B gas detection sensors in kitchens. Gas sensors shall be tied into security zone for kitchen security panel located in nearest MDF/IDF room.

    b. Coordinate sensor locations with the Owner and provide sensors and adjustments as required.

6. Duress/ Panic

    a. Duress / panic switch shall be NAPCO GEM-WP Waterproof Panic Button to be wireless in knee-space of all reception desk stations. SCCP shall be programmed for a 24 hour panic zone.

7. Power Supplies

    a. Provide a dedicated power supply for the control panel as required by the manufacturer and local codes. Provide Alarm Saf model AS/PS series power supplies for all other IDS equipment.

    b. Provide battery chargers and batteries for all power supplies.

c. Provide batteries as required to provide a minimum of 4 hours of battery backup and 15 minutes in alarm condition for a fully loaded power supply, regardless of the connected load.

d. Provide for monitoring power supplies as follows:

1) Monitor secondary output voltage of power supply to annunciate power failures.

2) Monitor batteries to annunciate low battery voltage and battery failure conditions.

3) Provide power distribution boards with independently fused outputs for each connected device.

4) Minimum Specifications

a) UL listed, power limited power supply.

b) 120VAC input voltage.

c) Output rating of 150% of the actual connected load.

d) Individual low battery and power fail alarm outputs.

e) Key lockable steel enclosure. Key all power supplies alike and on the same key as other IDS cabinets.

PART 3 - EXECUTION

3.01 COORDINATION

A. Owner Coordination

1. Prepare forms for all information required from the Owner necessary to program the security system. Include schedules that identify deadline dates for each coordination item necessary to meet construction milestones and deadlines.

2. Coordinate The following:

a. System input information including descriptors, schedules, reporting functions, and programming information required to interface systems with the Owner's existing systems.

b. Final device locations and installation and operational requirements.

c. Equipment labeling.

d. Cable jacket colors.

e. Training curriculum, syllabus, and schedule.

B. At a minimum, coordinate the following with the Architect:

1. Equipment finishes and colors. Submit finishes and graphics for equipment in public areas to the Architect for approval prior to installation.

2. Locations of all devices prior to installation.

C. Verify that adequate conduit is provided and that equipment backboxes are adequate for system installation.

D. Verify that adequate power has been provided and properly located for the security system equipment. Coordinate circuit, breaker, and panel locations and identify locations in record documents.

E. Verify that doors and door frames are properly prepared for electric locking hardware and door position switches.

3.02 INSTALLATION

A. General

1. Coordinate equipment installation requirements with other trades prior to installation.

2. After installation, protect equipment to prevent damage during the construction period. Close openings in conduits and boxes to prevent the entrance of foreign materials.

3. Make equipment connections in accordance with the approved submittal drawings and manufacturer specifications.

4. Seal exterior devices to protect against weather conditions including heat, cold, moisture, dust, and sand.

5. Site Observation

a. Continuously verify that the site conditions are in agreement with the Contract Documents. Submit a report to the Owner or its representatives documenting changes to the site or conditions that affect the performance of the system to be installed. For those changes or conditions, which affect system installation or performance, provide (with the report) specification sheets, or written functional requirements to support the findings, and a cost estimate to correct the deficiency. No deficiency shall be corrected without written permission from the Owner or its representatives.

b. The Owner or its representatives will conduct random site observation visits during the project and prepare reports noting observations. Correct deficiencies noted on the site visit reports. All work shall comply with the Contract Documents, applicable codes, regulations and local Authorities whether or not a particular deficiency has been noted in a site visit report.

B. Equipment

1. Field-verify specific equipment locations to provide the best fit and function. Verify locations with the Owner or its representatives as necessary.

2. Install equipment in accordance with manufacturer specifications.

3. Install equipment to allow adequate clearance for testing and maintenance.

4. Locate end of line devices within the device housing.

5. Provide tamper resistant screws and fasteners for equipment located in accessible and/or public areas.

6. Remove dirt, packaging, wiring scraps, and other debris from equipment, boxes, and cabinets at the end of each work day.

7. Wherever possible, remove contractor and manufacturer equipment logos from security field devices.

8. Keypads

    a. Verify keypad locations with the Owner prior to installation. Mounting heights shall comply with ADA requirements.

    b. Wall mount keypads to recessed junction boxes.

9. Motion Detectors

    a. Locate motion detectors to provide maximum coverage within the protected space.

    b. Mount motion detectors in corners of walls and ceilings unless directed otherwise by the Owner.

    c. Securely fasten mounting brackets to the building structure as necessary to prevent false activation due to vibration.

    d. Do not use swivel brackets for Middle Schools and High Schools.

10. Sirens

    a. Mount wall mounted sirens to recessed junction boxes.

    b. No outdoor or MDF room sirens unless specifically requested by Owner and indicated in the drawings.

    c. Install sirens in locations with limited access to prevent vandalism and tampering. Locate at least 96” AFF.

C. Existing Equipment

1. Replace ceiling tiles with matching new tiles when removing ceiling mounted devices.

2. Restore surfaces where removed equipment was located. Provide covers, patching, painting, and other remedies to match surface finishes.

D. Programming

1. Program IP addresses and other basic information necessary for the Owner to communicate with and complete programming of the System.

2. The Owner will complete programming of the system.

3.03 SURGE PROTECTION

A. Provide protection against spikes, surges, noise, and other line problems for all system equipment and components from unregulated power sources including 120VAC branch circuit inputs.

B. Provide surge protection for all power circuits, network, telephone and other communication circuits, and electronic modules to protect against lightning damage where external wiring enters the premises.

3.04 POWER REQUIREMENTS

A. Provide 120 VAC power circuits dedicated for the system. Power connections shall comply with NEC and shall be installed by a licensed electrical contractor.

B. Provide one dedicated 120 VAC receptacle for each control panel.

C. Provide and label circuit breakers, conduit, wiring, receptacles, and installation hardware as necessary to provide 120 VAC power for the system.

D. Connect to the AC power and provide duplex receptacles within dedicated locked cabinets. Provide UL listed power supplies and transformers with plug type connectors to distribute low voltage power to the system components as required. Plug transformers into duplex receptacles within locked cabinets only. 120 VAC power connections shall not be made within Security System cabinets. Locate receptacles as necessary to ensure power supply cord lengths shall not exceed six feet.

E. Equipment power wiring shall directly feed the associated equipment and shall not feed through other equipment or cabinets.

F. Grounding

1. Establish an isolated, reference ground connection at each security equipment location. The intent of the ground is to prevent ground loops within Security System circuits, ensure proper communications between system components and devices, and isolate security equipment from building electrical system noise.

2. Under no circumstances shall the AC neutral be used for a reference ground.

3. Provide all necessary hardware and cable to properly ground security equipment.

4. Ground all equipment in strict accordance with manufacturer recommendations.

5. The Contractor shall be responsible for equipment damage or communications problems that may occur due to improper grounding.

3.05 PROJECT COMPLETION PROCESS

A. System Programming

1. The Owner will program the security systems as necessary to communicate with equipment installed by the Security Contractor.

2. Submit Owner supplied system-programming forms (electronic in format submitted by the Owner) to the Owner with the prefabrication submittals.

3. While the systems are being installed, the Contractor will program the information into the security systems in an off-line mode.

4. The Owner and the Security Contractor will review the completed programming by the Owner to identify and correct programming and compatibility issues.

B. Project Completion and Final Acceptance Testing

1. Install the security system in accordance with the project schedule.

2. Three Weeks Prior To Security System Final Acceptance Testing

a. Provide a two week completion notice the Architect and the Owner.

b. Provide notice of the pending final acceptance testing to the Architect, the Owner, and the Security Consultant.

c. Coordinate final network (ports, IP addresses, programming, etc.) and telephone (ports, extensions, programming, etc.) requirements with the Architect and the Owner.

d. The Owner will complete system programming and communication to the security systems within those two weeks.

3. One Week Prior To Security System Final Acceptance Testing

a. Test the security system devices, communications, and programming.

b. Prepare a downloadable test program for the System. The test program shall allow the Contractor to demonstrate proper operation of the System and each device and shall be used to perform System testing if programming or communications work by the Owner is not complete.

c. Coordinate with the Owner to resolve any programming and communication problems that arose during the test.

d. Submit a system completion report detailing the installation and test dates of installed devices to the Security Consultant.

e. Submit one electronic copy of draft as-built drawings to the Security Consultant. The draft as-builts will be used for acceptance testing only.

f. Upon completion of the Security Contractor testing and coordination, the Owner and the Security Consultant will conduct a final acceptance test.

g. The Security Consultant will prepare a punch list of items identified during the test that require correction.

END OF SECTION 281600

APPENDIX “A”
Project Description and Scope of Work

PROJECT DESCRIPTION AND SCOPE OF WORK

APPENDIX “B”
Intrusion Detection System Schedule

VIDEO SURVEILLANCE SYSTEM
SECTION 282300

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Division 1 – General Requirements shall apply to this section. Unless this section contains statements which are more definitive than those contained in the General Requirements, this section shall not be interpreted as waiving or overruling any requirements expressed in the General Requirements.

B. The requirements specified in Division 28 Security System Basic Materials and Methods shall apply to the Work of this Section.

1.02 CONFIDENTIALITY

A. All drawings, specifications, and other documents and information about the Work are confidential information and shall remain secure and confidential at all times. Confidential information shall not be deliberately or inadvertently disclosed to anyone other than the Contractor's personnel and subcontractors who require disclosure to perform the Work.

B. The Contractor shall keep track of all confidential information at all times and shall ensure that all copies are accounted for at all times. The Contractor shall not permit any persons to have access to the confidential information of the Work unless and until the Contractor has assured itself of the trustworthiness of such persons.

1.03 CONTRACT DOCUMENTS

A. Contract documents shall consist of:

a. AISD Front End Documents.

b. Division 1.

c. Division 28 Security System Basic Materials and Methods sections.

d. This Section.

e. Appendix A – Project Description and Scope of Work.

f. Appendix B – Video Surveillance System Schedule

g. Drawings as applicable including:

1.04 PERMITS

A. The Contractor shall ensure compliance with and an understanding of all local codes and contract conditions and obtain all permits necessary pertaining to the Work.

1.05 REFERENCES

A. Americans with Disabilities Act – ADA

B. City of Austin and State of Texas Building, Life Safety, and Fire Codes.

C. Underwriter's Laboratories (UL) Applicable Standards

D. Factory Mutual (FM)

E. National Electrical Code (NEC)

1.06 SUMMARY

A. Owner Security System Description

a. The Project consists of the installation and start-up of equipment connected to the Owner's existing Security System. The existing Security System consists of the following.

a. Access Control System (as required)

b. Intrusion Detection System (as required)

c. Video Surveillance System

B. Scope of Work

a. Provide Video Surveillance cameras and power supplies. Interface cameras to Owner's TCP/IP network to provide for monitoring and recording through the Owner's existing Video Insight Video Security Software.

b. Provide complete turnkey camera installation including all hardware, equipment, peripherals, camera setup, conduits, boxes, and raceways, power, carpentry, demolition, patching, refinishing, and relocation. Include the cost of all other trades necessary to install the complete system, whether specifically mentioned or not, in the Bid Proposal.

c. The drawings indicate approximate locations. The Contractor shall coordinate with the Owner and determine final equipment layouts and exact equipment locations and mounting requirements to ensure coverage that fully satisfies the intent of the Contract Documents.

d. Where the Work affects or overlaps existing systems and equipment, the existing systems shall remain operational until the Owner accepts the Work unless directed otherwise by the Owner or its representatives.

1.07 RELATED WORK

A. Coordinate the installation with the following related Sections.

a. Section 27 13 00 – Communications Cable Plant (as applicable).

b. Section 27 13 11 – Conductors and Cables for Video Surveillance Systems (as applicable).

c. Division 28 Security System Basic Materials and Methods sections including the following:

a. Section 28 05 10 – Conductors and Cables for Security Systems.

b. Section 28 05 30 – Pathways for Security Systems.

c. Section 28 05 55 – Identification for Security Systems.

d. Section 28 08 10 – Submittals for Security Systems.

e. Section 28 08 40 – Acceptance Testing of Security Systems.

1.08 SUBMITTALS

A. Provide submittals in accordance with Division 1 and Section 28 08 10.

B. Provide pre-fabrication submittals within seven business days after award of contract.

1.09 QUALITY ASSURANCE

A. Contractor Qualifications

a. The Contractor shall have a service facility and organization with staffing capable of providing comprehensive maintenance and service for the specified systems within the Greater Austin Area.

b. The Contractor shall be a manufacturer-certified installer and properly trained by the manufacturer to install, modify, and service the specified systems and equipment.

c. The Contractor shall provide factory-certified technicians. Certified technicians shall install and supervise installation, commissioning, and maintenance of the Work. All installing personnel shall be licensed as required by local and/or state jurisdictions.

d. The Contractor shall have a minimum of five years experience in the installation of closed circuit television (CCTV) camera systems of similar complexity as specified herein.

e. The Contractor shall ensure compliance with and have a thorough understanding of all local codes and contract conditions pertaining to the Work.

f. The Contractor shall have local in-house engineering and project management capabilities consistent with the requirements of the Work. The Contractor shall provide a team managed by a project manager responsible for submittals, installation, scheduling, manpower, testing, record documents, subcontractors, etc.

g. By submitting a Bid Proposal, the Contractor certifies that it is qualified in all areas pertaining to the Work. In the event the Contractor becomes unable to complete the Work in accordance with the Contractor Documents, or the satisfaction of the Owner or its representatives due to a lack of understanding of the equipment, systems, or services required by the Contract Documents, the Contractor shall retain the services of the applicable manufacturer’s representatives to expeditiously

complete the Work in accordance with the construction schedule at no additional cost to the Owner.

h. Bidders shall submit documentation with the Bid Proposal as required to demonstrate compliance with Contractor Qualifications. References shall include contact information for end users familiar with the installation and continued operation of the systems, and the Contractor's work.

B. Product Standards

a. Materials included in the completed security system installation shall be new and shall fully comply with the latest published specifications and versions of the manufacturer.

b. Unless otherwise specified, components included in the completed security system shall be standard, unmodified production models.

c. Equipment, components and materials provided by the Contractor shall meet or exceed the performance characteristics and technical specifications for referenced components.

d. The Contractor shall provide complete and detailed technical information for equipment, components and materials. The Owner or its representatives will reject proposed equipment in the event that submitted technical information is not sufficient to readily confirm that proposed equipment, components, and materials will meet or exceed the performance and technical specifications. The Owner or its representatives shall make the final decision as to whether proposed equipment, components and materials are acceptable. In no case shall acceptance by the Owner or its representatives of proposed equipment, components and materials relieve the Contractor of his/her responsibility to produce completed systems, which comply with this Section.

e. The systems (including software, hardware and firmware) proposed for this project shall have been installed in at least two projects of similar size and nature and shall have been in beneficial use for at least six months prior to submission of the bid proposal. Provide a compliance statement from each manufacturer along with references as part of the Bid Proposal.

1.10 WARRANTY

A. Furnish a one-year warranty for the Work. The Warranty shall begin after acceptance of the Work by the Owner.

B. If, within one year after the date of final acceptance of the Work or within such longer period of time as may be prescribed by law, or by the terms of any applicable special warranty required by the Contract Documents or provided by a manufacturer, any of the Work or equipment is found to be defective or not in accordance with the Contract Documents, the Contractor shall correct it promptly including all parts and labor after receipt of notice from the Owner to do so unless the Owner or its representative has previously given the Contractor a written acceptance of such condition. This obligation shall survive termination of the Contract. The Owner will give notice of such conditions promptly after discovery. Owner representatives shall furnish such notice either verbally or in writing.

C. Nothing contained in the Contract Documents shall be construed to establish a shorter period of limitation with respect to any other obligation which the Contractor might have under the Contract Documents or any manufacturer's warranty.

D. The establishment of the time period of one year after the date of final acceptance of the Work or such longer period of time as may be prescribed by law or by the terms of any warranty required by the Contract Documents, relates only to the specific obligation of the Contractor to correct the Work or equipment, and has no relationship to the time within which its obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to its obligations other than specifically to correct the Work or equipment.

E. Furnish written notice to the Owner documenting any Work performed during the warranty period, including any preventive maintenance Work performed.

F. The Owner reserves the right to expand or add to the system during the warranty period using firm(s) other than the Contractor for such expansion without affecting the Contractor's responsibilities, provided that the expansion is done by a firm which is an authorized dealer or agent for the equipment or system being expanded. Contractor shall not be responsible for maintenance of equipment installed by other firms.

1.11 SEQUENCE AND SCHEDULING

A. The Contractor shall review the construction and completion schedules and shall coordinate execution of the Work as defined in the Contract Documents with all other contractors and service providers engaged by the Owner and their representatives for the Work.

PART 2 - PRODUCTS

A. SYSTEM DESCRIPTION

a. The Video Surveillance System (VSS) shall consist of fixed and pan, tilt, and zoom IP network Video Surveillance cameras connected to the Owner's existing Video Insight system. VSS equipment shall be fully compatible with the Owner's existing Video Insight system.

b. Unless noted otherwise, interface the VSS equipment to the Owner's existing Video Insight system over the Owner's TCP/IP network and cable plant. The Owner will provide network ports to each camera location. Provide interface equipment and cables as required. Contractor to provide port and switch information to owner.

c. Camera Views

a. Unless noted otherwise in the Video Surveillance System Schedule, the following are camera views for a number of applications. They are intended to provide general direction for determination of initial camera location and lens adjustment. Coordinate final camera locations and adjustments with the Owner.

1) Interior Camera View of Building Entrance: View of doorways (including multiple door sets when applicable) from floor to 9' above finished floor.

2) Interior Camera View of Building Entrance Hands Free Telephone: Camera view of telephone user as viewed through the door glass or sidelight.

3) Exterior Camera View of Building Entrance Hands Free Telephone: View of telephone and surrounding area from floor to 8’ above finished surface.

4) Gymnasiums and Cafeterias: General surveillance of floor, seating, and activity areas.

5) Kitchen Cash Register: Overhead view of cash handling area including a view of the cash drawer, register keyboard, and 4’ radius around register.

6) Administrative Office Commons Area and Visitor Sign In: Surveillance of visitor sign in and waiting areas and including office entry doors when possible.

d. Infrastructure

a. Provide patch cables from the camera to the network interface box and from the patch panel to the network switch.

b. Unless noted otherwise, another section will provide the following infrastructure.

1) Interior Dome Cameras

a) Acceptable Manufacturers

(1) Panasonic WV S2136L Series Fixed Dome Network Camera.

b) specification 271300. Communications Cabling Plant.

c) Terminate the network cables to patch panels in the IDF/MDF Room in accordance with specification 271300.

d) Terminate and label data cables in accordance with Section 27 13 00.

2) Exterior Dome Cameras

a) Provide one Category 5e (Category 6 for new facilities and additions) network cable from a 4” x 4” x 2 1/8” deep network interface box located above the accessible ceiling near each camera location to the scheduled IDF/MDF Room. Coordinate the network interface box location.

b) Terminate the network cables to patch panels (provided by the Owner) in the IDF/MDF Room and to Systimax RJ45 female connectors located within the camera housing.

c) Terminate and label data cables in accordance with Section 27 13 00.

B. EQUIPMENT REQUIREMENTS

1. Interior Dome Cameras

a. The Fixed Dome Camera shall deliver H.265 stream and H.264 stream.

b. The Fixed Dome Camera shall produce a resolution of 1,920 x 1,080 pixels (Full HD 1080p) at up to 60 fps with a 16:9 aspect ratio.

c. The Fixed Dome Camera shall feature a 144dB wide dynamic range based on Enhanced Super Dynamic and Adaptive Black Stretch technology (ABS).

d. The Fixed Dome Camera shall offer a built-in IR illumination to produce a clear monochrome image in zero lux conditions with 30m (98feet) irradiation distance.

e. The Fixed Dome Camera shall generate multiple simultaneous video streams of up to four (4) H.265 (Main profile) or H.264 (High profile) streams and JPEG streams.

f. The Fixed Dome Camera shall be equipped with GOP control and Smart Facial coding which control an image quality of a stationary area, a moving area and a face, as bitrate reducing technology.

g. The Fixed Dome Camera shall produce encrypted stream.

i. A user shall be able to view video on a smartphone and tablet using viewer software for IPhone and Android.

j. The Fixed Dom Camera shall offer Video Motion Detection (VMD) with four (4) programmable detection areas, 15 steps sensitivity level and 10 septs detection size.

k. The Fixed Dome Camera shall offer the prioritized stream control which transmits a video stream to a specified client PC or recorder preferentially.

l. The Fixed Dome Camera shall have a SD memory card slot that supports SD, SDHS and SDXC memory card for local storage.

1. Exterior Dome CCTV Camera

a. The Fixed Dome Camera shall produce a resolution of 1,920 x 1,080 pixels (Full HD 1080p) at up to 60 fps with a 16:9 aspect ratio.

b. The Fixed Dome Camera shall produce a resolution of 2,048 x 1,536 pixels at 30fps with a 4.3 aspect ratio.

c. The Fixed Dome Camera shall feature a 144dB wide dynamic range based on Enhanced Super Dynamic and Adaptive Black Stretch technology (ABS)

d. The Fixed Dome Camera shall offer a built-in IR illumination to produce a clear monochrome image in zero lux conditions with 40m (131feet) irradiation distance.

e. The Fixed Dome Camera shall generate multiple simultaneous video streams of up to four (4) H.265 (Main profile) or H.264 (High profile) streams and JPEG streams.

f. The Fixed Dome Camera shall be equipped with GOP control and Smart Facial coding which control an image quality of a stationary area, a moving area and a face, as bitrate reducing technology.

g. The Fixed Dome Camera shall produce encrypted stream.

h. A user shall be able to view video on a smartphone and tablet using viewer software for IPhone an Android.

i. The Fixed Dome Camera shall offer Video Motion Detection (VMD) with four (4) programmable detection areas, 15 steps sensitivity level and 10 steps detection size

j. The Fixed Dome Camera shall offer the prioritized stream control which transmits a video stream to a specified client PC or recorder preferentially.

k. The Fixed Dome Camera shall have a SD memory card slot that supports SD, SDHC and SDXC memory card for local storage.

PART 3 - Acceptable Manufacturers

1. Panasonic WV-S2536LN Series Fixed Dome Network Exterior Camera to be supplied with Video insight Enterprise Video Management Software Camera License.

2. Panasonic WV-S2136L Series Fixed Dome Network Interior Camera to be supplied with Video insight Enterprise Video Management Software Camera License.

PART 4 - EXECUTION

4.01 COORDINATION

A. Owner Coordination

a. Coordinate programming information required to interface systems with the Owner's existing systems.

b. Coordinate final device locations and installation and operational requirements.

c. Coordinate equipment labeling.

d. Coordinate cable jacket colors.

B. At a minimum, coordinate the following with the Architect:

a. Equipment finishes and colors. Submit finishes and graphics for equipment in public areas to the Architect for approval prior to installation.

b. Exact locations of all devices prior to installation.

C. Verify that adequate conduit is provided and that equipment backboxes are adequate for system installation.

4.02 INSTALLATION

A. General

a. Coordinate equipment installation requirements with other trades prior to installation.

b. After installation, protect equipment to prevent damage during the construction period. Close openings in conduits and boxes to prevent the entrance of foreign materials.

c. Make equipment connections in accordance with the approved submittal drawings and manufacturer specifications.

d. Seal exterior devices to protect against weather conditions including heat, cold, moisture, dust, and sand.

e. Site Observation

a. Continuously verify that the site conditions are in agreement with the Contract Documents. Submit a report to the Owner or its representatives documenting changes to the site or conditions that affect the performance of the system to be installed. For those changes or conditions, which affect system installation or performance, provide (with the report) specification sheets, or written functional requirements to support the findings, and a cost estimate to correct the deficiency. No deficiency shall be corrected without written permission from the Owner or its representatives.

b. The Owner or its representatives will conduct random site observation visits during the project and prepare reports noting observations. Correct deficiencies noted on the site visit reports. All work shall comply with the Contract Documents, applicable codes, regulations and local Authorities whether or not a particular deficiency has been noted in a site visit report.

B. Equipment

a. Field-verify specific equipment locations to provide the best fit and function. Verify locations with the Owner or its representatives before installation.

b. Install equipment in accordance with manufacturer specifications.

c. Install equipment to allow adequate clearance for testing and maintenance.

d. Provide tamper resistant screws and fasteners for equipment located in accessible and/or public areas.

e. Remove dirt, packaging, wiring scraps, and other debris from equipment, boxes, and cabinets at the end of each work day.

f. Wherever possible, remove contractor and manufacturer equipment logos from security field devices.

C. Existing Equipment

a. Replace ceiling tiles with matching new tiles when removing ceiling mounted devices.

b. Restore surfaces where removed equipment was located. Provide covers, patching, painting, and other remedies to match surface finishes.

D. Programming

a. Program IP addresses and other basic information necessary for the Owner to communicate with and complete programming of the System. Owner to provide IP addresses to contractor. Contractor to provide owner with port and switch information.

b. The Owner will complete programming of the system.

4.03 SURGE PROTECTION

A. Provide protection against spikes, surges, noise, and other line problems for all system equipment and components fed by unregulated power sources including 120VAC power branch circuits.

B. Provide surge protection for all power circuits, telephone, network, and other communication circuits, and electronic modules on wiring entering the premises.

4.04 PROJECT COMPLETION PROCESS

A. System Programming

a. The Owner will program the security systems as necessary to communicate with equipment installed by the Security Contractor.

b. Submit Owner supplied system-programming forms (electronic in format submitted by the Owner) to the Owner with the prefabrication submittals.

c. While the systems are being installed, the Owner will program the information into the security systems in an off-line mode.

d. The Owner and the Security Contractor will review the completed programming by the Owner to identify and correct programming and compatibility issues.

B. Project Completion and Final Acceptance Testing

a. Install the security system in accordance with the project schedule.

b. Three Weeks Prior To Security System Final Acceptance Testing

a. Provide a two week completion notice the Architect and the Owner.

b. Provide notice of the pending final acceptance testing to the Architect, the Owner, and the Security Consultant.

c. Coordinate final network (ports, IP addresses, programming, etc.) requirements with the Architect and the Owner. Submit completed camera schedules in electronic form and high quality digital photographs of network switches and available ports where cameras will be connected. The Owner will use the photographs to verify switch port requests by the Contractor and reduce errors in port assignments.

d. The Owner will complete system programming and communication to the security systems within those two weeks.

c. One Week Prior To Security System Final Acceptance Testing

a. Test the security system devices, communications, and programming.

b. Prepare a downloadable test program for the System. The test program shall allow the Contractor to demonstrate proper operation of the System and each device and shall be used to perform System testing if programming or communications work by the Owner is not complete.

c. Coordinate with the Owner to resolve any programming and communication problems that arose during the test.

d. Submit a system completion report detailing the installation and test dates of installed devices to the Security Consultant.

e. Submit one electronic copy of draft as-built drawings to the Security Consultant. The draft as-builts will be used for acceptance testing only.

f. Upon completion of the Security Contractor testing and coordination, the Owner and the Security Consultant will conduct a final acceptance test.

g. The Security Consultant will prepare a punch list of items identified during the test that require correction.

END OF SECTION 282300

APPENDIX “A”
Project Description and Scope of Work

PROJECT DESCRIPTION AND SCOPE OF WORK

APPENDIX “B”
Video Surveillance System Schedule

FIRE ALARM SYSTEM
SECTION 283100
(New Construction)

PART 1-GENERAL

1.1 SPECIAL CONDITIONS

A. Special conditions of this specification apply to the work of this section.

B. The Contractor shall provide all equipment, materials, tools, labor, engineering, drawings, testing, and certifications necessary for a complete operational, code compliant fire alarm system. The purpose of the contract documents is to convey to the Contractor the scope of work required, for which the Contractor is responsible to furnish, install, adjust and make ready for operation.

C. All major elements of the work are described. The Contractor is expected, to anticipate and include in the cost of the work any incidentals that may be required, but are not specifically expressed, in order to provide a complete and fully functional fire alarm system for this structure.

D. Project design drawings and specifications reflect the intent and scope of the project. The Contractor is expected to make allowances for necessary adjustment during the actual system installation, to examine physical conditions, coordinate the actual device locations as necessary to accommodate the existing conditions, obstructions, manufacturer's installation specifications, applicable codes, and the work of others. Every panel and/or device necessary to complete the project may not be indicated on the drawing. No extra payments will be allowed for the Contractor on account of extra work made necessary by his failure to make such allowances. The cost associated with this task shall be included in the Contractor's base bid. Any case of error, omission, discrepancy or lack of clarity shall be promptly identified to the Owner for clarification prior to submission of the base bid price.

E. The Contractor shall provide all devices and equipment as required by contract drawings and these specifications. Under no circumstances shall the Contractor delete or alter any equipment or devices without the written directive of the Owner. Deviations from the specified items shall be at the risk of the contractor until the date of final acceptance by the architect, engineer, and owner's representative. All costs for removal, relocation, or replacement of a substituted item shall be at the risk of the contractor.

F. The Owner prefers the use of addressable duct detectors over area smoke detectors as the required means of smoke detection through ventilation systems.

G. Fire Alarm Contractor to obtain system approval from Local Fire Marshall. System Planner’s Name and License Number are to appear on shop drawings.

1.2 PERFORMANCE GUIDELINES

This Contractor shall provide labor, materials, equipment, and installation for a functional fire alarm and as outlined in these specifications and shown on the drawings. The Contractor shall be responsible for compliance with the entire project specifications as well as the following guidelines. The guidelines are not intended to be all-inclusive, to limit or define the Contractor's Scope of Work. The work includes the following:

1. Installation of a complete operational point addressable fire alarm system.

2. Core drilling and fire stopping.

3. Cutting, patching and fire caulking. (Keep UL details at site for fire caulk being used)

4. Production and Distribution of detailed shop drawings.

5. Coordinate the work with other trades for this project and coordinate with any other Owner projects in the building ongoing at the time of Fire Alarm Contractor's work.

6. Provide on-site project supervision by a person licensed by the State Fire Marshal while any installation is being performed.

7. Develop a construction schedule, conduct job progress meetings, and issue written job progress reports at interval agreed upon by the Owner and Engineer.

8. Provide record documents as required by applicable code, AHJ and specifications.

9. Provide operating and maintenance instructions.

10. Conduct a test of the system upon completion of installation to assure the Contractor and the Owner that the system is operational. This test shall take place prior to the commissioning test.

11. Conduct the commissioning test. The Fire Alarm Contractor shall furnish personnel who are familiar with the installation at a time convenient to the Authority Having Jurisdiction, Owner and Engineer.

12. Provide training of Owner's personnel.

13. Provide design and as built drawings in AutoCad 2011 or later DWG. Format. Verify software version with Owner.

14. Provide 1-year job site warranty of all materials and labor furnished under this section. The 1-year warranty shall begin upon Authority Having Jurisdiction, Owner and Engineer acceptance.

15. Provide a fire alarm inspection and report one month prior to expiration of warranty in accordance with NFPA, State and local Fire Alarm Codes.

1.3 APPLICABLE STANDARDS

The following standards and guides (current adopted edition) are hereby made a part of this work by reference there to:

A. National Fire Protection Association (NFPA):

1. NFPA 13 - Installation of Sprinkler Systems,

2. NFPA 20 - Installation of Centrifugal Fire Pumps,

3. NFPA 70 - National Electrical Code,

4. NFPA 72 - National Fire Alarm Code,

5. NFPA 90A - Standard for the Installation of Air-conditioning and Ventilating Systems

6. NFPA 92A - Recommended Practice for Smoke Control Systems

7. NFPA 92B - Guide for Smoke Management Systems in Malls, Atria, and Large Areas

8. NFPA 101 - Life Safety Code

9. NFPA 110 - Emergency and Standby Power Systems

B. Underwriters Laboratories latest edition

1. UL Standard 346, Waterflow Indicators for Fire Protective Signaling Systems

2. UL Standard 268, Smoke Detectors for Fire Protective Signaling Systems

3. UL Standard 521, Heat Detectors for Fire Protective Signaling Systems

4. UL Standard 827, Central Stations for Watchman, Fire Alarm and Supervisory Services

5. UL Standard 268, Smoke Detectors for Fire Protective Signaling Systems

6. UL Standard 864, Control Units for Fire Protective Signaling Systems

7. UL Standard 1424, Cables for Power-Limited Fire Protective Signaling Systems

8. UL Standard 1480, Speakers for Fire Protective Signaling Systems

9. UL Standard 1481, Power Supplies for Fire Protective Signaling Systems

10. UL Standard 1971, Signaling Devices for the Hearing Impaired

11. UL Standard 1711, Amplifiers for Fire Protective Signaling Systems

C. American National Standards Institute (ANSI) A17, Safety Code for Elevators and Escalators, latest edition.

D. Americans with Disabilities Act Accessibility Guidelines (ADAAG)

E. Texas Accessibility Standards (TAS)

1.4 DEFINITIONS AND ABBREVIATIONS

Accessible: Spaces or concealed areas that can be entered via an openable door, panel hatch or other easily moveable material to accommodate inspection, testing and servicing.

Approved: Unless otherwise stated, materials, equipment or submittals approved by the Owner and Engineer.

Authority Having Jurisdiction (AHJ):
City of Austin Fire Department
Texas Department of Insurance State Fire Marshal's Office

Concealed: Where used in connection with installation of piping or conduit and accessories shall mean, "hidden from sight" as in shafts, furred spaces, in soffits, in walls or above suspended ceilings.

Contractor: The Company awarded the prime contract for this work and any of its subcontractors, vendors, suppliers or fabricators.

Exposed: Where used in connection with installation of conduit and accessories shall mean "visible" or "not concealed".

Furnish: Supply materials.

Install: Mount and connect equipment or assemblies, made operable and test

Owner: Austin Independent School District
4000 S. IH 35 Frontage Road
Austin, Texas 78704
Tel: 512-414-2215
Fax: 512-414-0706

Provide: Furnish, install, connect, and test.

Shall: Indicate a mandatory requirement.

1.5 RELATED WORK

A. Related work existing or specified in other sections:

1. Demolition and removal of existing system –Division 2

2. Elevator – Division 14

3. Automatic Sprinkler System – Division 21

4. Special Hazards Fire Suppression – Division 21

5. Mechanical – Division 23

6. Electrical – Division 26

B. Existing equipment or equipment furnished and installed by others under another section of the specification to be wired, and connected to the fire alarm system by the fire alarm contractor as required:

1. Provide elevator control relays as required within the elevator machine room for fireman’s notification, elevator shutdown, primary and secondary recalls. The Fire Alarm Contractor shall provide in accordance with ANSI A17 a control relay adjacent to each control unit in the elevator machine rooms. Route a one-inch empty conduit between elevator controller and fire alarm system control relay.

2. The Fire Alarm Contractor shall provide the necessary monitoring modules and wiring to connect the water flow and Tamper/Supervisory

switches. Each water flow switch shall be monitored individually. Each Tamper switch shall be monitored individually. Refer to plumbing drawings for locations.

3. The Fire Alarm Contractor shall provide the necessary monitoring modules and wiring to connect the Fire Pump monitoring relays to the fire alarm system.

4. Fire suppression system alarm micro-switch provided by others, to be wired and monitored by the fire alarm contractor.

5. Fire Smoke dampers are furnished and installed *by* others. The fire alarm contractor is to provide an alarm relay (contacts rated minimum 10 amp) for (FSD) control. Fire Smoke dampers shall not be powered by fire alarm system.

6. Fire alarm contractor to provide an accessible control relay for AHU control. Fire alarm contractor to provide necessary wire conductors from control relay to AHU connection point. Fire alarm contractor shall be responsible for providing conduit to the AHU Shutdown Control point.

7. Provide electrical power connections to all fire alarm panels. Provide a dedicated circuit in accordance with NFPA 70 and 72.

1.6 PERFORMANCE REQUIREMENTS

A. Install a UL listed point addressable fire alarm and supervisory alarm system. Acceptable manufacturers are listed in the Part II - Products section. The new system shall include but, is not limited to, the following as required:

1. Provide elevator control relay for fireman’s notification, primary and alternative recall of elevators in accordance with ANSI A17.1. The Fire Alarm Contractor shall provide detection and control relays, required for the shutdown of elevators if hoist ways and or elevator machine room are to be protected by a fire sprinkler.

2. Provide fire alarm input modules to monitor and supervise the sprinkler system Devices as required by code and this specification. This includes, but is not limited to, all water flow devices, all valve supervisory devices, and fire pump.

3. A 10 AMP control relay for shut down of an amplified sound system upon fire alarm activation shall be installed to meet EVS code requirements.

4. Provide twenty percent (20%) excess capacity in the fire alarm panel and on each circuit to allow for future expansion by the owner. SLC device count should not exceed 80% of an individual SLC card’s capacity for that type device or an additional 6815 card will be required.

5. Provide user controls *for* override of smoke control/fan shutdown functions to allow for maintenance and testing to minimize disruption of normal activities, i.e., walk test or service group functions.

6. Provide one manual pull station in each fire sprinkler riser room and one manual pull station at the primary entrance of each separate building. Coordinate exact locations of pull stations with AISD Life Safety Supervisor.

7. All initiating devices shall have a unique digital fire alarm address. Monitor devices for fire sprinklers, fire extinguishing systems, and supervisory switches shall be allowed to have a maximum of one (1) supervisory switch per address.

8. Voice evacuation signals generated shall be the distinctive evacuation signal with a digitized textual message. It shall allow for voice paging to selected areas and an all-call control.

9. The fire alarm system must be listed and approved as a smoke detector sensitivity test set and be capable of providing drift compensation.

10. All systems must be field programmable for all changes, alterations, modifications, additions, deletions, hardware and software upgrades.

11. All systems must be capable of generating comprehensive reports for sensitivity, verification counts and address registers.

12. A fault isolation device shall be provided electrically between each building level and between each smoke zone. The device shall be powered by the SLC loop.

B. Systems Circuit Wiring:

1. All fire alarm initiating device circuits (IDC) shall be NFPA 72, **Class B** Pathway, supervised signing line circuits from the point addressable interface modules to the devices.

2. All fire alarm point addressable circuits (SLC) shall be NFPA 72, **Class B**, Style 4, supervised signaling line circuits from the fire alarm panel to the point addressable sensors or point addressable interface modules.

3. All notification appliance circuits (NAC) shall be NFPA, **Class B**, Style Y, supervised notification appliance circuits from the fire alarm panel to the audible devices, and strobes.

1.7 SYSTEM OPERATION

A. The point addressable fire alarm and supervisory system shall perform the following functions:

1. Continuous monitoring of the status of all alarm and supervisory signal initiating devices.

2. Continuous monitoring of all electrically supervised initiating, supervisory, and signaling circuits.

3. Visible point annunciation of all fire alarm point trouble conditions at the control panel.

4. Operation of elevator controls as indicated herein.

5. Be silenced by a code or Firefighter key at the main or remote annunciators

B. Upon change in status of any device on the system, the fire alarm control panel shall activate audible and visible status change indicators and display the system point number, point description and message associated with the point. Permanently record the change in status, time, date, point description, and message in the history buffer, and transmit the point ID information to the central monitoring station.

C. Activation of any water flow device, smoke detector, heat detector, manual pull station, supervisory device or other initiating device will cause the following functions to occur:

1. Water flow switch, Smoke detector, Beam smoke detector, Manual pull station, Heat detectors, and Fire suppression system operation shall:

   a. Activate audible and visible status changes indicators and display the system point number, point description, and message associated with the point on the system's operator terminal.
   b. Permanently record the change in status, time, date, point description, and message associated with the point in history buffer
   c. Release electronically held open and or locked doors.
   d. Activate smoke control system.
   e. Activate the audio visual alarm.
   f. Transmit an alarm condition using point ID to the Owners Central Station.
   g. In area(s) protected by voice evacuation, shut down the amplified sound.

2. Duct type smoke detector operation shall cause the following to occur:

a. Activate audible and visible status changes indicators and display the system point number, point description, and message associated with the point on the system's operator terminal.
b. Permanently record the change in status, time, date, point description, and message associated with the point in history buffer
c. Activate smoke control system.
d. Activate the supervisory signal
e. Transmit supervisory condition using point ID to the Owners Central Station.

3. Elevator machine room and lobby smoke detectors operation shall be in accordance with the State of Texas and ANSI AI7.1. Smoke detectors in the elevator machine room and elevator lobbies shall cause the following to occur:

   a. Activate audible and visible status changes indicators and display the system point number, point description, and message associated with the point on the system's operator terminal.
   b. Permanently record the change in status, time, date, point description, and message associated with the point in history buffer
   c. Activate the audio visual alarm
   d. Release electronically held open and or locked doors. Activate smoke control system
   e. Activate appropriate control relay for elevator recall
   f. In area(s) protected by voice evacuation, shut down the amplified sound.
   g. Transmit an alarm condition using point ID to the Owners Central Station

4. Elevator machine room and (if required) elevator hoistway's smoke detector operation shall be in accordance with the State of Texas and ANSI AI7.1. Smoke detectors in the elevator machine room and elevator hoistways shall cause the following to occur:

   a. Activate audible and visible status changes indicators and display the system point number, point description, and message associated with the point on the system's operator terminal.
   b. Permanently record the change in status, time, date, point description, and message associated with the point in history buffer
   c. Activate the audio visual alarm
   d. Release electronically held open and or locked doors. Activate smoke control system.
   e. Activate appropriate control relay for elevator recall
   f. Activate appropriate control relay for fireman's cab notification
   g. In area(s) protected by voice evacuation, shut down the amplified sound.
   h. Transmit an alarm condition using point ID to the Owners Central Station

5. If required Elevator machine room and elevator hoistway's heat detectors operation shall be in accordance with the State of Texas and ANSI AI7.1. Smoke detectors in the elevator machine room and elevator hoist ways shall cause the following to occur:

    a Activate audible and visible status change indicators and display the system point number, point description, and message associated with the point on the system's operator terminal.
    b. Permanently record the change in status, time, date, point description, and message associated with the point in history buffer
    c. Activate the audio visual alarm
    d. Release electronically held open and or locked doors. Activate smoke control system.

    e. Activate appropriate control relay.

    f. Transmit alarm condition using point ID to the Owners Central Station

6. Supervisory device or trouble condition activation, including valve supervisory devices, shall:

    a. Activate audible and visible status with the point on the system's operator terminal.
    b. Permanently record the change in status changes indicators and display the system point number, point description, and message associated, time, date, point description, and message associated with the point in history buffer
    c. Transmit supervisory condition using point ID to the Owners Central Station
    d. When the device in trouble is restored to normal, the control panel shall be automatically reset

1.8 SUBMITTALS

A. Electronically submit the following equipment information:

1. Manufacturer's data sheets (PDF is acceptable) with equipment to be used highlighted

2. Wiring diagrams of all equipment,

4. Installation instructions for all equipment,

4. Equipment dimensions,

5. Equipment testing procedures,

6. Equipment operation and maintenance manuals

7. Wire data sheets.

B. Submit the following software information:

1. Complete sequence of operation with input/output matrix for all points

C. Submit the following shop drawing information:

1. Complete panel layout showing all field terminations

2. Complete panel layout showing location of all modules, power supplies and batteries

3. Complete system riser diagrams

4. Main panel elevations

5. Complete floor plans showing all devices with point identification numbers.

D. Submit the following system calculations:

A. Standby battery capacity for fire alarm

A. Standby battery capacity for voice alarm

A. Standby battery capacity for all remote panels

A. Voltage drop calculations for each type of circuit (identifying all mathematical formulas, variables, constants, and sources of the mathematical constants)

5. Speaker zone/circuit loading (including amplifier loading)

6. Strobe zone/circuit loading

7. Normal 120 VAC fire alarm panel(s) circuit loading

8. Normal 120 VAC voice alarm panel(s) circuit loading

9. Normal 120 VAC remote panel circuit loading

E. Provide the following shop drawing information (Shop drawings shall be prepared using AutoCAD. Shop drawings shall be drawn to scale: 1/8" = 1'0" for floor plans.

1. Complete point-to-point wiring diagrams showing all field terminations.

2. Complete panel layout showing location of all modules.

3. Complete system riser diagrams, indicating wire sizes and types.

4. Interaction with all other building systems (i.e. elevator, AHU, FSD).

5. Complete floor plans showing all devices with point numbers.

F. Submittal packages shall be signed by a Fire Alarm Planner licensed by the State of Texas or signed and sealed by a PE registered in the State of Texas.

G. Prior to start of construction, submit the information outlined in A, B, C, and D above as follows:

1. Three complete system packages to the Owner for review by the Owner and Engineer.

2. One copy of AHJ “Approved Plan”

3. Any work performed prior to Owner approval not in full compliance with construction documents and this specification will be corrected at contractor’s expense.

1.9 WARRANTY

A. This Contractor shall provide a one-year written warranty against defects in material and workmanship furnished under this Contract. The costs of such warranty shall be part of the purchase price. The warranty shall commence when the Owner and Engineer accept the system and installation.

B. The warranty shall include all necessary material, travel, labor and parts to replace defective components or materials at the job site. This Contractor shall commence repair of any "in warranty" defects within 8 hours of notification of such defects.

C. The Contractor shall include, as part of the one-year warranty, a test and inspection of the new fire alarm devices within one month prior to the expiration of the one-year construction warranty. The Contractor shall provide a written report of any deficiencies and repair any of the deficiencies. The test and inspection report shall conform to the test and inspection form as described in NFPA 72 and as required by the AHJ.

1.10 QUALITY ASSURANCE

A. The fire alarm system manufacturer or authorized distributor shall maintain a fully staffed branch office including application engineers and technical service personnel.

B. All supplied equipment shall be new, currently manufactured, standard product of the manufacturer.

C. All technical service personnel shall be regularly employed by the distributor of the fire alarm system.

D. The installing Contractor shall hold a current license, issued by the State of Texas Commission on Fire Safety, to design, install, and service fire detection and alarm equipment.

E. All electrical installation of the fire alarm system, including wire installation and terminations, shall be performed by personnel under the supervision of the Fire Alarm Contractor.

F. Any subcontractors used to install portions of the system shall be submitted and approved by the Owner and the Engineer prior to commencement of the installation.

1.11 BASE BID AND ALTERNATES

A. The base bid shall include all items described in this specification.

PART 2 - PRODUCTS

2.1 MAIN FIRE ALARM CONTROL PANEL

A. Acceptable manufacturers of the fire alarm systems are Silent Knight/Honeywell.

2.2.1 Control Panel

A. The fire alarm control panel (FACP) shall be the Honeywell/Silent Knight 6820XL/EVS. The FACP must have a built in LCD annunciator with the capability of having an additional eight (8) remote annunciators in the field. The FACP shall support Telco and IP communications for Central Station monitoring.

Devices supported must include analog photoelectric and ionization type smoke detectors, analog heat detectors, addressable input modules, relay output modules and addressable notification modules using SK protocol.

The panel must have a built in 80 character LCD annunciator with the capability of having an additional eight supervised remote annunciators connected in the field.

The FACP must have a built in UL approved digital communicator. The communicator must allow local and remote up/downloading of system operating options, event history, and detector sensitivity data.

The FACP must automatically test the smoke detectors in compliance with NFPA standards to ensure that they are within listed sensitivity parameters and be listed with Underwriters Laboratories for this purpose.

Devices supported must include analog photoelectric smoke detectors, analog heat detectors, addressable input modules, relay output modules or addressable notification modules compatible with SK protocol. Individual SLC 6815 cards should not exceed 80% of maximum capacity to ensure future expansion capability. Only Silent Knight Devices using SK protocol can be connected to the SLC. Examples are:

SK-Photo	Analog Photoelectric Smoke detector
SK-Heat/SK Heat-HT	Analog Heat Sensor
SK-Relay	Addressable Relay Module
SK-Monitor	Addressable Input Module
SK-ISO	Fault Isolation Module
B224RB-WH	Detector Relay Base
SK-DUCT	Duct Smoke Detector
SK-PULL-SA	Addressable Pull Station

B. Normal operating power for the FACP shall be 120 volt AC supplied from dedicated circuits of the emergency power panel. All circuits shall be protected by circuit breakers of proper size.

C. The fire alarm system shall be provided with an emergency standby power system consisting of backup batteries. Batteries shall be sealed lead-acid or gel cell of sufficient capacity to provide 24 hours standby operation plus 15 minutes in full alarm condition. All calculations shall allow a minimum of 20% safety factor for battery degradation.

D. The FACP shall accommodate all specified initiating device, notification appliance and command points. Each initiating circuit shall allow a 20 percent expansion of connected detection devices and 20 percent expansion of connected monitor/control points. Each notification appliance circuit shall allow a 20 percent expansion of connected devices.

2.2.2 Annunciators

A. An EVS-LOC shall be installed in the main office or close proximity if the FACP is located elsewhere.

B. A 5860 or 6860 model annunciator shall be installed in the main sprinkler riser room.

2.3 VOICE COMMUNICATION SYSTEM

A. The 6820XL/EVS features a built-in Digital Message Repeater with 15 EVS message capability.

B. SBUS addressable constant voltage amplifiers are needed to amplify and distribute the EVS messages. Only the listed models are allowed. A combination of four of the following shall be used for a maximum of 500 watts per system:

1. EVS-50W
2. EVS-125W
3. EVS-INT50W
4. EVS-100W

C. Normal operating power for the voice system amplifiers shall be 120 volt AC supplied from dedicated circuits of the local electrical power panel. All circuits shall be protected by circuit breakers of proper size.

D. EVS Amplifiers shall be provided with an emergency standby power system consisting of backup batteries. Batteries shall be sealed lead-acid or gel cell of sufficient capacity to provide 24-hour standby operation plus 15 minutes in full alarm condition. All calculations shall allow a minimum of 20% safety factor for battery degradation.

E. The appropriate model EVS amplifier shall be chosen to accommodate all required speaker wattage loads while maintaining a surplus capacity of at least 20% to ensure future expansion.

F. The EVS shall provide prerecorded messages to be transmitted to the entire building. The Authority Having Jurisdiction (AHJ) shall approve messages. Prerecorded messages shall be in English and Spanish for the following emergency events:

(1) Fire Alarm
(2) Severe Weather
(3) Intruder Alert

2.4 REMOTE TRANSPONDER PANELS

A. Remote Power Supplies shall be provided where required. Power Supplies shall be surface mounted with locking door or over keyed the same as the main fire alarm panel. Power supplies shall be supervised and monitored by the FACP for AC Power Loss and Low battery condition.

B. The contractor shall supply a power module 5895 XL (Rev F or higher) compatible with the 6820XL fire alarm control panel. The power module must have 6 amps of output power. The Distributed Power Supply shall be capable of being connected via an RS-485 system bus (SBUS). The power module's

RS-485 bus shall be electrically isolated providing ground loop isolation and transient protection.

C. The 5895 XL panels shall accommodate all specified initiating device and command points. Each initiating circuit shall allow a 20 percent expansion of connected detection devices and 20 percent expansion of connected monitor/control points.

D. Normal system power shall be 120-volt AC power provided by dedicated circuits from the local electrical power panel. All circuits shall be protected by circuit breakers of proper size.

E. The 5895 XL panels shall be provided with an emergency standby power system consisting of backup batteries. Batteries shall be sealed lead-acid or gel cell of sufficient capacity to provide 24 hours of standby operation plus 5 minutes in full alarm condition. All calculations shall allow a minimum of 20% safety factor for battery degradation. The loss of AC or DC power at any 5895 XL shall cause a distinct power failure signal.

F. The 5895 XL cabinets shall accept input/output (initiating, supervision, notification and/or command) modules for the specified points, zones and spares.

2.5 Remote 5495 or 5496 (Rev F or higher) Power Supplies shall include:

A. A minimum of four notification appliance circuit monitoring and control modules. The modules shall be designed to meet the required circuit Style Y configurations.

B. Power supply with battery charger and standby batteries. Batteries shall be sized to meet the standby requirements of the FACP.

C. Supervision and activation by the main fire alarm system.

D. Provide an SK-Monitor module to monitor each 5495 panel that is not located in the same room as the main fire alarm control panel.

E. Each panel and initiating circuit shall not exceed 80 percent of capacity.

2.6.1 MAIN FIRE ALARM SYSTEM EQUIPMENT

A. Alarm Initiating Devices: All alarm initiating devices must be compatible with and UL listed with the fire alarm control panel

1. Manual fire alarm pull stations shall be addressable, single action type with key operated reset lock. Pull stations shall include flush mount STI Stopper II with Horn Protective Cover.

2. Wet system water flow switches indicated on the drawings exist or be furnished and installed by the sprinkler contractor and connected by this Contractor. The switches shall actuate within 0-90 seconds after the inspector's test valve is opened. Each flow switch and each tamper shall be identified with an individual SK-Monitor module, do not use MIM.

3. Point addressable heat detectors listed under UL Standard 521 shall be provided where indicated and where elevator machine rooms and elevator hoistways are sprinkled.

4. Analog addressable photoelectric smoke detectors shall be provided where indicated.

   a. Analog addressable photoelectric smoke detectors shall be provided with integral LEDs to indicate detectors in alarm. The detectors shall operate from the two-wire signaling line circuit and be listed under UL Standard 268.

   b. Duct-mounted analog addressable smoke detectors shall be provided when required and installed in an accessible space in accordance with manufacturer’s instructions and NFPA 72. Duct mounted detectors installed above ceiling shall be installed with compatible remote test switch. Duct detector shall be mounted in an accessible locations for service and required inspection and testing. Duct detectors mounted above a hard surface shall have an access panel installed so the detector can be inspected and tested by a technician standing safely on a ladder. Remote test switches shall be mounted on wall surface near the location of the detector. Remote test switch shall be mounted 9 feet above finished floor or 1 foot below ceiling, whichever is lower. Remote test switch shall be installed in an appropriate recessed back box or surface mount Wiremold extra deep box model V5744. Duct detectors shall be labeled with durable, machine produced, easy to read minimum 1/2 “ labels indicating module and point address of corresponding duct detector. Remote test switches shall be labeled with durable, easy to read minimum 3/4” labels indicating module and point address of associated duct detector.

5. The beam smoke detector shall have an operating range of 30 feet by 320 feet and shall have a range of field selective sensitivity setting from 7% to 50% of higher total obscuration. The beam smoke detector shall provide continuous supervision and shall be provided with an automatic gain control that compensates for slow ambient visibility changes. The detector shall operate on 24 VDC from the nearest power source UL listed for that purpose. The detector shall be supervised for alarm and trouble conditions. The detector shall be installed in accordance with the manufacturer's instructions.

6. Addressable point monitoring interface modules shall be used to monitor the water flow switches and fire suppression systems. The interface modules shall provide Style B electrical supervision of circuits connected to monitoring devices. Honeywell/SK MIM or Potter100MIM modules are not acceptable.

B. Supervisory Devices:

1. Valve supervisory devices (i.e., tamper switches) existing or shall be furnished and installed by the Sprinkler Contractor and wired by this Contractor as indicated. The valve supervisory devices shall be installed to transmit a supervisory signal within the first two turns of the control valve handle.

2. Electric fire pump shall be supervised per NFPA 20 for run status, loss of AC power/phase reversal. Dry contacts may be provided in the pump controller and may be used. If dry contacts are not provided in the pump controller, provide accessory SPST relays for the required supervision.

3. Accessory relays shall be provided as needed to supervise equipment. All accessory relays shall be SPDT.

4. Addressable point monitor interface modules shall be used to monitor all supervisory points. The interface modules shall provide Style B electrical supervision of circuits to monitored devices.

C. Control Devices:

1. Provide control relays/contacts where required. The control relays/coils shall be 24 volt DC low voltage type each with number of contacts as required and housed in metal enclosure. The contacts shall be rated for 10 amps as required for continuous duty and for the control circuit voltage.

2. Addressable point control devices shall be used to provide all required control functions.

PART 3 - EXECUTION

3.1 INSTALLATION

A. System components shall be installed in accordance with the latest revisions of the appropriate NFPA code, National Electrical Code, the requirements contained herein, local and state regulations, the requirements of the fire department and other applicable authorities having jurisdiction (AHJ). The Fire Alarm Contractor shall furnish on-the-job supervision for the proper installation of devices in cooperation with, or as may be required by, other trades. This supervision shall include, but not be limited to, the following:

1. Provide specific on-site instructions to others on mounting and installation of each type of device by physically observing the mounting of one or more of each type of device, as required, to assure that the installer is properly instructed in the work.

2. Provide other supervision as required by the trades to properly interface fire alarm installation work.

3. Perform a complete test of all devices, certifying that all devices have been activated and that the devices and systems perform in accordance with the requirements of these specifications.

4. Install, test, troubleshoot and correct all system software provided under these specifications. This includes, but is not limited to, actual keyboard entry, reprogramming required to meet these specifications and any other task associated with the system software.

A. Provide all necessary submittals to the authority having jurisdiction.

A. Label each device connected to the SBUS or SLC with its module and SLC address with durable machine produced inch label.

A. Verify that fire alarm device as identified and in fire alarm control panel match building room numbers at time of building acceptance test. Correct as necessary.

A. At each stage of construction, State of Texas fire alarm installation form 34.618 shall be completed and a copy provided to owner.

B. The Fire Alarm Contractor shall furnish material and labor to provide a fully functioning system as described herein and in project drawings. The system shall operate in accordance with all the requirements of these specifications. No devices or equipment shall be used for any purposes other than their intended ones. This shall include, but not be limited to, the following:

1. Conduit, raceway and wiring systems shall be as indicated herein.

a.Wire shall be installed in conduit or wire mold in any area other than above an accessible suspended ceiling fire alarm unless specifically defined as not required in writing by owner.
b. All conduit fittings shall be threaded with plastic insert.
c. All risers wiring and wiring between floors shall be installed in conduit.
d. Conduit, flex, boxes and fittings water flow and supervisory switches for sprinkler systems shall be weatherproof to a height of 7 Ft. AFF.
e. Wiring, cables, conduits and raceways shall be neatly run parallel and perpendicular to building lines.

f. All raceways shall be of metal construction. Plastic conduits shall not be acceptable.
f. All cable not run in raceway shall be parallel/perpendicular to building lines and secured to the building structure. Provide bridal rings, D rings, or J hooks minimum of five feet spacing. Wire shall be neatly bundled with nylon wire ties at a minimum of four feet spacing.
h. All conduits shall be independently supported from structure. Wire and or Conduit may not be supported from equipment, piping, ductwork or other trade's supports without written permission from owner.
i. Do not route conduit or wire under ductwork or other equipment.
j. Where independent support wires are used, they shall be distinguishable by color, tagging, or other approved means from those that are part of the ceiling grid support system.
k. Wire installed in an area that is not accessible shall be installed in conduit.
l. Conduit shall be used for any wall penetration.

2. Wire
All wire used on the fire signaling system shall be UL Listed as fire alarm protection signaling circuit cable per National Electrical Code, Articles 760.

a. Wire used for 120 VDC power circuits shall be minimum 12 AWG solid copper conductors, with THHN insulation and UL listed for fire alarm use.
b. Fire alarm "SLC" cable (Smoke Detectors, Pull Stations, Etc.) shall be a minimum of 18 AWG, with red/black non-shielded conductor insulation with Plenum rated jacket. (18/2- FPLP)
c. Fire alarm power cable (Audio/Visual, Door Holders) shall be a minimum of 14 AWG, with red/black non-shielded conductor insulation with Plenum rated jacket. (14/2 FPLP)
d. Fire alarm "SBUS" cable shall be a minimum of 18 AWG, shielded conductor insulation and Plenum rated jacket. (18/4 FPLP)
e. Voice circuit cable shall be a minimum of 18 AWG shielded conductor insulation and Plenum rated jacket. (18/2)
f. All wiring shall be appropriately sized based upon voltage drop calculations.
g. Any underground wire must be UL Listed for that purpose.
h. Do not run wiring under ductwork or other above ceiling equipment.
i. Wire shall not be spliced between devices without written permission by owner.

3. Junction Boxes:
a. System components shall be securely fastened to the building structure. Devices shall not be supported by wiring or by other installed electrical fixtures or conduits.
b. Each box shall be large enough to accommodate required splices and conduit in accordance with NFPA 70.

c. System components shall be securely fastened to the building structure. Devices shall not be supported by wiring or by other installed electrical fixtures or conduits.
d. Boxes at sprinkler risers shall be weatherproof.
e. Provide and label box covers for all new and reused junction boxes.

4. Patching:
   Patching of all walls, floors, and ceilings, which are penetrated or damaged during construction and returning the surface to a condition matching existing adjacent surfaces.
   a. All slab penetrations shall be completely sealed and made watertight.
   b. Restore all fire rated walls to rated conditions. All fire rated wall penetrations shall be made in conduit and sealed with UL Listed "fire stop" caulking.
5. Mounting:
   a. All devices shall be mounted in accordance with the manufacturer's instructions and shall utilize the manufacturer's suggested mounting box.

   b. Surface-mounted devices shall be smooth sided, without knockouts.
   c. Point addressable monitor modules and control modules shall be securely mounted in back boxes in an accessible location.
   d. Field devices shall be labeled and all labeling recorded on "as-built drawings" indicate location, address and type of remote devices.
   e. Devices shall be flush or semi-flush mounted where possible.
   f. System components shall be placed and installed to comply with the Americans with Disabilities Act.
   g. All surface mounted devices shall be installed with appropriate back boxes. All work shall be neat and performed in a craftsman like manner.
   h. All devices, which are mounted behind walls or above a hard ceiling, shall be provided with access panels. Location of access panels shall be coordinated with the Owner.
   i. Fire alarm system devices shall not be installed where they may interfere with the operation of other building systems, devices or features.
   j. Devices and wiring installed in suspended ceilings shall be supported with appropriate bridge supports and ties.

C. Pay for all permits, fees and charges required for this work.

D. Any fire alarm work performed prior to obtaining AISD approval of contractor's shop drawings plan is subject to removal and correction at contractor's expense.

3.2 TESTS FIELD QUALITY CONTROL

A. Prior to or at the alarm test an As-Built drawing shall be provided to owner.

B. If the Fire Alarm System includes or is part of a Building Voice Evacuation System or Mass Notification System the installing contractor must inspect and test intelligibility in all areas after final furnishings and finishes are in place. Contractor shall refer to current NFPA 72 Chapters, along with associated Annex A material to develop and perform intelligibility testing. Contractor shall provide owner with statement describing how the testing plan was developed and implemented along with the results of the testing.

C. The commissioning alarm test shall be coordinated with the Owner, Engineer and AHJ. A letter certifying that the installation is complete per drawings and specifications and fully operational per NFPA 72 shall be forwarded to the Owner and Engineer. The fire alarm contractor is responsible for pretesting the system prior to scheduling any test with Owner or AHJ.

D. The Owner, Fire Alarm Contractor, Fire Alarm System Supplier, the Engineer and an authorized representative from each supplier of equipment shall be in attendance at the commissioning test to make necessary adjustments. A commissioning test shall be conducted in accordance with NFPA 72 and Authority Having Jurisdiction requirements. The test for owner may exceed AHJ requirements and shall include, but not be limited to:

1. A test of the system for grounded, opened and shorted circuits.
2. A test of each alarm and new supervisory signal-initiating device for functions specified.
3. A test to verify that the alarm signals will operate under specified trouble conditions.
4. A test to verify that the components and wiring will operate under specified trouble conditions.
5. A test to verify that the system will perform all specified tasks.
6. A test to verify that all devices subject to inspection and testing are accessible.
7. At the completion of the installation, inspect and provide to owner the contractor’s standard NFPA 72 compliant inspection form.
8. Provide a copy of State of Texas Form, FML 009A to owner.

3.4 RECORD DOCUMENTS

A. Provide three (3) full size prints, and a electronic copy of dwg files in AutoCad 2011 or later of “As Built” equipment and wiring diagrams.

B. Provide one (1) complete set of "as-built" data sheets for all system -connected equipment to the Owner.

C. Provide two (2) sets (hard copies) of the complete "as-built" software listing of all data files, event programs, print statements, etc. to the Owner.

D. Provide a completed test form, which complies with NFPA 72, signed and dated by the fire alarm contractor.

E. Provide completion certificate, signed by the authority having jurisdiction.

F. Provide manufacturer's recommended cleaning procedure for smokes detectors.

G. Provide manufacturer's recommended calibration procedure for smokes detectors.

H. Furnish a signed letter of guarantee, which specifies the substantial completion date and the guarantee period.

3.5 SPARE PARTS

Not required

END OF SECTION 283100

FIRE ALARM SYSTEM
SECTION 283101
(FOR RENOVATIONS AND ADDITIONS)

PART 1-GENERAL

1.1 SPECIAL CONDITIONS

A. Special conditions of this specification apply to the work of this section.

B. The Contractor shall provide all equipment, materials, tools, labor, engineering, drawings, testing, and certifications necessary for a complete operational, code compliant fire alarm system. The purpose of the contract documents is to convey to the Contractor the scope of work required, for which the Contractor is responsible to furnish, install, adjust and make ready for operation.

C. All major elements of the work are described. The Contractor is expected, to anticipate and include in the cost of the work any incidentals that may be required, but are not specifically expressed, in order to provide a complete and fully functional fire alarm system for this structure.

D. Project design drawings and specifications reflect the intent and scope of the project. The Contractor is expected to make allowances for necessary adjustment during the actual system installation, to examine physical conditions, coordinate the actual device locations as necessary to accommodate the existing conditions, obstructions, manufactures installation specifications, applicable codes, and the work of others. No extra payments will be allowed for the Contractor on account of extra work made necessary by his failure to make such allowances. The cost associated with this task shall be included in the Contractor's base bid. Any case of error, omission, discrepancy or lack of clarity shall be promptly identified to the Owner for clarification prior to submission of the base bid price.

E. The Contractor shall provide all devices and equipment as required by contract drawings and these specifications. Under no circumstances shall the Contractor delete or alter any equipment or devices without the written directive of the Owner. Deviations from the specified items shall be at the risk of the contractor until the date of final acceptance by the architect, engineer, and owner’s representative. All costs for removal, relocation, or replacement of a substituted item shall be at the risk of the contractor.

F. Protection of Existing Fire Alarm Systems prior to demolition of an area of construction.

1. Remove existing fire alarm components and devices affected by construction dust or environment not complying with NFPA standards (85% relative Humidity and an ambient temperature of 86*F). Devices shall be protected by covering with plastic or other materials or by

removing the device and storing in safe clean environment for reinstallation at a later time. Devices that are removed shall also be removed from the fire alarm program. Devices that remain in the construction area shall be supported by hanger bar, J box or other device and shall not be supported by fire alarm device conductors.

2. For the purpose of this project, any time part of the existing fire alarm system is totally or partially removed from service, for more than eight hours, a red tag shall be attached and the procedures prescribed in the fire alarm rules, adopted by the State Fire Marshal's Office, shall be followed. Red tags for removal of equipment shall indicate module and point address of devices removed.
3. When ceiling or wall are removed as a necessary part of construction, the fire alarm contractor shall remove all fire alarm wire and devices prior to ceiling or wall demolition. Fire alarm wiring shall be protected from construction activities. Fire alarm contractor shall make necessary wiring to keep system operational for others areas affected by the removal. Contractor shall reinstall and test 100% of devices removed for construction and provide service tag indicate testing.
4. Fire alarm conductors and devices that are damaged by construction shall be replaced with new wiring and devices. New wiring must be installed from the last device, no junction boxes or splices between devices.
5. Reinstall and test fire alarm devices after construction is complete and area is clean.

G. Fire Alarm Contractor to obtain system approval from Local Fire Marshall. System Planner’s Name and License Number are to appear on shop drawings.

1.2 PERFORMANCE GUIDELINES

This Contractor shall provide labor, materials, equipment, and installation for a functional fire alarm and as outlined in these specifications and shown on the drawings. The Contractor shall be responsible for compliance with the entire project specifications as well as the following guidelines. The guidelines are not intended to be all-inclusive, to limit or define the Contractor's Scope of Work. The work includes the following:

1. Installation of a complete operational point addressable fire alarm system.

2. Core drilling and fire stopping.

3. Cutting, patching and fire caulking. (Keep UL details at site for fire caulk being used.)

4. Detailed shop drawings.

5. Coordinate the work with other trades for this project and coordinate with any other Owner projects in the building ongoing at the time of Fire Alarm Contractor's work.

6. Provide on-site project supervision by a person licensed by the State Fire Marshal while any installation is being performed.

7. Develop a construction schedule, conduct job progress meetings, and issue written job progress reports at interval agreed upon by the Owner and Engineer.

8. Provide record documents as required by code, Authority Having Jurisdiction (AHJ) and specifications.

9. Provide operating and maintenance instructions.

10. Conduct a test of the system upon completion of installation to assure the Contractor and the Owner that the system is operational. This test shall take place prior to the commissioning test.

11. Conduct the commissioning test. The Fire Alarm Contractor shall furnish personnel who are familiar with the installation at a time convenient to the AHJ, Owner and Engineer.

12. Provide training of Owner's personnel.

13. Provide design and as built drawings as dwg files in AutoCad 2011 or later.

14. Provide 1-year job site warranty of all materials and labor furnished under this section. The 1-year warranty shall begin upon AHJ, Owner and Engineer acceptance.

15. Provide a fire alarm inspection and report one month prior to expiration of warranty in accordance with NFPA, State and local Fire Alarm Codes.

1.3 APPLICABLE STANDARDS

The following standards and guides (current adopted edition) are hereby made a part of this work by reference there to:

A. National Fire Protection Association (NFPA):

1. NFPA 13 - Installation of Sprinkler Systems,

2. NFPA 20 - Installation of Centrifugal Fire Pumps,

3. NFPA 70 - National Electrical Code,

4. NFPA 72 - National Fire Alarm Code,

5. NFPA 90A - Standard for the Installation of Air-conditioning and Ventilating Systems
6. NFPA 92A - Recommended Practice for Smoke Control Systems
7. NFPA 92B - Guide for Smoke Management Systems in Malls, Atria, and Large Areas
8. NFPA 101 - Life Safety Code
9. NFPA 110 - Emergency and Standby Power Systems

B. Underwriters Laboratories latest edition

1. UL Standard 346, Waterflow Indicators for Fire Protective Signaling Systems
2. UL Standard 268, Smoke Detectors for Fire Protective Signaling Systems
3. UL Standard 521, Heat Detectors for Fire Protective Signaling Systems
4. UL Standard 827, Central Stations for Watchman, Fire Alarm and Supervisory Services
5. UL Standard 268, Smoke Detectors for Fire Protective Signaling Systems
6. UL Standard 864, Control Units for Fire Protective Signaling Systems
7. UL Standard 1424, Cables for Power-Limited Fire Protective Signaling Systems
8. UL Standard 1480, Speakers for Fire Protective Signaling Systems
9. UL Standard 1481, Power Supplies for Fire Protective Signaling Systems
10. UL Standard 1971, Signaling Devices for the Hearing Impaired
11. UL Standard 1711, Amplifiers for Fire Protective Signaling Systems

C. American National Standards Institute (ANSI) A17, Safety Code for Elevators and Escalators, latest edition.

E. Americans with Disabilities Act Accessibility Guidelines (ADAAG)

F. Texas Accessibility Standards (TAS)

1.4 DEFINITIONS AND ABBREVIATIONS

Accessible: Spaces or concealed areas that can be entered via openable door, panels, hatches or other easily moveable material to accommodate inspections, testing and servicing.

Approved: Unless otherwise stated, materials, equipment or submittals approved by the Owner and Engineer.

Authority Having Jurisdiction:
City of Austin Fire Department
Texas Department of Insurance State Fire Marshal's Office

Concealed: Where used in connection with installation of piping or conduit and accessories, shall mean, "hidden from sight" as in shafts, furred spaces, in softies, in walls or above suspended ceilings.

Contractor: The company awarded the prime contract for this work and any of its subcontractors, vendors, suppliers or fabricators.

Exposed: Where used in connection with installation of conduit and accessories shall mean "visible" or "not concealed".

Furnish: Supply materials.

Install: Mount and connect equipment or assemblies, made operable and test

Owner: Austin Independent School District
4000 S. IH 35 Frontage Road
Austin, Texas 78704
Tel: 512-414-1703
Fax: 512-414-0295

Provide: Furnish, install, connect, and test.

Shall: Indicate a mandatory requirement.

1.5 RELATED WORK

A. Related work existing or specified in other sections:

1. Elevator – Division 14
2. Automatic Sprinkler System – Division 21
3. Special Hazards Fire Suppression – Division 21
4. Mechanical – Division 23
5. Electrical – Division 26
6. Demolition and removal of existing system – Division 2

A. Existing equipment or equipment furnished and installed by others under another section of the specification to be wired, and connected to the fire alarm system by the fire alarm contractor as required:

1. Provide elevator control relays as required within the elevator machine room for fireman's notification, elevator shutdown, primary and secondary recalls. The Fire Alarm Contractor shall provide in accordance with ANSI A17 a control relay adjacent to each control unit in the elevator machine rooms. Route a one-inch empty conduit between elevator controller and fire alarm system control relay.

2. The Fire Alarm Contractor shall provide the necessary monitoring modules and wiring to connect the waterflow and Tamper/Supervisory switches. Each waterflow switch shall be monitored individually. Each Tamper switch shall be monitored individually. Refer to plumbing drawings for locations.

3. The Fire Alarm Contractor shall provide the necessary monitoring modules and wiring to connect the Fire Pump monitoring relays to the fire alarm system.

4. Fire suppression system alarm micro-switch provided by others, to be wired and monitored by the fire alarm contractor.

5. Fire Smoke dampers are furnished and installed *by* others. The Fire alarm contractor to provide an alarm relay (contacts rated minimum 10 amp) for control.

6. AHU shutdown control. Fire alarm contractor to provide an accessible control relay for AHU control. Fire alarm contractor to provide necessary wire conductors from control relay to AHU connection point. Fire alarm contractors shall provide their own conduit for the AHU Control. Conduits installed by others shall NOT be used.

7. Provide electrical power connections to all fire alarm panels. If panel is installed in area with no existing fire panel provide new-dedicated circuit in accordance with NFPA 70 and 72. Field verify.

1.6 PERFORMANCE REQUIREMENTS

A. Install a UL listed point addressable fire alarm and supervisory alarm system. Acceptable manufacturers are listed in the Part II - Products section. The system shall include but, is not limited to, the following as required:

1. Provide connection to the elevator machine equipment for shutdown of elevators in accordance with ANSI A17. 1. The Fire Alarm Contractor shall provide all equipment, materials, and labor required for the shutdown of elevators if hoistways and or elevator machine room has or is to receive a fire sprinkler. Heat detectors shall also be added as required.

2. Provide connection to the elevator machine equipment to provide fireman's notification, primary and secondary recall of elevators in accordance with ANSI A17.1. The Fire Alarm Contractor shall provide all equipment, materials, and labor required for the primary and secondary recall of elevators. Smoke detectors shall also be added as required at the elevator lobbies, elevator hoist ways and elevator machine rooms.

3. Provide devices to properly monitor and supervise the sprinkler system devices. This includes all waterflow devices, all valve supervisory Devices and all devices associated with the fire pump to be installed by the Sprinkler Contractor.

4. Where voice evacuation is required provide control relay for shut down of amplified sound system upon alarm.

5. Provide or maintain twenty percent (20%) excess capacity on each SLC or NAC fire alarm circuit to allow for future expansion by the owner.

6. Provide user controls *for* override of smoke control/fan shutdown functions to allow for maintenance and testing to minimize disruption of normal activities, i.e. walk test or service group functions.

7. All initiating devices shall have a unique digital address. Monitor devices for water-based fire extinguishing system valve position supervisory switches shall be allowed to have a maximum of one (1) supervisory switches per address provided the valves are located in the same physical area.

8. Where indicated on bid documents the audible portion of the public alarm shall be a voice, evacuation system. Signals generated shall be the distinctive evacuation signal with a digitized textual message. It shall allow for voice paging to selected areas and an all-call control.

9. A fault isolation device shall be provided electrically between each building level and between each smoke zone. The device shall be powered by the SLC loop.

10. All systems must be capable of generating comprehensive reports for sensitivity, verification counts and address registers.

B. Systems Circuit Wiring:

1. All fire alarm initiating device circuits (IDC) shall be NFPA 72, Class B, electrically supervised circuits from the point addressable interface modules to the devices.

2. All fire alarm point addressable circuits (SLC) shall be NFPA 72, Class B, supervised signaling line circuits from the fire alarm panel to the point addressable sensors or point addressable interface modules.

3. All notification appliance circuits (NAC) shall be NFPA, Class B, supervise notification appliance circuits from the fire alarm panel to the audible devices, and strobes.

4. All power supplies will be continuously supervised and monitored to indicate loss of AC power at the control panel. All devices connected to the system SLC shall be powered by the SLC or other fire alarm power supply.

1.7 SYSTEM OPERATION

A. The point addressable fire alarm and supervisory system shall perform the following functions:

1. Continuous monitoring of the status of all-new alarm and supervisory signal initiating devices.

2. Continuous monitoring of all new electrically supervised initiating, supervisory, and signaling circuits.

3. Visible point annunciation of all fire alarm point trouble conditions at the control panel.

4. Operation of elevator controls as indicated herein.

5. Be silenced by a code or Firefighter key at the main or remote annunciators

B. Upon change in status of any device on the system, the fire alarm control panel shall activate audible and visible status change indicators and display the system point number, point description and message associated with the point. Permanently record the change in status, time, date, point description, and message in the history buffer, and transmit the point ID information to the central monitoring station.

C. Activation of any waterflow device, smoke detector, heat detector, manual pull station, supervisory device or other initiating device will cause the following functions to occur:

1. Waterflow switch, Smoke detector, Beam smoke detector, Manual pull station, Heat detectors, and Fire suppression system operation shall:

a. Activate audible and visible status changes indicators and display the system point number, point description, and message associated with the point on the system's operator terminal.
b. Permanently record the change in status, time, date, point description, and message associated with the point in history buffer
c. Release electronically held open doors and or locked doors.
d. Activate smoke control system.

e. Activate the audio visual alarm
f. Transmit an alarm condition using point ID to the Owners Central Station.
g. In area(s) protected by voice evacuation, shut down the amplified sound.

2. Duct type smoke detector operation cause the following to occur:

a. Activate audible and visible status changes indicators and display the system point number, point description, and message associated with the point on the system's operator terminal.
b. Permanently record the change in status, time, date, point description, and message associated with the point in history buffer
c. Release electronically held open and or locked doors.
d. Activate smoke control system.
e. Activate the supervisory signal
f. Transmit supervisory condition using point ID to the Owners Central Station.

3. Elevator machine room and lobby smoke detectors operation in accordance with the State of Texas and ANSI AI7.1. Smoke detectors in the elevator machine room and elevator lobbies shall cause the following to occur:

a. Activate audible and visible status changes indicators and display the system point number, point description, and message associated with the point on the system's operator terminal.
b. Permanently record the change in status, time, date, point description, and message associated with the point in history buffer
c. Activate the audio visual alarm
d. Release electronically held open and or locked doors. Activate smoke control system
e. Activate appropriate control relay for elevator recall
f. In area(s) protected by voice evacuation, shut down the amplified sound.
g. Transmit supervisory condition using point ID to the Owners Central Station

4. Elevator machine room and (if required) elevator hoistways smoke detectors operation shall be in accordance with the State of Texas and ANSI AI7.1. Smoke detectors in the elevator machine room and elevator hoistways shall cause the following to occur:

a. Activate audible and visible status changes indicators and display the system point number, point description, and message associated with the point on the system's operator terminal.
b. Permanently record the change in status, time, date, point description, and message associated with the point in history buffer
c. Activate the audio visual alarm

d. Release electronically held open and or locked doors. Activate smoke control system.
e. Activate appropriate control relay for elevator recall
f. Activate appropriate control relay for fireman’s cab notification
g. In area(s) protected by voice evacuation, shut down the amplified sound.
h. Transmit supervisory condition using point ID to the Owners Central Station

5. If required Elevator machine room and elevator hoistways heat detectors operation shall be in accordance with the State of Texas and ANSI AI7.1. Smoke detectors in the elevator machine room and elevator hoistways shall cause the following to occur:

a. Activate audible and visible status changes indicators and display the system point number, point description, and message associated with the point on the system's operator terminal.
b. Permanently record the change in status, time, date, point description, and message associated with the point in history buffer
c. Activate the audio visual alarm
d. Release electronically held open and or locked doors. Activate smoke control system.
e. Activate appropriate control relay for elevator recall
f. Transmit supervisory condition using point ID to the Owners Central Station

6. Supervisory device or trouble condition activation, including valve supervisory devices, shall:

a. Activate audible and visible status with the point on the system's operator terminal.
b. Permanently record the change in status changes indicators and display the system point number, point description, and message associated, time, date, point description, and message associated with the point in history buffer
c. Transmit supervisory condition using point ID to the Owners Central Station
d. When the device in trouble is restored to normal, the control panel shall be automatically reset

1.8 SUBMITTALS

A. Submit the following equipment information:

1. Manufacturer's data sheets with equipment to be used highlighted

2. Wiring diagrams of all equipment,

3. Installation instructions for all equipment,

4. Equipment dimensions,
5. Equipment testing procedures,
6. Equipment operation and maintenance manuals
7. Wire data sheets.

B. Submit the following software information:

Complete sequence of operation with input/output matrix for all points

C. Submit the following shop drawing information:

1. Complete panel layout showing all field terminations,
2. Complete panel layout showing location of all modules, power supplies and batteries,
3. Complete system riser diagrams,
4. Main panel elevations
5. Complete floor plans showing all devices with point numbers

D. Submit the following system calculations:

A. Standby battery capacity for fire alarm

A. Standby battery capacity for voice alarm

A. Standby battery capacity for all remote panels

A. Voltage drop calculations for each type of circuit (identifying all mathematical formulas, variables, constants, and sources of the mathematical constants)

5. Speaker zone/circuit loading (including amplifier loading)
6. Strobe zone/circuit loading
7. Normal 120 VAC fire alarm panel(s) circuit loading
8. Normal 120 VAC voice alarm panel(s) circuit loading
9. Normal 120 VAC remote panel circuit loading

E. Provide the following shop drawing information (Shop drawings shall be prepared using AutoCAD. Shop drawings shall be drawn to minimum scale: 1/16" = 1'0" for floor plans

1. Complete point-to-point wiring diagrams showing all field terminations

2. Complete panel layout showing location of all modules

3. Complete system riser diagrams, indicating wire sizes and types

4. Interaction with all other building systems (i.e. elevator, AHU, FSD)

5. Complete floor plans showing all devices with point numbers

F. Submittal packages shall be signed by planner licensed by the Texas State Fire Marshal's Office or signed and sealed by a PE registered in the State of Texas.

G. Prior to start of construction, submit the information outlined in A, B, C, and D above as follows:
1. Complete system packages to the Owner for review by the Owner and Engineer.

2. One copy of AHJ "Approved Plan"

H. PARTIAL SUBMITTALS ARE NOT ACCEPTABLE.

1.9 WARRANTY

A. This Contractor shall provide a one-year written warranty against defects in material and workmanship furnished under this Contract. The costs of such warranty shall be part of the purchase price. The warranty shall commence when the Owner and Engineer accept the system and installation.

B. The warranty shall include all necessary material, travel, labor and parts to replace defective components or materials at the job site. This Contractor shall commence repair of any "in warranty" defects within 8 hours of notification of such defects.

C. The Contractor shall include, as part of the one-year warranty, a test and inspection of the new fire alarm devices within one month prior to the expiration of the one-year construction warranty. The Contractor shall provide a written report of any deficiencies and repair any of the deficiencies. The test and inspection report shall conform to the test and inspection form as described in NFPA 72 and as required by the AHJ.

1.10 UNIT PRICES (Coordinate unit prices with proposal sheets)

A. The Contractor shall provide with his bid, unit price during construction for the items in the following list. The unit prices for the devices shall include the device, installation, 20 feet of conduit, wire, programming and any other required installation.

1. Addressable rate of rise heat detector.

2. Addressable photoelectric smoke detector.
3. Beam smoke detector.
4. Addressable duct smoke detector with relay.
5. Addressable manual pull station.
6. Point addressable monitor module.
7. Point addressable control/relay module.
8. 24 VDC Relay SP/DT, with 10 amp rated contacts
9. Fire Alarm Speaker.
10. Strobe Wall Mount. 15/75, 30, 75, and 110 candela rating
11. Strobe Ceiling Mount. 15/75, 30, 75, and 110 candela rating
12. Speaker/Strobe 15/75, 30, 75, and 110 candela rating
13. Horn/Strobe Wall Mount15/75, 30, 75, and 110 candela rating
14. Horn/Strobe Ceiling Mount 15/75, 30, 75, and 110 candela rating
15. Remote LCD annunciator
16. Addressable power supply
17. Non Addressable power supply
18. Stopper II manual pull station cover

1.11 QUALITY ASSURANCE

A. The fire alarm system manufacturer or authorized distributor shall maintain a fully staffed branch office including application engineers and technical service personnel.

B. All supplied equipment shall be new, currently manufactured, standard product of the manufacturer.

C. All technical service personnel shall be regularly employed by the distributor of the fire alarm system.

D. The installing Contractor shall hold a current license, issued by the State of Texas Commission on Fire Safety, to design, install, and service fire detection and alarm equipment.

E. All electrical installation of the fire alarm system, including wire installation and terminations, shall be performed by personnel under the supervision of the Fire Alarm Contractor.

F. Any subcontractors used to install portions of the system shall be submitted and approved by the Owner and the Engineer prior to commencement of the installation.

1.12 BASE BID AND ALTERNATES

A. The base bid shall include all items described in this specification and unit prices shown on the bid form.

PART 2 - PRODUCTS

2.1 MAIN FIRE ALARM CONTROL PANEL

A. Acceptable manufacturers of the fire alarm systems are Silent Knight and Farenhyt.

2.2 Control Panel

A. The fire alarm control panel shall be Honeywell/Silent Knight 6820XL EVS series Addressable Fire Panels. The FACP must have a built in LCD annunciator with the capability of having an additional eight (8) remote annunciators in the field. The FACP shall support Telco and IP communications for Central Station monitoring.

Devices supported must include analog photoelectric and ionization type smoke detectors, analog heat detectors, addressable input modules, relay output modules and addressable notification modules.

B. Normal operating power for the FACP shall be 120 volt AC supplied from dedicated circuits of the emergency power panel. All circuits shall be protected by circuit breakers of proper size.

C. The fire alarm system shall be provided with an emergency standby power system consisting of backup batteries. Batteries shall be sealed lead acid or gel cell of sufficient capacity to provide 24 hours standby operation plus 5 minutes in full alarm condition. All calculations shall allow a minimum of 20% safety factor for battery degradation.

D. The FACP shall accommodate all specified initiating device, notification appliance and command points. Each initiating circuit shall allow a 20 percent expansion of connected detection devices and 20 percent expansion of connected monitor/control points. Each notification appliance circuit shall allow a 20 percent expansion of connected devices.

E. The FACP shall support the operation of 127 total devices per SLC loop without regard to device type. The following devices shall be supported:

2.3 VOICE COMMUNICATION SYSTEM (Where indicated on plans)

A. Where Voice Evacuation is required, provide a UL listed Voice Evacuation Control System. The Voice Evacuation Control System shall be manufactured and produced by the same manufacturer as the building Fire Alarm System.

2.4 REMOTE TRANSPONDER PANELS

A. Remote Power Supplies shall be provided where required. Supplies shall be surface mounted with locking door or cover keyed the same as the main fire alarm panel. Power supplies shall be supervised and monitored by the FACP for AC Power Loss and Low battery conditions.

2.5 MAIN FIRE ALARM SYSTEM EQUIPMENT

A. Alarm Initiating Devices: All alarm initiating devices must be compatible with and UL listed with the fire alarm control panel

1. Manual fire alarm pull stations shall be addressable, single action type with key operated reset lock. Pull stations shall include flush mount STI Stopper II with Horn Protective Cover.

2. Point addressable heat detectors listed under UL Standard 521 shall be provided where indicated and where elevator machine rooms and elevator hoistways are sprinkled.

3. Analog addressable photoelectric smoke detectors shall be provided where indicated.
   a. Analog addressable photoelectric smoke detectors shall be provided with integral LEDs to indicate detectors in alarm. The detectors shall operate from the two-wire signaling line circuit and be listed under UL Standard 268. Line transient and RFI protection shall be built into the detector.
   b. Duct mounted analog addressable smoke detectors with integral relay shall be provided when required and installed in an accessible space in accordance with manufacturer's instructions and NFPA 72. Duct mounted detectors installed above ceiling shall be installed with compatible remote test switch. Duct detector shall be mounted in an accessible location for service and required inspection and testing. Duct detectors mounted above a hard surface shall have an access panel installed so the detector can be inspected and tested by a technician standing safely on a ladder. Remote test switches shall be mounted on

wall surface near the location of the detector. Remote test switch shall be mounted 9 feet above finished floor or 1 foot below ceiling, whichever is lower. Remote test switch shall be installed in an appropriate recessed back box or surface mount Wiremold extra deep box model V5744. Duct detectors shall be labeled with durable, machine produced, easy to read minimum ½ inch labels indicating module and point address of corresponding duct detector. Remote test switches shall be labeled with durable, easy to read minimum ¾ inch labels indicating module and point address of associated duct detector.

4. The beam smoke detector shall have a operating range of 30 feet by 320 feet and shall have a range of field selective sensitivity setting from 7% to 50% of higher total obscureness. The beam smoke detector shall provide continuous supervision and shall be provided with an automatic gain control that compensates for slow ambient visibility changes. The detector shall operate on 24 VDC from the nearest power source UL listed for that purpose. The detector shall be supervised for alarm and trouble conditions. The detector shall be installed in accordance with the manufacturer's instructions.

5. Addressable point monitoring interface modules shall be used to monitor the water flow switches and fire suppression systems. The interface modules shall provide Style B electrical supervision or circuits to monitored devices.

6. Addressable point monitoring interface modules shall be used to monitor water flow switches and fire suppression systems. The interface modules shall provide Class B electrical supervision of circuits connected to monitoring devices. Honeywell/Silent Knight SD500-AIM Addressable Input Module.

B. Supervisory Devices:

1. Valve supervisory devices existing or shall be furnished and installed by the Sprinkler Contractor and wired by this Contractor as indicated. The valve supervisory devices shall be installed to transmit a supervisory signal in accordance with NFPA code.

2. Electric fire pump shall be supervised per NFPA 20 for run status, loss of AC power/phase reversal. Dry contacts may be provided in the pump controller and may be used. If dry contacts are not provided in the pump controller, provide accessory SPST relays for the required supervision.

3. Accessory relays shall be provided as needed to supervise equipment. All accessory relays shall be SPDT.

4. Addressable point monitor interface modules shall be used to monitor all supervisory points. The interface modules shall provide Class b electrical supervision of circuits to monitored devices.

C. Control Devices:

1. Provide control relays/contacts where required. The control relays/coils shall be 24 volt DC low voltage type each with number of contacts as required and housed in metal enclosure. The contacts shall be rated for 10 amps as required for continuous duty and for the control circuit voltage.

2. Addressable point control devices shall be used to provide all required control functions.

2.7 OTHER FIRE ALARM EQUIPMENT

A. Manual Pull Station Protection (All manual pull stations to include)
Stopper II with polycarbonate shield and frame that fits over manual pull stations. When lifted to gain access to the actual alarm, it sounds a piercing 95 dB or 105

B. Wall Mount Magnetic Door Holder –GE DHS 24120C DH Series Electromagnetic Fire Door Holders with die-cast metal and finished in chrome plating.

C. Floor Mount Magnetic Door Holder –GE DHFM1-24120 DH Series Electromagnetic Fire Door Holders Stainless Steel 24 or 120 Volt coil

PART 3 - EXECUTION

3.1 INSTALLATION

A. System components shall be installed in accordance with the latest revisions of the appropriate NFPA code, National Electrical Code, the requirements contained herein, local and state regulations, the requirements of the fire department and other applicable authorities having jurisdiction (AHJ). The Fire Alarm Contractor shall furnish on-the-job supervision for the proper installation of devices in cooperation with, or as may be required by, other trades. This supervision shall include, but not be limited to, the following:

1. Provide specific on-site instructions to others on mounting and installation of each type of device by physically observing the mounting of one or more of each type of device, as required, to assure that the installer is properly instructed in the work.

2. Provide other supervision as required by the trades to properly interface fire alarm installation work.

3. Perform a complete test of all devices, certifying that all devices have been activated and that the devices and systems perform in accordance with the requirements of these specifications.

4. Install, program, test, troubleshoot and correct all system software provided under these specifications. This includes, but is not limited to, actual keyboard entry, reprogramming required to meet these specifications and any other task associated with the system software.

A. Provide all necessary submittals to the authority having jurisdiction.

6. Label each SLC and SBUS connected device with its module and point address identification with durable machine produced easy to read minimum labels. Labels shall be white ¾" minimum, with ½" minimum, black lettering.

B. The Fire Alarm Contractor shall furnish material and labor to provide a properly functioning system as described herein and in project drawings. The system shall operate in accordance with all the requirements of these specifications. No devices or equipment shall be used for any purposes other than their intended ones. This shall include, but not be limited to, the following:

1. Conduit, raceway and wiring systems shall be as indicated herein.

   a. In any areas other than above suspended ceiling such as a mechanical room or above a sheetrock ceiling wiring shall be installed in conduit or wire mold.
   b. All conduit fittings shall be threaded with plastic inserts where wire leaves conduit.
   c. All riser wiring and wiring between floors shall be installed in conduit.
   d. Conduit and fittings to water flow and valve supervisory switches shall be weatherproof to 7' AFF.
   e. Wiring, cables, conduits and raceways shall be neatly run parallel and perpendicular to building lines.
   f. All raceways shall be of metal construction. Plastic conduits shall not be acceptable.
   g. All cable not run in raceway shall be parallel/perpendicular to building lines and secured to the building structure. Provide bridal rings, D rings, or J hooks. Wire shall be neatly bundled with nylon wire ties at a minimum of four feet spacing.
   h. All conduit and supports shall be independently supported from building structure. Conduit may not be supported from equipment, piping, ductwork or other trade's supports.
   i. <u>Do not</u> route wire or conduit under ductwork or other equipment.

2. Wire

   All wire used on the fire signaling system shall be UL Listed as fire alarm protection signaling circuit cable per National Electrical Code, Articles 760.

   a. Wire used for 120 VDC power circuits shall be minimum 12 AWG solid copper conductors, with THHN insulation and UL listed for fire alarm use.
   b. Fire alarm “SLC” cable (Smoke Detectors, Pull Stations, Etc.) shall be a minimum of 18 AWG, with red/black non-shielded conductor insulation with Plenum rated jacket. (18/2- FPLP)
   c. Fire alarm power cable (Audio/Visual, Door Holders) shall be a minimum of 14 AWG, with red/black non-shielded conductor insulation with Plenum rated jacket. (14/2 FPLP)
   d. Fire alarm “SBUS” cable shall be a minimum of 18 AWG, shielded conductor insulation and Plenum rated jacket. (18/4 FPLP)
   e. Voice circuit cable shall be a minimum of 18 AWG shielded conductor insulation and Plenum rated jacket. (18/2)
   f. All wiring shall be appropriately sized based upon voltage drop calculations.
   g. Any underground wire must be UL Listed for that purpose.
   h. Do not run wiring under ductwork or other above ceiling equipment.

3. Junction Boxes:
   a. System components shall be securely fastened to the building structure. Devices shall not be supported by wiring or by other installed electrical fixtures or conduits.
   b. Each box shall be large enough to accommodate required splices and conduit in accordance with NFPA 70.
   c. System components shall be securely fastened to the building structure. Devices shall not be supported by wiring or by other installed electrical fixtures or conduits.
   d. Boxes at sprinkler risers or outside shall be weatherproof.
   e. Provide and label box covers for all new and reused junction boxes.

4. Patching:
   Patching of all walls, floors, and ceilings, which are penetrated or damaged during construction and returning the surface to a condition matching existing adjacent surfaces.
   a. All slab penetrations shall be completely sealed and made watertight.
   b. Restore all fire rated walls to rated conditions. All fire rated wall penetrations shall be made in conduit and sealed with UL Listed "fire stop" caulking.

5. Mounting:
   a. All devices shall be mounted in accordance with the manufacturer's instructions and shall utilize the manufacturer's suggested mounting box.

b. Surface-mounted devices shall be smooth sided, without knockouts.
c. Point addressable monitor modules and control modules shall be securely mounted in back boxes in an accessible location.
d. Conduit and fittings to water flow and valve supervisory switches shall be weatherproof to 7’ AFF
e. Devices shall be flush or semi-flush mounted where possible.
f. System components shall be placed and installed to comply with the Americans with Disabilities Act.
g. All surface mounted devices shall be installed with appropriate back boxes. All work shall be neat and performed in a craftsman like manner.
h. All devices, which are mounted behind walls, shall be provided with access panels. Location of access panels shall be coordinated with the Owner.
i. Fire alarm system devices shall not be installed where they may interfere with the operation of other building systems, devices or features.
j. Devices and wiring installed in suspended ceilings shall be supported with appropriate bridge supports and ties.
k. Existing stopper covers are to be removed, carefully stored, and reinstalled on new pull stations. Provide new stopper covers as required. All pull stations shall have stopper cover.

A. Pay for all permits, fees and charges required for this work.

3.2 TESTS & FIELD QUALITY CONTROL

A. The commissioning alarm test shall be coordinated with the Owner, Engineer and AHJ. A letter certifying that the installation is complete per drawings and specifications and fully operational per NFPA 72 shall be forwarded to the Owner and Engineer.

B. If the Fire Alarm System includes or is part of a Building Voice Evacuation System or Mass Notification System the installing contractor must inspect and test intelligibility in all areas after final furnishings and finishes are in place. Contractor shall refer to current NFPA 72 Chapters 14, 18 and 24 along with associated Annex A material to develop and perform intelligibility testing. Contractor shall provide owner with statement describing how the testing plan was developed and implemented along with the results of the testing.

C. The Owner, Fire Alarm Contractor, Fire Alarm System Supplier, the Engineer and an authorized representative from each supplier of equipment shall be in attendance at the commissioning test to make necessary adjustments. A commissioning test shall be conducted in accordance with NFPA 72 and Authority Having Jurisdiction requirements. The test shall include, but not be limited to:

1. A test of the system for grounded, opened and shorted circuits.
2. A test of each alarm and new supervisory signal-initiating device for functions specified.
3. A test to verify that the alarm signals will operate under specified trouble conditions.
4. A test to verify that the components and wiring will operate under specified trouble conditions.
5. A test to verify that the system will perform all specified tasks.
6. A test to verify that all devices subject to inspection and testing are accessible.

3.3 TRAINING

A. Provide training for the operating personnel in proper system operation and required user maintenance procedures.

The training program for the personnel shall include the following:

1. Customized Operating & Maintenance Manuals – Printed, comprehensive installation and maintenance manuals, assembled with covers and conforming to the specified equipment supplied, shall be furnished with the equipment. The manual shall include a material guide, which shall include the replacement part numbers and description of all components used. The manual shall provide sufficient, concise information, including schematics, troubleshooting diagrams, layout drawings, printed circuit overlays, test and alignment procedures, interconnect diagram parts list, compatibility charts and theory of operation of all active devices to permit quick, efficient maintenance and repair of the equipment by a competent Fire Alarm Systems Technician.

2. Provide customized software manuals containing a listing of all points, event programs, basic programming and instructions, and software troubleshooting information.

3.4 RECORD DOCUMENTS

A. Provide one set of full size prints, and a full set of disks in PDF and AutoCAD 2004 DWG format of drawings and wiring diagrams reflecting "as-built" conditions to the Owner.

B. Provide one (1) complete sets of "as-built" data sheets for all system - connected equipment to the Owner.

C. Provide complete "as-built" software listing of all data files, event programs, print statements, etc. in PDF format to the Owner.

D. Provide a completed test form, which complies with NFPA 72, signed and dated by the fire alarm contractor.

E. Provide completion certificate, signed by the authority having jurisdiction.

F. Furnish a signed letters of guarantee, which specifies the substantial completion date and the guarantee period.

3.5 SPARE PARTS

Not required

END OF SECTION 283101

APPENDIX B

FORMS

AUSTIN
Independent School District

Issued: 01/18/2019

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CONDENSATE RECOVERY MEMO TEMPLATE B-3

AUSTIN Independent School District | **Construction Management**

Date: ***XXXXX XX, XXXX***

To: ***(insert name)***, City of Austin Water

From: ***XXXXX*** – Design Engineer
(insert name)– AISD Executive Director of Construction Management

Subject: Condensate Recovery for ***XXXXX*** School
AISD Project No. XX-XX-XXXXX

This memorandum serves as documentation of Alternative Compliance with the requirements of the City of Austin's Resolution 20170608-56 with respect to Standards for Air Conditioning Recovery Systems for New Development under the City's Mechanical Code.

1. All air-conditioning condensate that can be recovered without the use of pumps has been piped by gravity flow to **(# *of*)** cistern(s).
2. The air-conditioning systems from which condensate will be recovered include **(*use actual equipment nomenclature*)**:
    a. AHU-1
    b. AHU-2
    c. RTU-1
    d. RTU-2
    e. Etc.
3. A plumbing plan and a schematic drawing showing the location of condensate sources and routing of condensate lines to the cistern(s) have been included with the design drawings.
4. The estimated volume of captured condensate to be used for irrigation is ***XXXX*** gallons per year.
5. The estimated volume of captured condensate to be used for cooling tower make-up is *XXXX* gallons per year.
6. The estimated volume of captured condensate to be used for **(*other uses*)** is ***XXXX*** gallons per year
7. The cisterns used for condensate collection are **(*also*)** **(*not*)** being used for capture of rainwater.
8. Irrigation system design, including the use of condensate/rain water cisterns is shown in drawings prepared by the Landscape Architect.
9. **(*Optional*)** Additional condensate recovery has been included in **(*area XXX of the building*)** to serve as a demonstration/educational component.
10. The estimated volume of condensate not being recovered is ***XXX*** gallons per year.

cc: ***(insert name)***, AISD, Executive Director of Construction Management
(insert name), AISD, Executive Director of Facilities Maintenance
(insert name), AISD, Director of Facilities Maintenance
(insert name), AISD Sustainability
(insert name), AISD Project Manager

APPENDIX C

ADDITIONAL MATERIALS

AUSTIN
Independent School District

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RECOMMENDED PLANT LIST

This plant list is not intended to be an exhaustive list of materials but is intended to convey the fact that soil types and environmental zones in Austin can vary greatly and certain plants may perform much better on one side of the city than the other. Additionally, consider the following when preparing designs for site design and planting plans:

1. Native, minimal maintenance plant materials are preferred, but adaptable plant materials should not be overlooked.
2. Provide plantings, that once established after 2-3 years, will not require irrigation.
3. The key is to plan for, and design layered landscapes that are visually pleasing, provide seasonal interest and color, and are inviting to the motorist and pedestrian.
4. Provide street trees along walkways along public streets.
5. Provide shade trees in areas of outdoor play areas and along internal walkways where staff and learners congregate during drop-off and pick up.
6. Consider line of sight to enhance and promote safety and security. Plantings should not crowd walkways and allow adequate space for the plant's mature size. Specify low plantings along walkways for line of sight.
7. Increase the planting detail and intensity adjacent to building entry areas, outdoor learning spaces and outdoor courtyard areas where learners and staff congregate.

Austin has two distinct soil types that are roughly delineated by the IH-35 corridor through the city. Areas west of IH-35 typically have rocky and caliche soils. Areas east of IH-35 have Blackland prairie clay soils. Tree types are divided into those two categories. All other plant types (shrubs, grasses, perennials) are for all planting zones within the Austin area.

1. Trees West of IH-35 (rocky/caliche soils)
    A. Large / Shade Trees
        i. Cedar Elm / *Ulmus crassifolia*
        ii. Live Oak / *Quercus virginiana*
        iii. Texas Red Oak / *Quercus buckleyi*
        iv. Chinquapin Oak / *Quercus muehlenbergii*
        v. Lacey Oak / *Quercus laceyi*
        vi. Bigtooth Maple / *Acer grandidentatum*
            a. Plant in areas with ample soil run off
        vii. Montezuma Cypress / *Taxodium mucronatum*
            a. Plant in areas protected from severe cold and planted near runoff
        viii. Escarpment Cherry / *Prunus serotina*
            a. Plant only if local source is known
    B. Small / Understory Trees
        i. Yaupon Holly / *Ilex vomitoria*
        ii. Possumhaw / *Ilex decidua*
        iii. Texas Persimmon / *Diospyros texana*
        iv. Evergreen Sumac / *Rhus virens*
        v. Texas Redbud / *Cercis canadensis var. texensis*
        vi. Thornless Green Hawthorn / *Crataegus viridis* (Full sun only, non-native)
        vii. Desert Willow / *Chilopsis linearis* (Full sun only, non-native)
    C. Screening/Wind Block Trees
        i. Eastern Red Juniper / *Juniperus virginiana*
        ii. Arizona Cypress / *Cupressus arizonica*
2. Trees East of IH-35 (Blackland Prairie Clay Soils)
    A. Large / Shade Trees
        i. Cedar Elm / *Ulmus crassifolia*
        ii. Live Oak / *Quercus virginiana*
        iii. Lacey Oak / *Quercus laceyi*

iv. Monterrey oak / *Quercus polymorpha*
v. Chinquapin Oak / *Quercus muehlenbergii*
vi. Shumard Red Oak / *Quercus shumardii*
    a. Plant in alkaline soils only
vii. Bur Oak / *Quercus macrocarpa*
    a. Plant away from walkways and parking lots
viii. American Elm / *Ulmus americana*
ix. Bald Cypress / *Taxodium distichum*
    a. Plant in low areas that are frequently inundated with rain water
x. Montezuma Cypress / *Taxodium mucronatum*
    a. Plant in low areas
xi. Native Pecan / *Carya illinoinensis*
    a. Plant away from playgrounds and parking lots; Plant in rich soil
xii. American Sycamore / *Platanus occidentalis*
    a. Plant away from playgrounds and parking lots; Plant in rich soil

B. Small / Understory Trees
    i. Standard Wax Myrtle / *Myrica cerifera*
    ii. Yaupon Holly / *Ilex vomitoria*
    iii. Possumhaw / *Ilex decidua*
    iv. Texas Persimmon / *Diospyros texana*
    v. Texas Redbud / *Cercis canadensis var. texensis*
    vi. Cherry laurel / *Prunus laurocerasus*
    vii. Mexican Buckeye / *Ungnadia speciosa*
    viii. Texas Mountain Laurel / *Dermatophyllum secundiflorum*
    ix. Roughleaf Dogwood / *Cornus drummondii*
        a. Plant in moist and low areas

C. Screening / Wind Block Trees
    i. Standard Wax Myrtle / *Myrica cerifera*
    ii. Cherry laurel / *Prunus laurocerasus*

3. Trees for Erosion Control + No-Mow Zones (East and West of IH 35)
    A. Honey mesquite / *Prosopis glandulosa*
    B. Huisache / *Acacia farnesiana*
4. Prohibited Trees
    A. Lacebark Elm / *Ulmus parvifolia*

B. Siberian Elm / *Ulmus pumila*
C. Golden Raintree / *Koelreuteria paniculata*
D. Chinese Pistache / *Pistacia chinensis*
E. All Common Pear / *Pyrus calleryana*
F. Mulberry, White / *Morus alba*
G. Mulberry, Paper / *Broussonetia papyrifera*
H. Chinaberry */ Melia azedarach*
I. Chinese Tallow / *Triadica sebifera*
J. Mimosa / *Albizia julbrissin*
K. Tree of Heaven / *Ailanthus altissima*
L. Chinese Parasol / *Firmiana simplex*
M. Arizona ash / *Fraxinus velutina*
N. Hackberry / *Celtis laevigata*

5. Shrubs
    A. Buttonbush / *Cephalanthus occidentalis*
    B. Red Yucca / *Hesperaloe parvifolia*
    C. Dwarf Yaupon Holly / *Ilex vomitoria*
    D. Dwarf Heller's Holly / *Ilex crenata*
    E. Dwarf Wax Mrytle / *Myrica cerifera 'Don's Dwarf" (or equal variety)*
    F. Beautyberry / *Callicarpa americana*
    G. Rock Rose / *Pavonia lasiopetala*
    H. Texas Lilac / *Vitex agnus-castus*
    I. Mexican Honeysuckle / *Justicia spicigera*
    J. Fall aster / *Aster oblongifolium*
    K. Pride of Barbados / *Caesalpinia pulcherrima*
    L. Texas Sage / *Leucophyllum frutescens*
6. Prohibited Shrubs / Grasses
    A. All Chinese privets / *Ligustrum spp.*
    B. Bamboo / *Nandina domestica*
    C. All Photinia / *Photinia spp.*
    D. Russian Olive / *Elaeagnus angustifolia*
    E. All Pampas grasses / *Cortaderia selloana* (or similar aggressive grasses)
7. Perennials
    A. Common Yarrow / *Achillea millefloriu*m

B. Butterfly Milkweed / *Asclepias tuberosa*
C. Desert Marigold / *Baileya multiradiata*
D. Damianita / *Chrysactinia mexicana*
E. Plains Coreopsis / *Coreopsis tinctorial*
F. Red Indian Blanket / *Gaillardia amblyodon*
G. Black Eyed Susan / *Rudbeckia hirta*
H. Aster / *Nemophila phacelioides*
I. Wild Petunia / *Ruellia nudiflora*
J. Gregg's Mistflower / *Eupatorium greggii*
K. Verbena 'Homestead Purple' / *Verbena canadensis*
L. 'Mystic Spires Blue' / *Salvia longispicata x farinacea*
M. Turks Cap / *Malvaviscus arboreus var. Drummondii*
N. Texas Betony / *Stachys coccinea*

8. Grasses
    A. Pine Muhly Grass / *Muhlenbergia dubia*
    B. Switchgrass / *Panicum virgatum* (Only for no-mow large drainage swales)
    C. Little Bluestem / *Schizachryium scoparium*
    D. Prairie Dropseed / *Sporobolus heterolepis*
    E. 'Blonde Ambition' Grama Grass / *Bouteloua gracilis 'Blonde Ambition'*
    F. *Mexican Feathergrass /* Nassella tenuissima
    G. *Gulf Muhly /* Muhluenbergia rigens
    H. *Inland Seaoats /* Chasmanthium latifolium
9. Native Low Groundcover (below existing Live Oaks or trees with dense shade canopies)
    A. Mondo Grass / *Ophiopogon japonicus*
    B. Straggler Daisy / *Calyptocarpus vidalis*
    C. Frog Fruit Verbena / *Phyla incisa*
    D. Woodland Sedges / *Carex spp.*
10. No-Mow Grasses
    A. "HabitTurf"
        i. Commercially available polyculture seed mix of 3-native grasses including:
            a. Buffalo Grass / *Bouteloua dactyloides*
            b. Blue Grama Grass / *Bouteloua gracilis*
            c. Curly Mesquite Grass / *Hilaria belangeri*

Site Evaluation Matrix

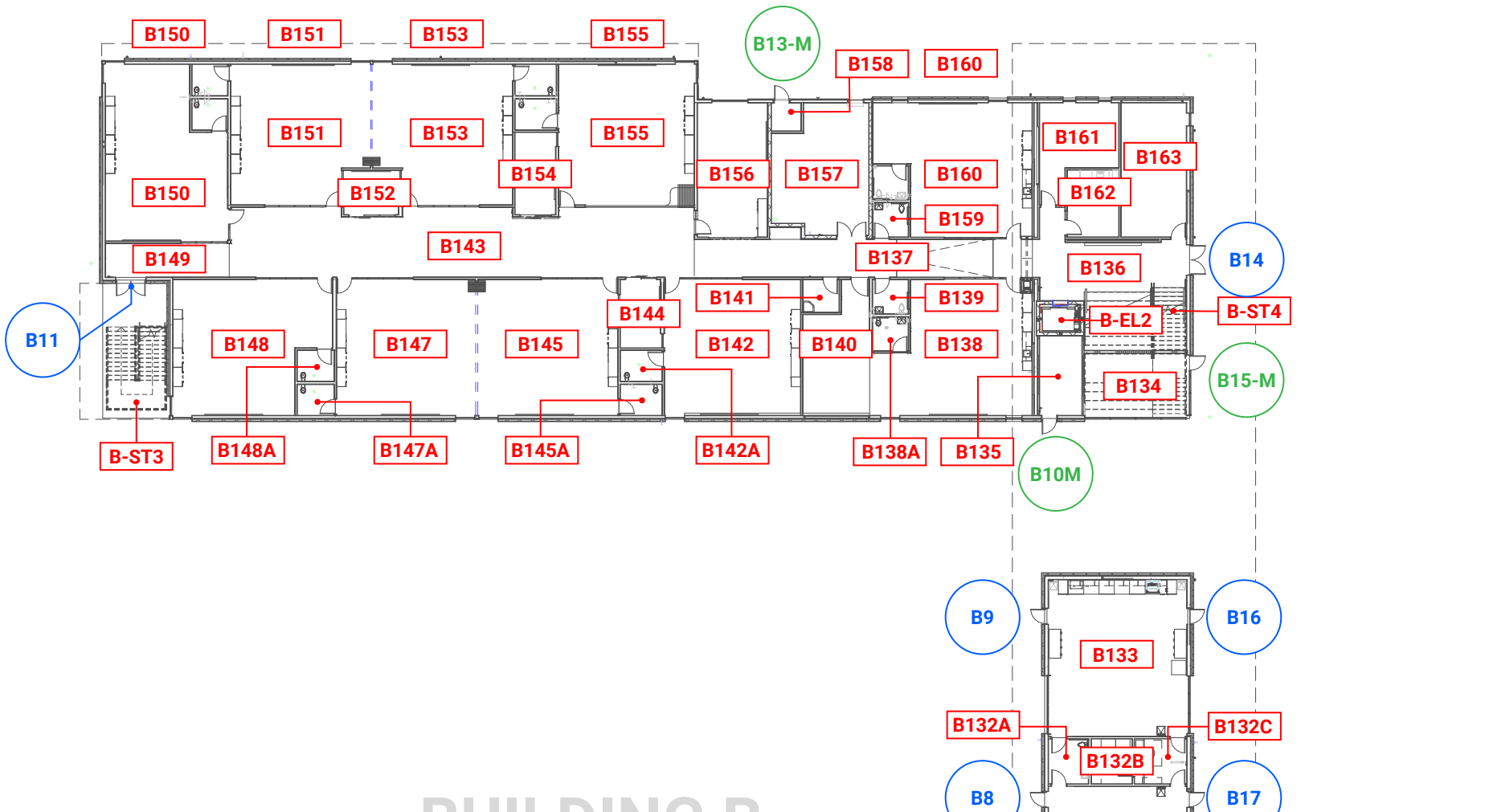
SITE EVALUATION FACTORS	WEIGHT FACTOR	SITE #1		SITE #2		SITE #3		SITE #4		SITE #5		SITE #6		SITE #7	
		Rating	Weighted Rating	Rating	Weighted Rating	Rating	Weighted Rating	Rating	Weighted Rating	Rating	Weighted Rating	Rating	Weighted Rating	Rating	Weighted Rating
Site Area (Primary: 10-15 acres and Secondary: 30-60 acres min.)	1														
Site Expansion Potential	1														
Natural Features (ie. ponds/wetlands)	1														
Located Near an Arterial St. (could be neg.)	3														
Located within at least 2 Collector Streets	2														
Pedestrian Accessibility	2														
Vehicular Accessibility	2														
Residential Proximity	2														
Compatible with Adjacent Land Uses	2														
Compatible Zoning	1														
Water Availability & Cost	3														
Sanitary Availability & Cost	3														
Electric/Gas Availability & Cost	1														
Storm Sewer/Drainage Availability & Cost	1														
Topography (3% to 8% max)	2														
Zoning/Easements	1														
Emergency Vehicle Accessibility	2														
Off-Site Roadway Improvements	1														
Floodway/Plain	1														
Land Acquisition Cost	1														
Site Improvement Cost	2														
Demolition Cost (exist site features)	1														
Overall Constructability	2														
TOTALS			**0**		**0**		**0**		**0**		**0**		**0**		**0**
Average			**0.00**		**0.00**		**0.00**		**0.00**		**0.00**		**0.00**		**0.00**

A weighting factor of (1) low priority to (3) high priority can be used as a subjective multiplier to reinforce key evaluation criteria.
Standard rating values range from 1 (poor) to 5 (excellent).
Adjust site evaluation factors as needed for each project.

DLR Group
Architecture Engineering Planning Interiors

BUILDING, ROOM, AND EXTERIOR DOOR NUMBERING STANDARDS

LEVEL 1 | NOT TO SCALE



PRIMARY CAMPUS ENTRY

PRIMARY BUILDING ENTRY

A1 — EXTERIOR DOOR NUMBER FOR DOORS TO OCCUPIED SPACES

A3-M — EXTERIOR DOOR NUMBER FOR DOORS TO NON-OCCUPIED SPACES W/O BUILDING ENTRY

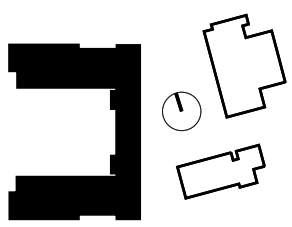
A100 — INTERIOR DOOR NUMBER

A100 — ROOM/CORRIDOR NUMBER

A-S1 — STAIR NUMBER

A-E1 — ELEVATOR NUMBER

A-SY1 — SERVICE YARD NUMBER



BUILDING, ROOM, AND EXTERIOR DOOR NUMBERING STANDARDS

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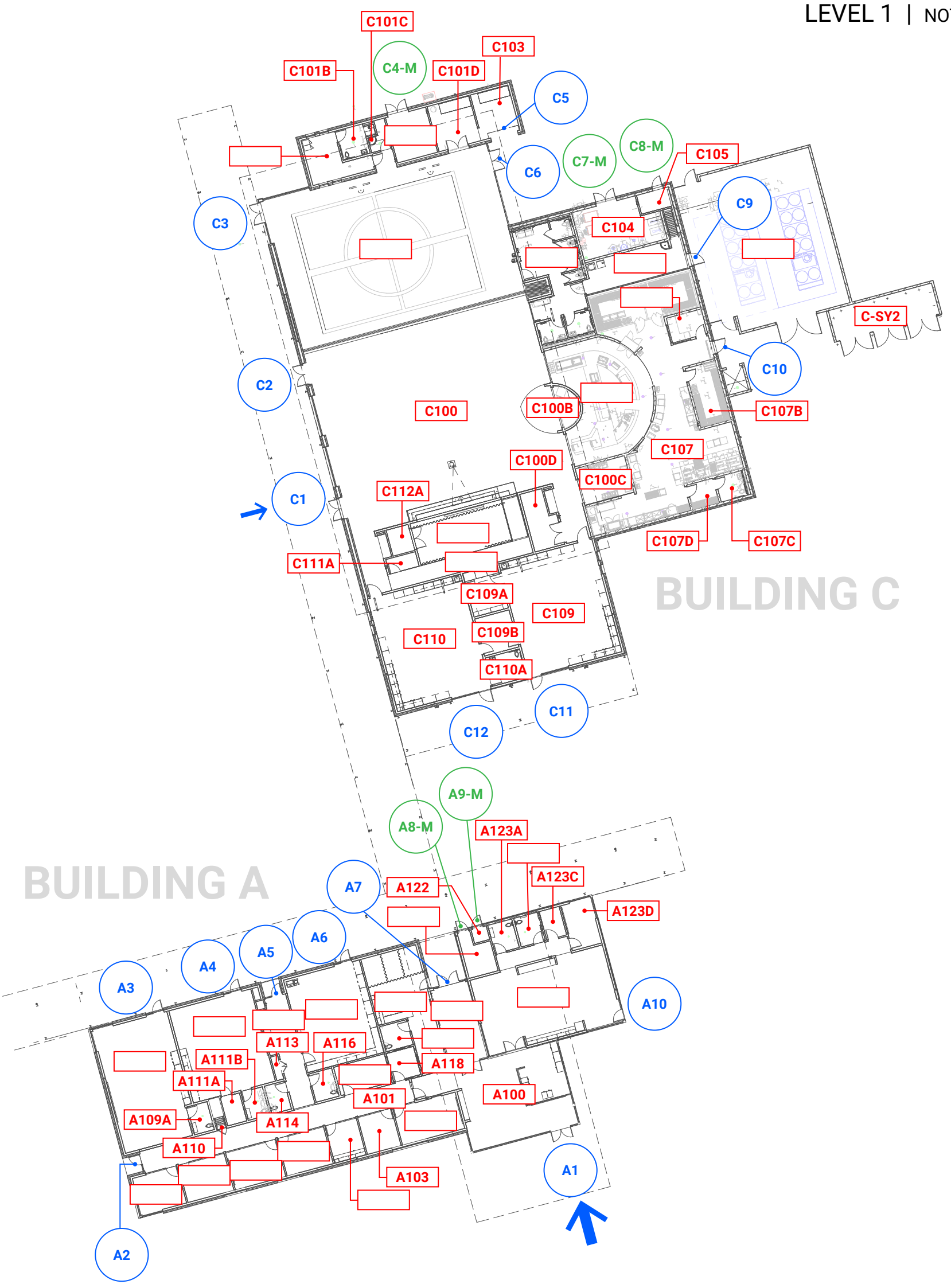

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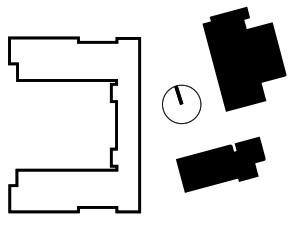
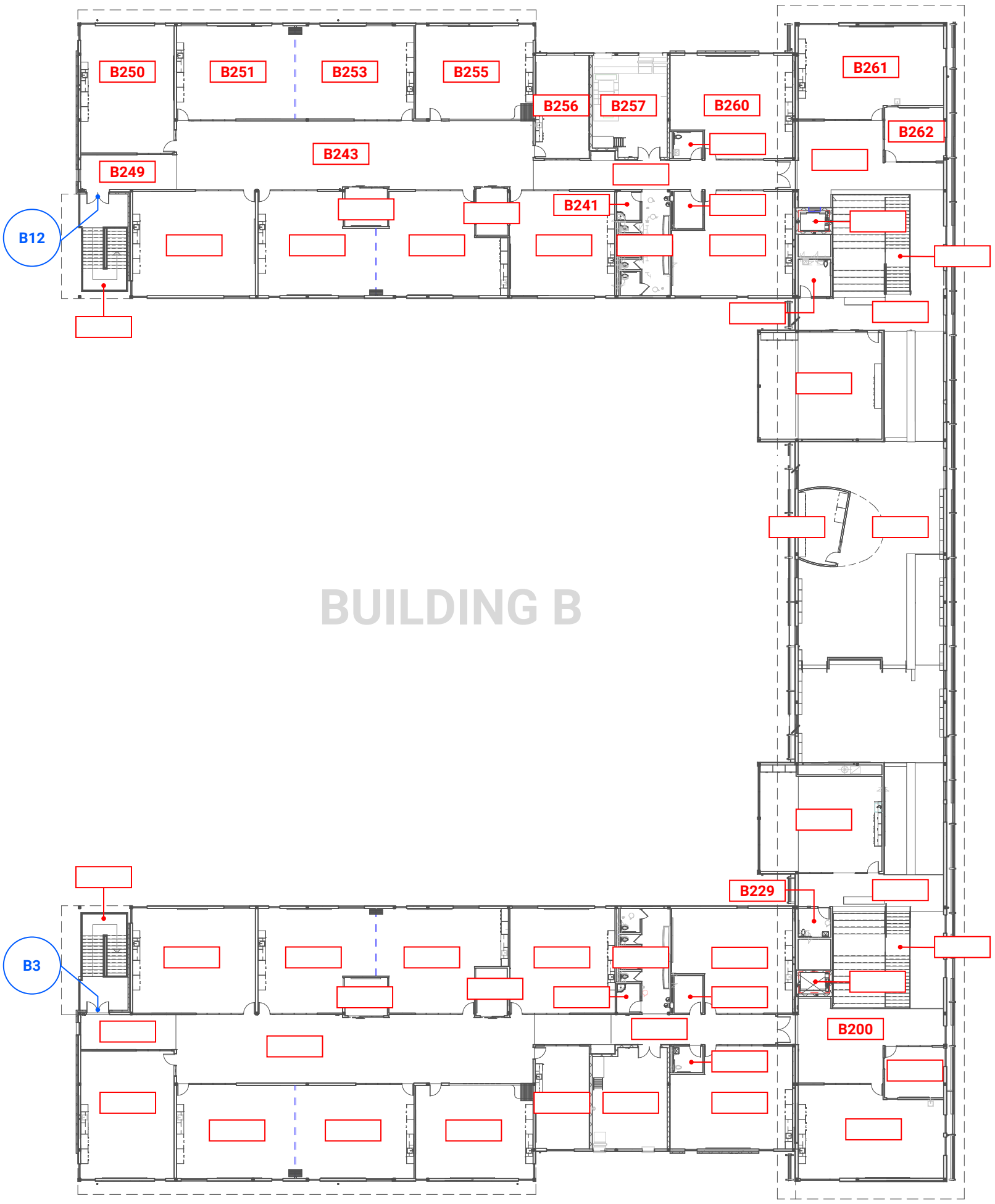


BUILDING, ROOM, AND EXTERIOR DOOR NUMBERING STANDARDS

LEVEL 2 | NOT TO SCALE



PRIMARY CAMPUS ENTRY

PRIMARY BUILDING ENTRY

A1 EXTERIOR DOOR NUMBER FOR DOORS TO OCCUPIED SPACES

A3-M EXTERIOR DOOR NUMBER FOR DOORS TO NON-OCCUPIED SPACES W/O BUILDING ENTRY

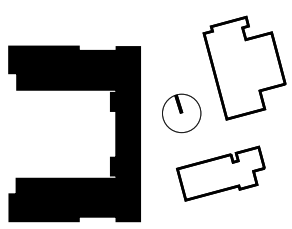
A100 INTERIOR DOOR NUMBER

ROOM/CORRIDOR NUMBER

STAIR NUMBER

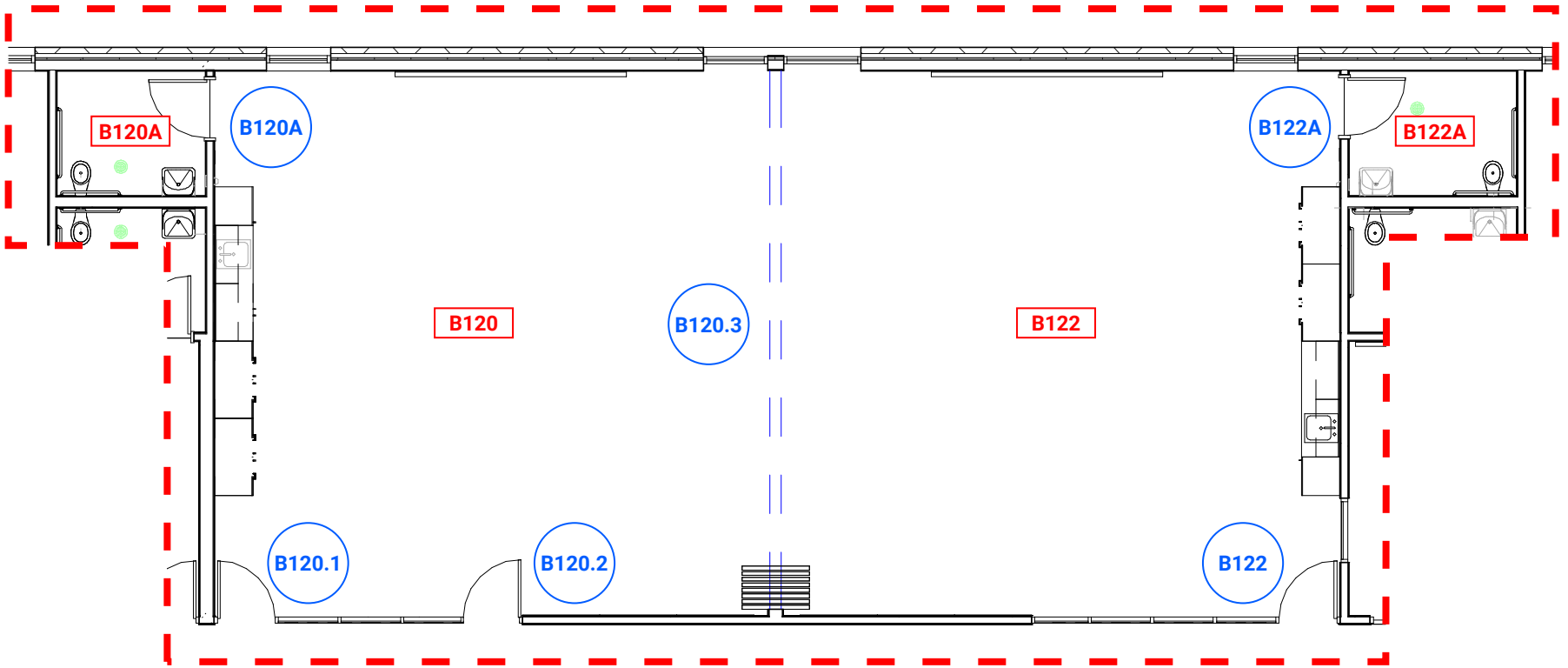
ELEVATOR NUMBER

SERVICE YARD NUMBER



INTERIOR DOOR NUMBERING STANDARDS

NOT TO SCALE



PRIMARY CAMPUS ENTRY

PRIMARY BUILDING ENTRY

A1 EXTERIOR DOOR NUMBER FOR DOORS TO OCCUPIED SPACES

A3-M EXTERIOR DOOR NUMBER FOR DOORS TO NON-OCCUPIED SPACES W/O BUILDING ENTRY

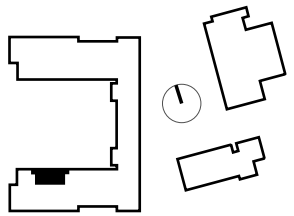
A100 INTERIOR DOOR NUMBER

A100 ROOM/CORRIDOR NUMBER

A-S1 STAIR NUMBER

A-E1 ELEVATOR NUMBER

A-SY1 SERVICE YARD NUMBER



AISD — OFCI / CFCI
RESPONSIBILITIES MATRIX

SYSTEMS	RESPONSIBLE PARTIES			
	CFCI	OFCI	OFOI	Notes
Technology:				
Structured Cabling (voice and data)	X			
Cisco VoIP phones			X	
WAP's			X	
Servers and Networking equipment			X	
PC's and Printers			X	
Rack mounted UPS for MDF/IDF			X	
Site raceway for GATTN	X			Contractor provides raeway out to the pole
Fiber cable service feed for GATTN			X	
A/V:				
A/V Equipment in Learning Spaces			X	
A/V Equipment not in learning spaces (auditorium, PAC, etc.)	X			
A/V Equipment on Mobile Carts			X	
Manual Projection Screens (classrooms)	X			The standard for classroom A/V will be the mobile LCD carts provided by AISD. If manual projection screens are required, these will be CFCI.
Motorized Projection Screens (cafeteria)	X			
Ceiling/Wall Mounted Projectors	X			The standard for classroom A/V will be the mobile LCD carts provided by AISD. If projectors are required, these will be CFCI.
LCDs			X	
Voice amplification - wireless mic system			X	
Intercom System			X	
Stage equipment (speakers, mics, amplifiers)	X			
A/V Mixer / Sound Editing Equipment	X			
Studio lighting control panel	X			
Security:				
Access Control System	X			
Intrusion Detection	X			
Video surveillance system - security cameras	X			
Police Panic Buttons	X			
Hardware/ Keying	X			
Rooftop Distributed Antenna System (DAS)	X			If required
Indoor DAS/ microcells	X			If required
Knox Box	X			

AISD — OFCI / CFCI
RESPONSIBILITIES MATRIX

SYSTEMS	RESPONSIBLE PARTIES			
	CFCI	OFCI	OFOI	Notes
General Building Equipment:				
Refrigerators			X	
Microwaves			X	
AED Cabinets	X			
Fire extinguishers cabinets	X			
Fire extinguishers			X	
Bike Racks	X			
Outdoor benches and trash receptacles	X			
Interior Trash/Recycling Receptacles (excluding restrooms)			X	
Custodial Key Box	X			
Vending Machines			X	
Kiln	X			
Art Equipment (excluding kiln)			X	
Safes (Depository & Gun)	X			
Tack boards/marker boards/dry erase boards/tack strips	X			
Washer and Dryer	X			
Office Equipment (including computers, iPads, copiers, scanners)			X	
Synchronized Clock System (public areas)	X			
Time Clock (Optimus Station)			X	Structured cabling by contractor
Other Clocks (classrooms)			X	
Athletics: Bleachers	X			
Athletics: Backboards and goals, volleyball floor inserts, chinning bars, climbing rope	X			
Athletics: Weight room and exercise machines/equip			X	
Playground equipment	X			
Modular walls / cubicles			X	AISD to provide information to allow for power/data coordination. Power and data installation by contractor.
Media resource racks / tables / carts / stands			X	
Stage Curtains	X			
Signage (non-digital)	X			
Exterior Building Marquis	X			
Digital signage (if required)			X	If required. AISD to provide information to allow for power/data coordination. Power and data installation by contractor.
Flag pole	X			
Chemical Mixing Unit for Custodial Rooms			X	
Science Classroom Fume Hood (Secondary Schools)	X			
Emergency Evacuation Chair			X	Coordinate locations with Director of Emergency Management

AISD — OFCI / CFCI
RESPONSIBILITIES MATRIX

SYSTEMS	RESPONSIBLE PARTIES			
	CFCI	OFCI	OFOI	Notes
Kitchen Equipment				
Grease Trap	X			
Walk-In Coolers/Freezers	X			
Dishwasher	X			
Steamer	X			
Oven	X			
Cashier Stand	X			
Hot/cold pass through	X			
Mixer	X			
Serving Lines	X			
Stainless steel work tables	X			
Mobile pot/pan rack	X			
Soiled / clean dish tables	X			
Dry storage shelving	X			
Can Storage Rack	X			
Coffee Stations			X	
POS System			X	
Food Service Equipment:				
Fold-up tables (with or without attached seating)			X	
Stackable Chairs			X	
Beverage Dispensers			X	
Toilet Accessories:				
Paper Towel Dispenser		X		
Toilet Paper Dispenser		X		
Soap Dispenser		X		
Toilet Partitions	X			
Trash Receptacles (built-in)	X			
Trash Receptacles (mobile)			X	
Electric Hand Dryer	X			

AISD — OFCI / CFCI
RESPONSIBILITIES MATRIX

SYSTEMS	RESPONSIBLE PARTIES			
	CFCI	OFCI	OFOI	Notes
Furnishings:				
Lockers	X			
Built-In Bookshelves / Cabinets	X			
Modular bookshelves, bookcases, display cases			X	
Shelving, storage cabinets			X	
Desks / Tables			X	
Lectern Podiums			X	
File Cabinets / Racks			X	
Vending Machines			X	
Cash Register			X	
Chairs			X	
Entry Mats / Rugs			X	
Built-In Mailboxes	X			

Name of Project Austin ISD Project No. #####											INSERT LOGO HERE
Division	In Project Yes	In Project No	Spec'd	Basis-of-Design Manufacturer	Product / Material	Size	Color	Texture / Finish	Location	Remarks
03 3000 Concrete											
SC Sealed Concrete	X									
Vapor Retarder	X				Vapor Barrier X	15mil	N/A	N/A	Under CIP slabs	Class A, ASTM E1745 compliance
03 3543 Polished Concrete Finishing										
Penetrating Liquid Floor Treatment	X					N/A	N/A	Low Sheen	Per Dwgs	
04 2000 Unit Masonry										
Concrete Masonry Units										
CMU	X				Normal weight	8" or as indicated	N/A	N/A	Per Dwgs	
Stone Trim Units										
ST-1	X						Blue-Grey		Base/Starter course	Dolomitic
Face Brick										
FB-1	X					Smooth Modular				SW, FBX
Ties & Anchors										
Adjustable masonry-veneer anchors	X							Galvanized	light-gauge backup	
Wire ties	X							Galvanized	CMU/cavity wall system	
Masonry joint reinforcement	X				Ladder-type			Galvanized	CMU/cavity wall system	
Grout for CMU	X				Portland cement/lime	N/A	Standard			
Grout for Face Brick	X				Premixed colored portland cement-lime mix	N/A	TBD			
Grout for Stone	X				Portland cement/lime	N/A	Standard			
Flashing & weeps/vents										
Partially exposed flashing	X				Stainless Steel					
Concealed (flexible) flashing	X									
Weeps/Vents	X				cellular head joints					
Cavity drainage material	X					Strips				
05 4000 Cold Formed Metal Framing										
Exterior non-load-bearing wall framing	X					As req. by structural performance.		G60		Delegated design submittal
Thermal clips	X									
05 5000 Metal Fabrications										
Metal Ships' Ladders	X									
Metal Bollards	X									
Pipe Guards	X									
05 5113 Metal Pan Stairs										
Steel stairs with concrete-filled treads	X								Egress stairs	Delegated design submittal
Steel tube railings attached to metal stairs	X				Steel w/ picket infill		TBD	Painted	Egress stairs	

EXAMPLE

Name of Project Austin ISD Project No. #####										INSERT LOGO HERE
Division	In Project Yes	In Project No	Spec'd	Basis-of-Design Manufacturer	Product / Material	Size	Color	Texture / Finish	Location	Remarks
Steel tube handrails attached to walls adjacent to metal stairs	X				Stainless Steel			Satin No.4	Egress stairs	
05 7313 Glazed Decorative Metal Railings										
Post-supported railings with glass infill	X					1/2" Temp. glass		Stainless Steel + Glass	Lobby stair	Delegated design submittal
06 1053 Miscellaneous Rough Carpentry										
Wood blocking	X				Fire-retardant treated					
06 1600 Sheathing										
Wall Sheathing	X									
Glass-Mat Gypsum Sheathing	X					4'x8'x5/8"			Perimeter walls	
Composite nail base insulated roof sheathing	X								Back of Parapets	
OSB-Surfaced, Polyisocyanurate-Foam Sheathing	X					2" insulation				
06 2023 Interior Finish Carpentry										
Shelving and Clothes Rods	X									
PL-1					TBD					
PL-2					TBD					
Edging for Plastic Laminate:	X									
PL-1					TBD					
PL-2					TBD					
07 1326 Self Adhering Sheet Waterproofing										
Modified bituminous sheet waterproofing	X					N/A	N/A			
07 2100 Thermal Insulation										
Walls										
Extruded polystyrene	X				Type IV, 25psi				Foundation	
Polyisocyanurate	X				Type I, Class I				Perimeter walls	
Spray polyurethane foam insulation	X				Type II, closed cell				Accessory locations	
07 2726 Fluid Applied Membrane Air Barriers										
Vapor-retarding, fluid-applied air barrier	X					N/A	N/A		Rainscreen wall system	Trowel, brush or spray
Accessory - transition flashing	X									
07 4213.13 Formed Metal Wall Panels										
MWP-1:	X					TBD	TBD	Fluoropolymer Three-coat Metallic/Mica Finish	Per Dwgs.	
MWP-2:	X					TBD	TBD	Fluoropolymer Three-coat Metallic/Mica Finish	Roof Mech. Screening	
07 4213.23 Metal Composite Materal Wall Panels										
MWP-3: Aluminum Composite Panels	X					TBD	TBD	Fluoropolymer Three-coat Metallic/Mica Finish	Fascia	

EXAMPLE

Name of Project Austin ISD Project No. #####										INSERT LOGO HERE
Division	In Project Yes	In Project No	Spec'd	Basis-of-Design Manufacturer	Product / Material	Size	Color	Texture / Finish	Location	Remarks
07 4646 Fiber Cement Panels										
FCP-1:	X					TBD			Main Bldg	
FCP-2:	X					TBD			Main Bldg	
FCP-3:	X					TBD				
07 6200 Sheet Metal Flashing and Trim										
Low-Slope Shet Metal Fabrications	X									
Roof Edge Flashing (gravel stop)	X				Steel		TBD	Two-coat fluoropolymer		Galvanized
Coping	X				Steel		TBD	Two-coat fluoropolymer		Galvanized
Through-wall flashing & counterflashing	X				Stainless Steel					
07 7200 Roof Accessories										
Roof Hatches	X					36x54	TBD	Prefinished		With safety railing system
Pipe Portals	X									
Preformed Flashing Sleeves	X									
07 7129 Manufactured Roof Expansion Joints										
Flanged bellows-type roof expansion joint	X					TBD				
07 8413 Penetration Firestopping										
	X									
07 8443 Joint Firestopping										
	X									
07 9100 Preformed Joint Seals										
Preformed Foam Joint Seals	X					TBD	TBD		Btwn Bldgs	
07 9200 Joint Sealants										
	X									
07 9219 Acoustical Joint Sealants										
Acoustic Sealant	X						TBD		Int. Partitions	
08 1113 Hollow Metal Doors and Frames										
Exterior	X							Painted		Galvanized, Thermally-broken frames
Interior	X							Painted		
08 1416 Flush Wood Doors										
Solid-core doors with wood-veneer faces	X							TBD	Interior	Factory finished
08 3113 Access Doors and Frames										
Flush with exposed flanges	X									Fire rated where required
08 3473.16 Wood Sound Control Door Assemblies										
	X									STC level 65
08 3613 Sectional Doors										
Sectional doors	X					2"T	TBD	Painted		Heavy duty trolly operator, 100,000 cycle door operator
08 4113 Aluminum Framed Entrances and Storefronts										
Exterior Frames	X						TBD		Window Openings	
Entrance Doors	X					Wide Style	TBD		Exterior Entry Doors	
Interior Frames	X						TBD		Interior	
08 7100 Door Hardware										
	X									
08 7113 Automatic Door Operators										
	X									

EXAMPLE

Name of Project Austin ISD Project No. #####										INSERT LOGO HERE
Division	In Project Yes	In Project No	Spec'd	Basis-of-Design Manufacturer	Product / Material	Size	Color	Texture / Finish	Location	Remarks
08 8000 Glazing										
Clear Tempered Float Glass	X					1/4"			Interior lites	
CTG										
Clear Tempered Insulating Glass	X					1"			Interior vestibule doors	
CTIG-1										
Tinted Tempered Insulating Glass									Exterior glazing	
TTIG-1	X					1"				
Insulated Spandrel	X					1"				
ISG-1										
09 2216 Non Structural Metal Framing										
Non-load-bearing steel framing systems for interior partitions	X									
Suspension systems for interior ceilings and soffits	X									
09 2900 Gypsum Board										
Gypsum Board	X					5/8"				
Mold-Resistant Gypsum Board	X					5/8"				
Tile Backing Panels	X					1/2"				
Sound Attenuation Batts	X					Depth of Studs	N/A		Interior Partitions	
09 3000 Ceramic Tiling										
Porcelain Tile							.			
CT-1	X				TBD	12x24	TBD		Floors	
CT-2	X				TBD	3x5	TBD		Walls at toilet rooms/showers	
Grout for Porcelain Tile							.			
CT-1	X				Epoxy Grout					
CT-2	X				Epoxy Grout					
Crack Isolation Membrane	X						.			
Metal Edge Strips	X						.			
09 5113 Acoustical Panel Ceilings										
Acoustic Ceiling Panels										
APC-1	X					24x24	White	Fine		Mineral Fiber
APC-2	X					24x24	White	Fine		Mineral Fiber
APC-3	X					24x24	White	Fine		Fiberglass
Support Grid for:										
APC-1	X					15/16" tegular	White	Painted		
APC-2	X					15/16"	White	Painted		
APC-3	X					15/16" tegular	White	Painted		
Wood Ceiling System	X					15/16" tegular with vertical slats	TBD	TBD		Solid wood tegular panels
09 6519 Resilient Tile Flooring										
	X					Varies	TBD			

EXAMPLE

Name of Project Austin ISD Project No. #####											INSERT LOGO HERE
Division	In Project Yes	In Project No	Spec'd	Basis-of-Design Manufacturer	Product / Material	Size	Color	Texture / Finish	Location	Remarks
	X					Varies	TBD			
	X					Varies	TBD			
	X					Varies	TBD			
09 6723 Resinous Flooring										
Resinous Flooring System	X					N/A	TBD	TBD		
RFS-1	X									
09 6813 Tile Carpeting										
Carpet Tile										
CPT-1	X									
CPT-2	X									
CPT-3	X									
CPT-4	X									
09 7723 Fabric-Wrapped Panels										
Acoustic Wall Panel	X					2"T				NRC 1.00
AWP-1	X						TBD			
AWP-2	X						TBD			
09 8433 Sound Absorbing Wall Units										
Acoustic Wall Panel	X					3/8"T	TBD			NRC 0.75
AWP-3	X						TBD			
AWP-4	X						TBD			
09 9113 & 09 9123 Ext/Int Painting										
P-1	X									
P-2	X									
P-3	X									
P-4	X									
P-5	X									
P-6	X									
P-7	X									
10 1100 Visual Display Units										
Markerboards	X				Porcelain-enamel faced					
Tackboards	X				Plastic-impregnated Cork					
10 1419 Dimensional Letter Signage										
Fabricated channel dimensional characters	X								Lobby	
Illuminated, fabricated channel dimensional	X								Exterior	
10 1423 Panel Signage										
Panel Signs	X								Wayfinding	
Field-Applied, vinyl character signs	X								Perimeter doors, super-graphics	
10 1423.13 Room Identification Signage										
Room identification signs	X									
10 1426 Post and Panel Pylon Signage										
Nonilluminated post-and-panel signs	X								Site wayfinding	

EXAMPLE

Name of Project Austin ISD Project No. #####										INSERT LOGO HERE
Division	In Project Yes	In Project No	Spec'd	Basis-of-Design Manufacturer	Product / Material	Size	Color	Texture / Finish	Location	Remarks
10 2239 Folding Panel Partitions										
Operable	X				Operable Partitions					
10 2239.13 Folding Glass-Panel Partitions										
Operable	X									
10 2800 Toilet, Bath and Laundry Accessories										
Baby Changing Station										
BCS	X									
Folding Shower Seat										
FSS	X									
Grab Bar										
GB-1	X									
GB-2	X									
GB-3	X									
Hand Dryer										
HD	X									
Mirror										
MR	X									
Mop and Broom Holder										
MBH	X									
Sanitary Napkin Vendor										
SNV	X									
Sanitary Napkin Disposal										
SND Partition Mounted	X									
Paper Towel Disposal										
PTD/R Paper Towel Dispenser with Waste Receptacle	X									
Soap Dish										
S	X									
Shower Curtain										
SC	X									
Seat Cover Dispenser										
SCD	X									
Shower Curtain Hook										
SCH	X									
Shower Curtain Rod										
SCR	X									
Soap Dispenser										
SD	X									
Towel Hooks										
TH	X									
Toilet Tissue Dispenser										
TTD	X									
Utility Shelf										
US	X									
10 4413 Fire Protection Cabinets										
Fire-protection cabinets for portable fire extinguishers	X				Recessed					
10 7516 Ground Set Flagpoles										

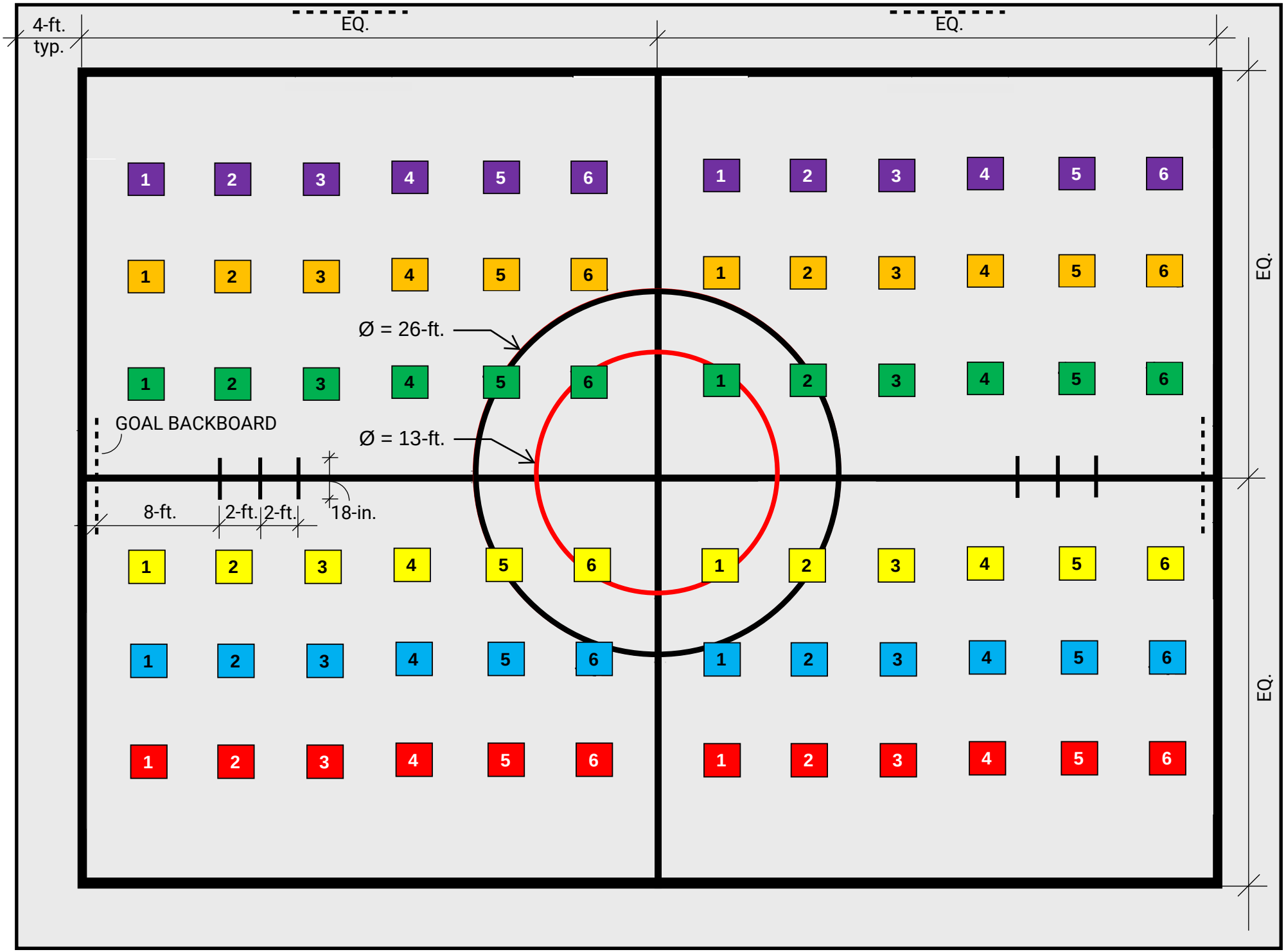
EXAMPLE

Name of Project Austin ISD Project No. #####										INSERT LOGO HERE
Division	In Project Yes	In Project No	Spec'd	Basis-of-Design Manufacturer	Product / Material	Size	Color	Texture / Finish	Location	Remarks
Aluminum Flagpole	X					30 feet		Anodized		
11 5313 Fume Hoods										
12 2413 Roller Window Shades										
Manually operated roller shades with single	X								Perimeter	Light-filtering fabric
Motor-operated roller shades with double rollers	X									Light-filtering fabric plus light-blocking fabric
12 3216 Manufactured Plastic-Laminate-Faced Casework										
Plastic Laminate	X									
PL-1										
PL-2										
PL-3										
Edging	X									
PVC edge banding										
Hardware	X									
Pulls										
12 3661.16 Solid Surfacing Countertops										
Countertop										
SS-1	X									
SS-2	X									
SS-3	X									
14 2400 Hydraulic Elevators										
Machine Room-less Hydraulic Elevator	X							Stainless Steel Finishes w/ LED lighting		
Other										

EXAMPLE

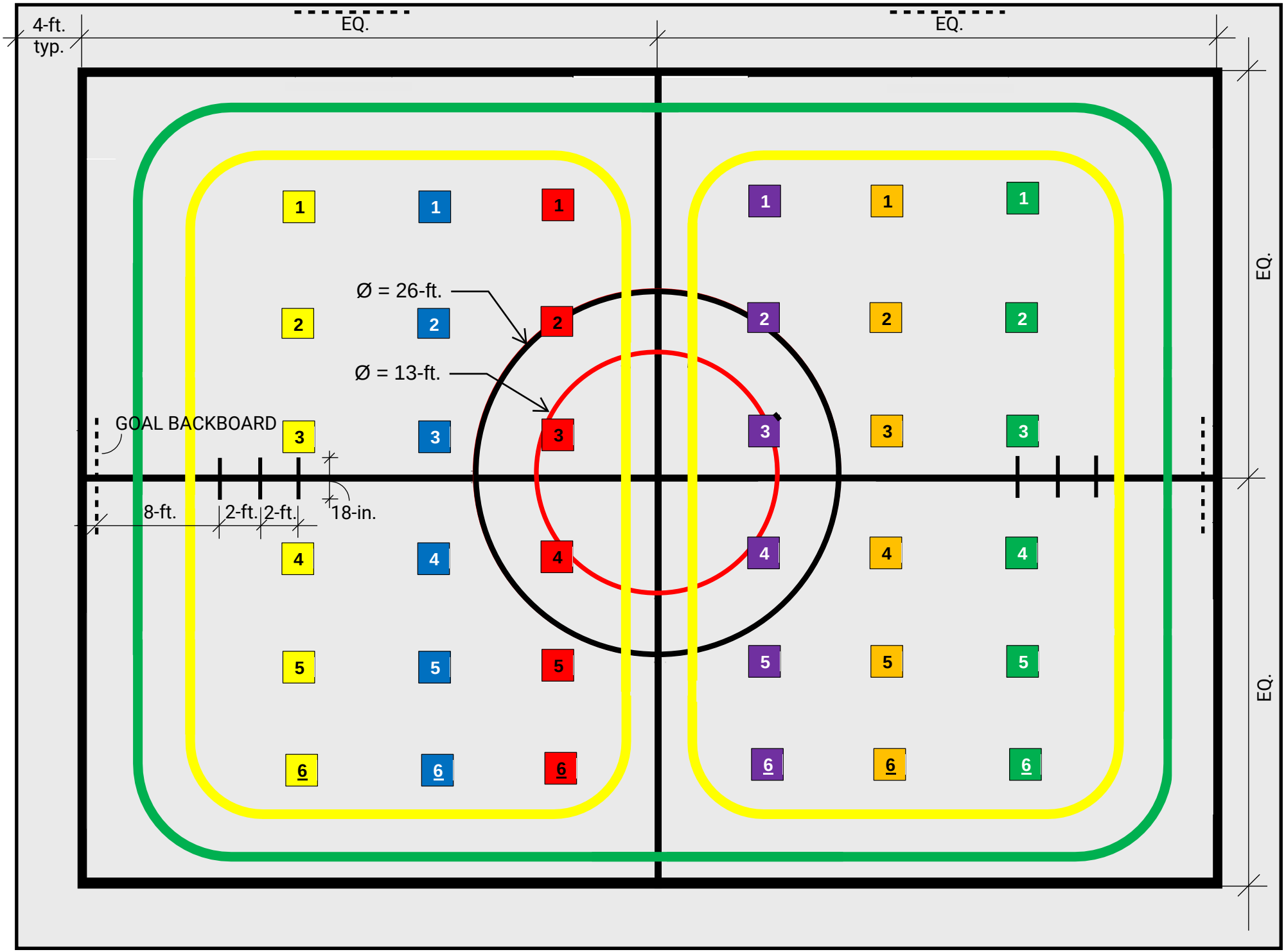
ELEMENTARY GYM FLOOR STRIPING - OPTION 1

NOT TO SCALE



ELEMENTARY GYM FLOOR STRIPING - OPTION 2

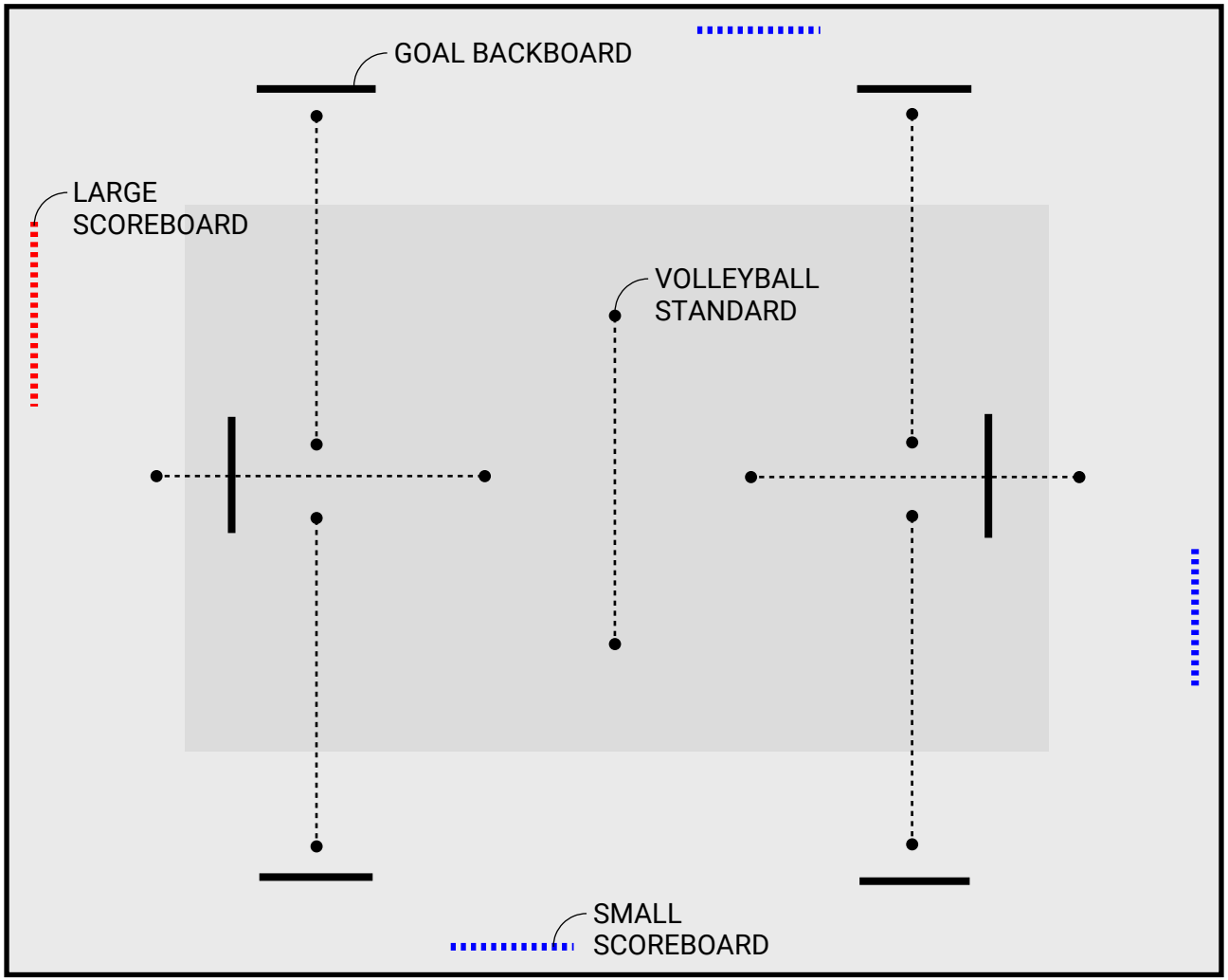
NOT TO SCALE



MIDDLE SCHOOL AND HIGH SCHOOL
LARGE GYM
ATHLETIC EQUIPMENT SCHEMATIC LAYOUT

NOT TO SCALE

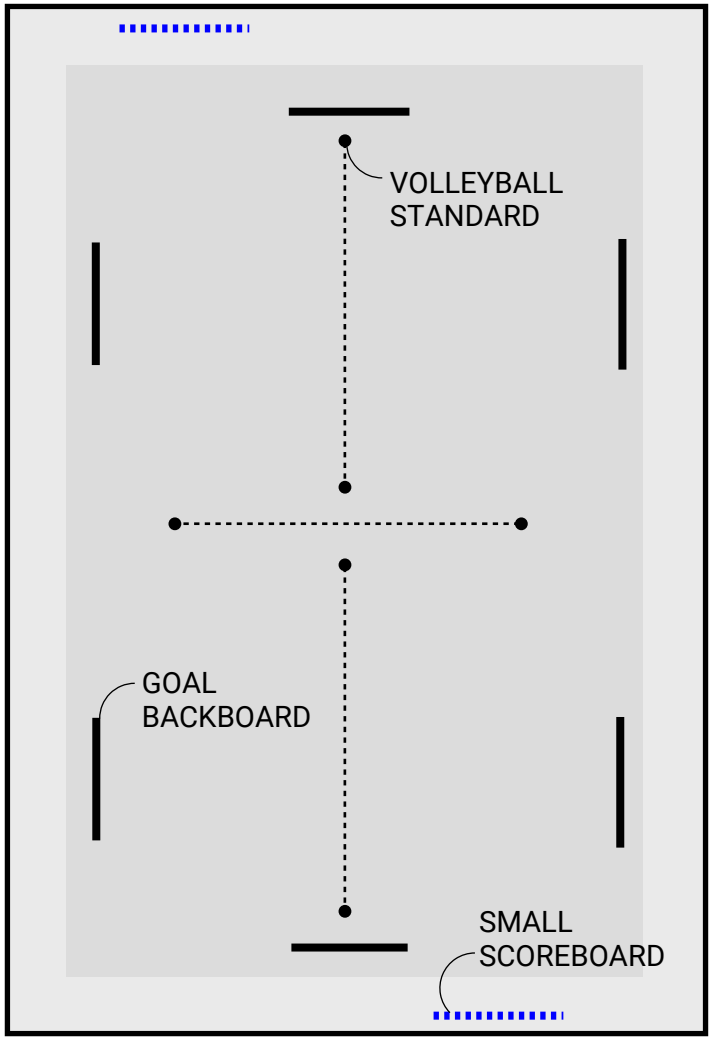
REFER TO NATIONAL FEDERATION OF STATE HIGH SCHOOL ASSOCIATIONS FOR ADDITIONAL REQUIREMENTS



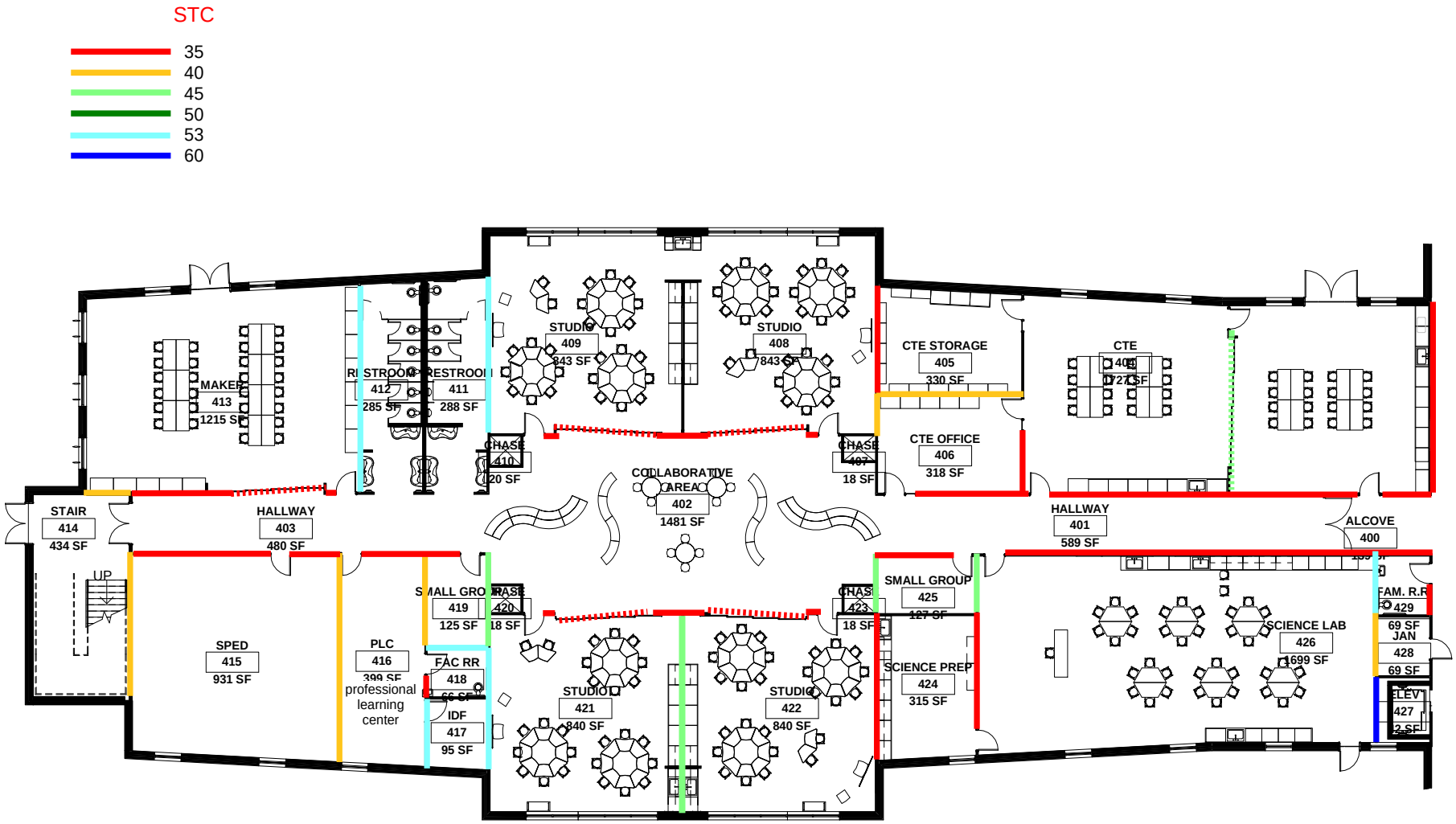
MIDDLE SCHOOL AND HIGH SCHOOL
MULTI-PURPOSE GYM
ATHLETIC EQUIPMENT SCHEMATIC LAYOUT

NOT TO SCALE

REFER TO NATIONAL FEDERATION OF STATE HIGH SCHOOL ASSOCIATIONS FOR ADDITIONAL REQUIREMENTS



STC NEIGHBORHOOD EXAMPLE



AUSTIN Independent School District

Product Provider Questionnaire - HVAC

Manufacturer: RTU Manufacturer, Inc. (Example)

Product	Contact Name, Title, Address, Email, Phone	Emergency/ Normal Local Service Contacts	Description of Product and Data Sheets	Years Product installed in U.S. and Austin	Efficiency At least 5 %> IECC FL/PL	Lead Time on Equipment Delivery (Weeks)	Available Parts and Labor Warranty / Yrs (Min 3)	Define Service Response Times - Emergency/Normal Provide contact information to verify performance	# of Service Techs in Greater Austin Area. Provide resumes for service techs	Contct info for product installation in Greater Austin Area	BACnet BTL Certified Integration Card Available? Y/N	Controls Interface Requirements (Sensors, programming, installation)	List all installations and experiences with AISD schools. List consultants, Service Center reps & contact information involved at each location. List issues and resolutions for each installation.	List all installations and experiences with other locations. List consultants, owner's reps & contact information involved for each location. List issues and resolutions for each installation.
Sample Product - Rooftop Unit	*Jane Doe Technical Rep 1000 Avenue Austin, TX Tech@company.com 512-xxx-xxxx*	*John Doe 512-xxx-xxxx*	*Handy Craft Brand 3 - 5 ton RTU: High Efficiency, Variable Speed, Hot-Gas Re-Heat, Economizer*	*X years in U.S./ X Years in Austin*	*15 EER / 19 SEER*	*X Weeks*	*X years*	*X hours for emergency service/ X hours for normal service*	*X techs*	*Jane Doe Technical Rep 1000 Avenue Austin, TX Tech@company.com 512-xxx-xxxx*	*Yes*	*Unit controls are pre-programed by manufacturer. Sensors are provided by manufacturer. BACNET Interface*	*Our RTUs are reliable but we have had some units delivered with faulty control boards, that we have replaced at no cost to the Owner.*	*Our RTUs are reliable but we have had some units delivered with faulty control boards, that we have replaced at no cost to the Owner.*
Water Cooled Centrifigual Chillers														
Water Cooled Screw Chillers														
Water Cooled Mag Bearing Chillers														
Air Cooled Scroll Chillers														
Air Cooled Screw Chillers														
Cooling Tower/Fluid Cooler														
Boilers														
Hydronic Pumps														
Hydronic Air Handling Units														
DX Outside Air Unit														
Packaged Dx Units														
Water Source Heat Pumps														
DX Split Systems/Heat Pumps														
Mini Splits														
Terminal Units														
Other														
Other														

ACCEPTABLE MEP MANUFACTURERS LIST

DIVISION 22 – PLUMBING

Section 223300 / 223400 – Domestic Hot Water

1. Storage Type, Natural Gas Fired Water Heaters:
    A. Rheem
    B. A.O. Smith
    C. Bradford White
    D. Lochinvar
    E. Raypack
    F. Aerco
    G. PVI

Section 224000 – Plumbing Fixtures

1. Water Closets (1.28 gpf , and 1.1 gpf for elementary school only, Flush Valve):
    A. American Standard
    B. Sloan
    C. Kohler
2. Urinals (0.125 gpf Flush Valve):
    A. American Standard
    B. Sloan
    C. Kohler
3. Lavatories (0.5 gpm Faucets):
    A. American Standard
    B. Sloan

C. Kohler

4. Showers (1.25 gpm Faucets):
    A. American Standard
    B. Bradley
5. Sinks:
    A. American Standard
    B. Elkay
    C. Just
6. Custodial Mop Sinks:
    A. American Standard
    B. Just
    C. Fiat
7. Drinking Fountains
    A. Elkay
    B. Halsey-Taylor

DIVISION 23 – MECHANICAL

Section 232123 – Hydronic Pumps

1. Armstrong
2. Bell & Gossett
3. Taco
4. Grundfos

Section 235200 – Hydronic Boilers

1. AERCO
2. Lochinvar
3. RBI
4. Raypak
5. Viessmann

Section 236410 – Chillers

1. Carrier
2. JCI / Quantech
3. Daikin
4. Trane

Section 236420 – Cooling Towers

1. Baltimore Air Coil
2. Evapco
3. SPX Cooling Technologies (Marley)

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

1. Heat Pump or Electric cool w/ Gas Fired Heat Outside Packaged Units
    A. Aaon
    B. Carrier
    C. JCI / Tempmaster
    D. Daikin
    E. Lennox
    F. Trane
    G. Valent
2. Dedicated, Outside Air Systems, Packaged or Semi-custom Units
    A. Aaon
    B. Daikin
    C. Trane
    D. Valent
3. Custom Outside Units
    A. Annexair
    B. Engineered Aire
    C. Innovent
    D. Temptrol

Section 237313 –-Modular Hydronic Indoor Central Station Air Handling Units and Fan Coil Units

1. Modular Hydronic Indoor Central Station Air Handling Units and Fan Coil Units
    A. Carrier
    B. Daikin
    C. JCI/Pace
    D. Trane
    E. Others as approved by Owner.

2. Custom Hydronic Indoor Central Station Air Handling Units and Fans
    A. Annexair
    B. Engineered Aire
    C. Innovent
    D. Temtrol
    E. Others as approved by Owner.

Section 238119 – Self Contained Air-Conditioners

1. Bard
2. Change Air
3. Marvair
4. Trane

Section 238146 – Water-to-Air Heat Pumps

1. Climate Master
2. Johnson Controls
3. Trane

Split Systems, Direct Expansion or Heat Pump

1. Aaon
2. Carrier
3. Lennox
4. Trane

Mini - Split Systems

1. Carrier
2. Johnson Controls
3. Trane / Mitsubishi

Variable Frequency Drives

1. Yaskawa
2. ABB

DIVISION 26 – ELECTRICAL

Electrical Power Distribution Equipment

1. Switchboards
    a. Eaton
    b. Square D
    c. Other manufacturers by Owner approval only.
2. Panelboards
    a. Eaton
    b. Square D
    c. Other manufacturers by Owner approval only.
3. Safety Switches
    a. Eaton
    b. Square D
    c. Other manufacturers by Owner approval only.
4. Low Voltage Transformers (600v and less)
    a. Eaton
    b. Square D
    c. Other manufacturers by Owner approval only.
5. Motor Controllers
    a. Eaton
    b. Square D
    c. Other manufacturers by Owner approval only.

Lighting

1. Lighting Controls
    a. Acuity Brands, nLight (Basis of Design)
    b. Lutron

2. Light Fixtures
    a. Acuity Brands
    b. Eaton
    c. Hubbell
    d. Philips

Wiring Devices

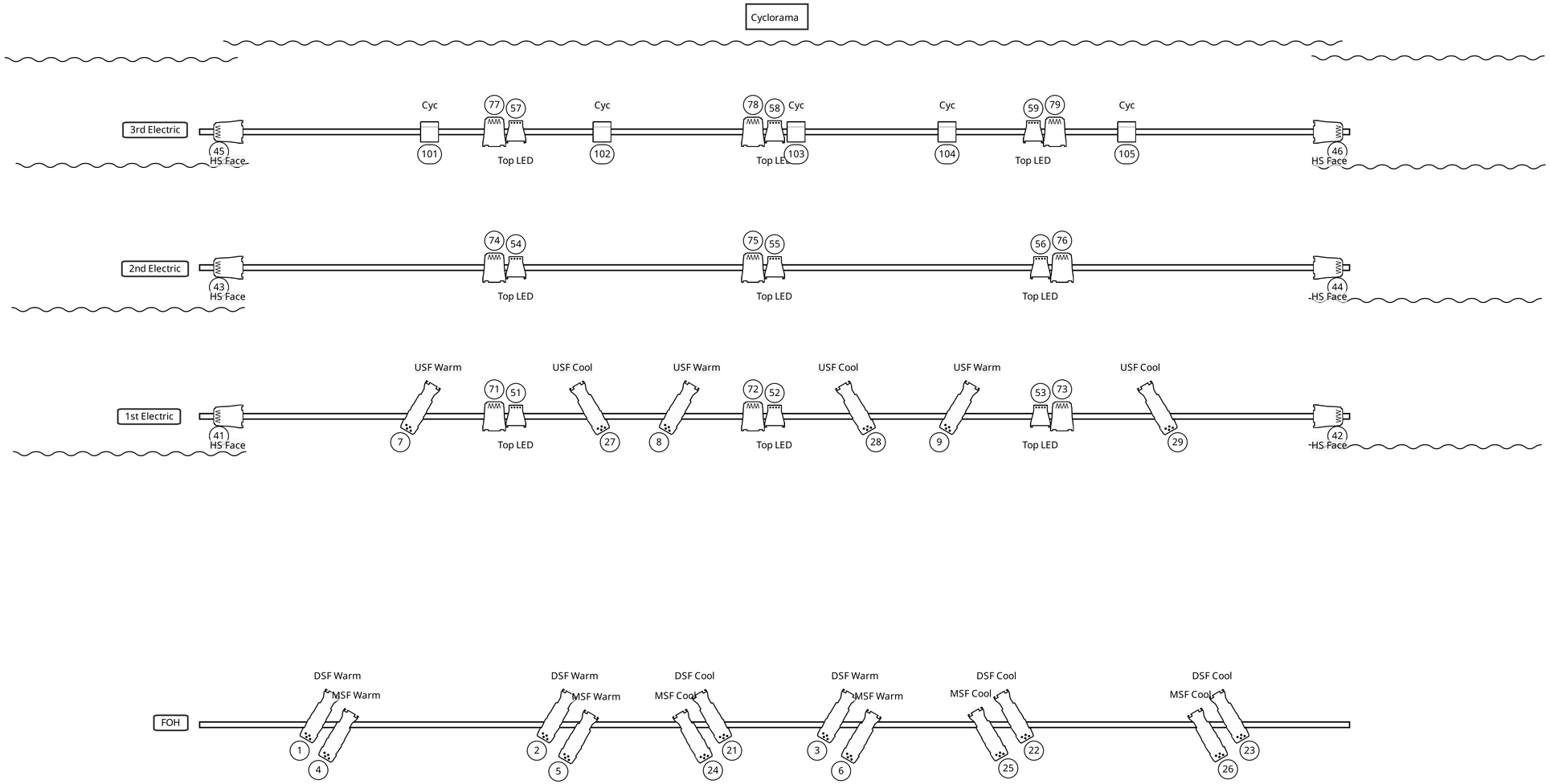
1. Eaton
2. Hubbell
3. Leviton
4. Legrand

Generators

1. Caterpillar (Owner's preference)
2. Cummins
3. Generac
4. MTU On-Site Energy

Transfer Switches

1. Asco
2. Caterpillar
3. Cummins
4. Eaton
5. Generac
6. MTU On-Site Energy
7. RussElectric



SYMBOL KEY

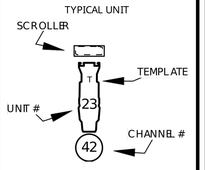
Source-4 ColorSource 36°
150w

Chauvet Ovation P-56 WW MFL

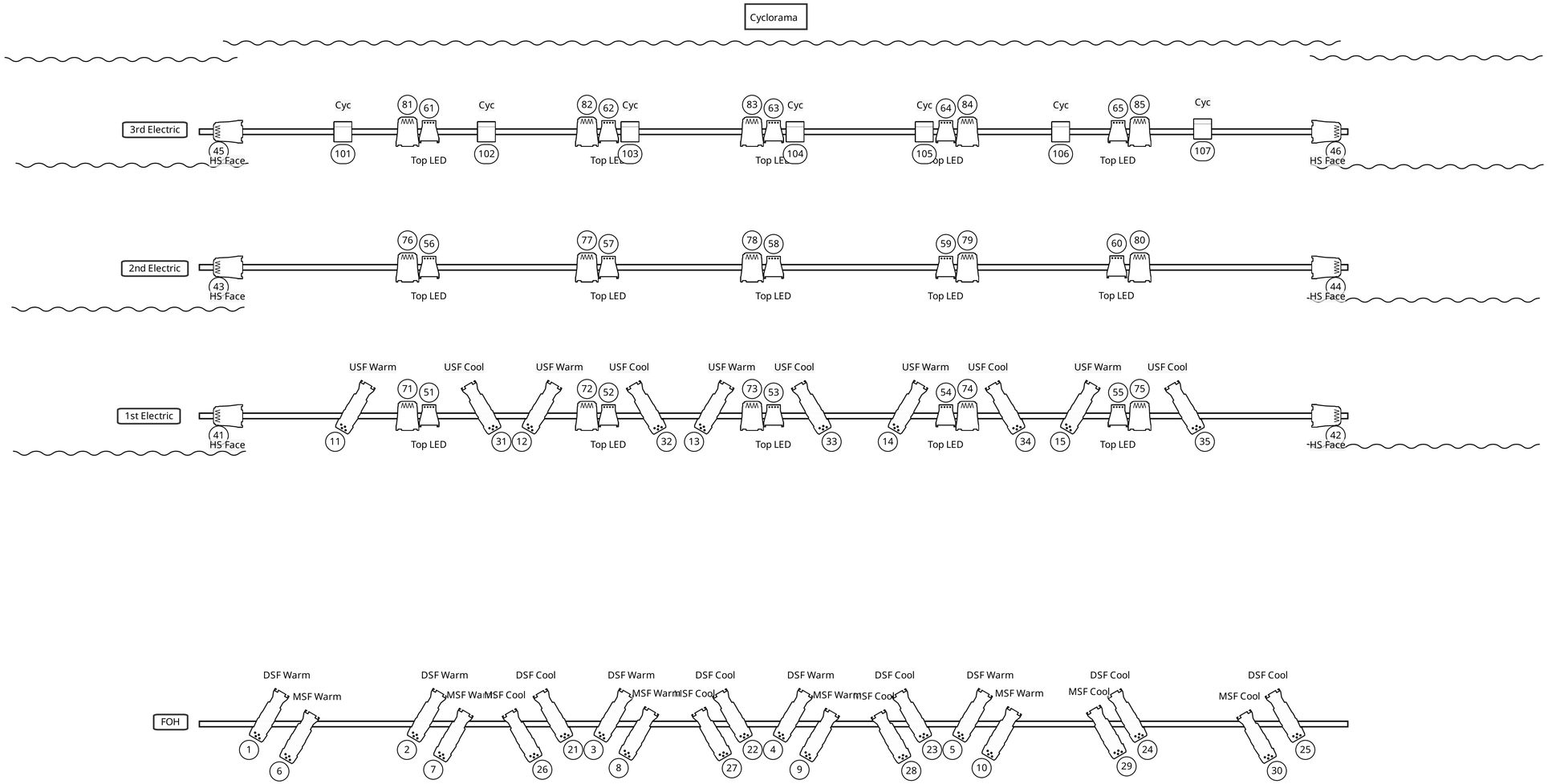
ETC ColorSource PAR Original
90w

ETC ColorSource Cyc
133w

TYPICAL UNIT



Theater Name
City, State


Cyclorama
3rd Electric
2nd Electric
1st Electric
FOH
HS Face
Top LED
Cyc
USF Warm
USF Cool
DSF Warm
DSF Cool
MSF Warm
MSF Cool
SYMBOL KEY
Source-4 ColorSource 36°
150w
Chauvet Ovation P-56 WW MFL
ETC ColorSource PAR Original
90w
ETC ColorSource Cyc
133w
TYPICAL UNIT
SCROLLER
TEMPLATE
UNIT #
CHANNEL #
Theater Name
City, State

KITCHEN DESIGN REQUIREMENTS

ELEMENTARY SCHOOL KITCHEN REQUIREMENTS

1. Servery
    A. Servery will be located between the dining room seating and the kitchen area.
    B. Servery will be open to the dining area visually, but able to be secured. This may include windows, roll gates, doors, etc.
    C. Serving Line will have an easy and efficient traffic flow.
    D. Serving Line will be organized and include the following:
    E. Serving Line with (1) POS/Cashier Area. The Serving Counter will include (5) waterless Hot Drop-in Wells with adjustable breath guards and serving shelves with lights; Cold Drop-in Wells with adjustable breath guards and serving shelves with lights; (1) Cold Pan with double Frost Over shelf with adjustable breath guards and serving shelves with lights, accessible for self-service; refrigerated Milk Cooler counter to accommodate 3 crates with solid tray rail; (Preferred manufacturer Mod-u-serve)
    F. Serving Line will end with the Milk Counter/Milk Cooler just before the Cashier/POS station. (1) POS/Cashier Station will support the serving line and be located directly at the end of the line.
    G. Serving line will have Stainless-Steel Top and Laminated or Tile base with solid Stainless Steel or Stone Tray Slide/Rail. 30 or 32” Tray Slide/Rail height for Elementary school will be standard. Service height for the equipment line will be 34”.
    H. Surveillance Security systems will be installed to cover the POS/Cashier area, if needed.
    I. Queue rails/Stanchions will only be installed to guide traffic as per District requirement.
    J. A Digital Display for promotional items has been requested by the Austin I.S.D. Food Service Team. Architect/IT will coordinate with district representatives to determine specifics.
    K. AISD would like utensils, condiments, and napkins to be centrally located in the dining room space. A mobile condiment counter will be provided.
2. Food Production / Cooking Areas
    A. Production/Cooking Area will be adjacent to Preparation Area to provide easy and efficient food production, storage, and holding.

B. Production/Cooking Equipment will accommodate the needs for planned Menu offerings and will be based on the food production needed for the student population.
C. Exhaust Hood(s) with Fire Suppression System will cover the entire cooking line. The wall behind the cookline(s) will be clad in Stainless Steel.
D. Cooking/Production Equipment to be provided will include the following:
    i. 2 Double Stack Convection Ovens - Blodgett
    ii. 2 Double Stack Steamers – Cleveland
    iii. 30-Gallon Tilting Braising Pan with Faucet and Drain Trough
    iv. Burner Range with Stand
    v. Mobile Racks
    vi. Mobile Hot Holding/Proofing Cabinets
    vii. Ice Machine
    viii. Food Processor with stand
    ix. Prep/Work Tables with drawers, under and over shelves
    x. Prep/Work Tables with with sinks for fruit and vegetable prep
E. Food Holding Equipment will include Hot Holding Cabinets, Reach-in Refrigerators, and Heated and Refrigerated Pass-Thru Units (Traulsen) to load and hold production ready food items.
F. Pass-Thru Units (2 Hot and 2 Cold) to support service will have SS doors on both the kitchen and serving line side.

3. Food Preparation Area
    A. Preparation area will be located adjacent to the walk-in cooler/freezer to minimize cross traffic.
    B. This area will include secondary storage (cold and dry) including Ingredient Bins, Reach-in Refrigerators, and Reach-in Freezers.

C. This area will include the following preparation equipment:
    i. Preparation Sinks and Tables with pot racks and single drawers
    ii. 20-Qt. Mixer with Mobile Stand
    iii. (5) Mobile Speed/Sheet Pan Racks – Channel with 20 universal slides
    iv. (2) Can Opener (Table-Mounted)
    v. Wall Mount Shelving
    vi. (2) Knife Holders
    vii. (3) 2-Shelf Carts (700# Lakeside)
    viii. (3) 3-Tier Busser Carts – Black (Carlisle, Cambro)
    ix. Blender
    x. Digital Portion Scale
D. Hand Sinks with foot pedal operation and paper towel/soap dispenser will be included, as necessary.

4. Food Storage Sensors and Monitoring
    A. Provide remote monitoring and sensor network management of operating temperatures for walk-in coolers and freezers.
        i. Operating range of cooler sensors shall be no less than 5-degree Celsius to 35-degrees Celsius (40-degrees Fahrenheit to 95-degrees Fahrenheit).
        ii. Operating range of freezer sensors shall be no less than -40-degrees Celsius to 60-degrees Celsius (-40-degrees Fahrenheit to 140-degrees Fahrenheit).
    B. System shall be equipped with probes, sensors, display screens, battery back-up, and cellular service to provide 24/7/365 monitoring.
    C. Screens shall provide high-contrast displays and be equipped with audible/visual alarms.
    D. Batteries shall provide up to 24 hours of back-up power in the event of power outage.

MIDDLE SCHOOL KITCHEN REQUIREMENTS

1. Servery
    A. Servery will be located between the dining room seating and the kitchen area.
    B. Servery will be open to the dining area visually, but able to be secured.
        i. This may include windows, roll gates, doors, etc.
    C. Serving Lines will have an easy and efficient traffic flow. Serving Lines (2) will be organized and include the following:
        i. 2 Main Serving lines and 1 line grab n go menu items and drinks
        ii. The Serving Counter will include (5) waterless Hot Drop-in Wells with adjustable breath guards and serving shelves with lights; Cold Drop-in Wells with adjustable breath guards and serving shelves with lights; (1) Cold Pan with double Frost Over shelf with adjustable breath guards and serving shelves with lights, accessible for self service; refrigerated Milk Cooler counter to accommodate 3 crates with solid tray rail; (Preferred manufacturer Mod-u-serve)
    D. Serving Line will end with the Milk Counter/Milk Cooler just before the Cashier/POS station. (2) POS/Cashier Station can support both serving lines and be located directly at the end of each line.
    E. Surveillance Security systems will be installed to cover the POS/Cashier area, if needed.
    F. Queue rails/Stanchions will only be installed to guide traffic as per District requirement.
    G. A Digital Display for promotional items has been requested by the Austin I.S.D. Food Service Team. Architect/IT will coordinate with district representatives to determine specifics.
    H. AISD would like utensils, condiments, and napkins to be centrally located in the dining room space. A mobile condiment counter will be provided.
    I. Additional Serving line to support the main kitchen featuring distributed quick lunch grab-n-go service items at the end of each line.
2. Food Production / Cooking Areas
    A. Production/Cooking Area will be adjacent to Preparation Area to provide easy and efficient food production, storage, and holding.
    B. Production/Cooking Equipment will accommodate the needs for planned Menu offerings and will be based on the food production needed for the student population.

C. Exhaust Hood(s) with Fire Suppression System will cover the entire cooking line. The wall behind the cookline(s) will be clad in Stainless Steel.

D. Cooking/Production Equipment to be provided will include the following:

i. 3 Double Stack Convection Ovens - Blodgett
ii. 1 Double Stack Combi Oven - Rational
iii. 2 Double Stack Steamers – Cleveland
iv. 30-Gallon Tilting Braising Pan with Faucet and Drain Trough
v. 4 Burner Range with Stand
vi. Mobile Racks
vii. Mobile Hot Holding/Proofing Cabinets
viii. Ice Machine
ix. Food Processor with stand
x. Prep/Work Tables with drawers, under and over shelves
xi. Prep/Work Tables with sinks for fruit and vegetable prep

E. Food Holding Equipment will include Hot Holding Cabinets, Reach-in Refrigerators, and Heated and Refrigerated Pass-Thru Units (Traulsen) to load and hold production ready food items.

F. Pass-Thru Units (2 Hot and 2 Cold) to support service will have SS doors on both the kitchen and serving line side.

3. Food Preparation Area

A. Preparation area will be located adjacent to the walk-in cooler/freezer to minimize cross traffic.

B. This area will include secondary storage (cold and dry) including Ingredient Bins, Reach-in Refrigerators, and Reach-in Freezers.

C. This area will include the following preparation equipment:
    i. Preparation Sinks and Tables with pot racks and single drawers
    ii. 20-Qt. Mixer with Mobile Stand
    iii. (8) Mobile Speed/Sheet Pan Racks – Channel with 20 universal slides
    iv. (1) Can Opener (Table-Mounted)
    v. Wall Mount Shelving
    vi. (2) Knife Holders
    vii. (4) 2-Shelf Carts (700# Lakeside)
    viii. (3) 3-Tier Busser Carts – Black (Carlisle, Cambro)
    ix. Blender
    x. Digital Portion Scale
D. Hand Sinks with foot pedal operation and paper towel/soap dispenser will be included, as necessary.

4. Food Storage Sensors and Monitoring
    A. Provide remote monitoring and senso network management of operating temperatures for walk-in coolers and freezers.
        i. Operating range of cooler sensors shall be no less than 5-degree Celsius to 35-degrees Celsius (40-degrees Fahrenheit to 95-degrees Fahrenheit).
        ii. Operating range of freezer sensors shall be no les than -40-degrees Celsius to 60-degrees Celsius (-40-degrees Fahrenheit to 140-degrees Fahrenheit).
    B. System shall be equipped with probes, sensors, display screens, battery back-up, and cellular service to provide 24/7/365 moitoring.
    C. Screens shall provide high-contrast displays and be equipped with audible/visual alarms.
    D. Batteries shall provide up to 24 hours of back-up power in the event of power outage.

HIGH SCHOOL KITCHEN REQUIREMENTS

1. Servery
    A. Servery will be located between the dining room seating and the kitchen area.
    B. Servery will be open to the dining area visually, but able to be secured.
        i. This may include windows, roll gates, doors, etc.
    C. Serving Line will have an easy and efficient traffic flow
    D. Serving Line(s) will have multiple concepts and relate to a food court: modern, collegiate, fresh and able to adapt to new trends and concepts
    E. Serving Line will be organized and include the following:
        i. Concept Line #1: Grill/Deli Serving Line – The custom counter will include a drop in pans, heated area, drop-in refrigerated pans with cold shelves for self service, serving shelves with lighting, adjustable breath protectors, and tray rail. Line would be supported by a deli/sandwich prep station and cookline including 36" Griddle, Alto Shaam Vector Oven and (or) Small Impinger.
        ii. Concept Line #2: Pizza Serving Line – The custom counter will include a drop-in heated pizza top with warming strips, drop-in refrigerated pans with cold shelves for self service, serving shelves with lighting, adjustable breath protectors, and tray rail. Line would be supported by pizza prep stations and cookline including Double Impinger Pizza Oven.
        iii. Concept Line #3: Global Serving Line with rotating menu - The custom counter will include dual-temp drop in pans, drop-in frost/cold top with cold shelf, serving shelves with lighting, adjustable breath protectors, and tray rail.
        iv. Concept Line #4: Fiesta Line – The custom counter will include dual-temp drop in pans, drop-in frost/cold top with cold shelf, serving shelves with lighting, adjustable breath protectors, and tray rail.
        v. Beverage Merchandisers (open, air screen type) will be accessible at the end of each line prior to the POS Station. Merchandisers will accommodate bottled beverages, water, juice, yogurt, Grab-n-Go Salads
        vi. Observational/on-demand cooking lines in the front of the house will be supported behind the Pizza and Grill Concept lines.
    F. (2) Double POS/Cashier Station will support Serving lines and be located directly at the end of the line(s).

G. Surveillance Security systems will be installed to cover all POS/Cashier areas, if needed. ·Necessary secondary storage, refrigeration, and support equipment will be located directly behind each Serving line including both hot and cold pass-thru units. Queue rails/Stanchions will only be installed to guide traffic as per District requirement.

H. Menu and/or Digital signage will be supplied and installed with direction of Austin I.S.D.

I. Food Services for AISD would like utensils, condiments, napkins, to be centrally located in the dining room space.

J. Waste/Recycle areas will be in the Commons/Dining area.

K. Serving Line will end with the Milk Counter/Milk Cooler just before the Cashier/POS station. (1) POS/Cashier Station will support the serving line and be located directly at the end of the line.

L. Serving line will have Stainless-Steel Top and Laminated or Tile base with solid Stainless Steel or Stone Tray Slide/Rail.

M. Surveillance Security systems will be installed to cover the POS/Cashier area, if needed.

N. Queue rails/Stanchions will only be installed to guide traffic as per District requirement.

O. AISD would like utensils, condiments, and napkins to be centrally located in the dining room space. A mobile condiment counter will be provided.

2. Food Production / Cooking Area

A. Production/Cooking Area will be adjacent to Preparation Area to provide easy and efficient food production, storage, and holding.

B. Production/Cooking Equipment will accommodate the needs for planned Menu offerings and will be based on the food production needed for the student population.

C. Exhaust Hood(s) with Fire Suppression System will cover the entire cooking line. The wall behind the cookline(s) will be clad in Stainless Steel.

D. Cooking/Production Equipment to be provided will include the following:
    i. 3 Double Stack Convection Ovens - Blodgett
    ii. 1 Double Stack Combi Oven - Rational
    iii. 2 Double Stack Steamers – Cleveland
    iv. 40-Gallon Tilting Braising Pan with Faucet and Drain Trough
    v. 4 Burner Range with Stand
    vi. Double Stacked Impinger Pizza Oven –Lincoln
    vii. Small Impinger – Turbo Chef
    viii. 36" Griddle with stand
    ix. Mobile Racks
    x. Mobile Hot Holding/Proofing Cabinets
    xi. Ice Machine
    xii. Food Processor with stand
    xiii. Prep/Work Tables with drawers, under and over shelves
    xiv. Prep/Work Tables with with sinks for fruit and vegetable prep
E. Food Holding Equipment will include Hot Holding Cabinets, Reach-in Refrigerators, and Heated and Refrigerated Pass-Thru Units (Traulsen) to load and hold production ready food items.
F. Pass-Thru Units (2 Hot and 2 Cold) to support service will have SS doors on both the kitchen and serving line side.

3. Food Preparation Area
    A. Preparation area will be located adjacent to the walk-in cooler/freezer to minimize cross traffic.
    B. This area will include secondary storage (cold and dry) including Ingredient Bins, Reach-in Refrigerators, and Reach-in Freezers.
    C. This area will include the following preparation equipment:
        i. Preparation Sinks and Tables with pot racks and single drawers
        ii. 20-Qt. Mixer with Mobile Stand
        iii. (10) Mobile Speed/Sheet Pan Racks – Channel with 20 universal slides
        iv. (2) Can Opener (Table-Mounted)
        v. Wall Mount Shelving
        vi. (2) Knife Holders

D. (6) 2-Shelf Carts (700# Lakeside)
    i. (4) 3-Tier Busser Carts – Black (Carlisle, Cambro)
    ii. Blender
    iii. Digital Portion Scale
E. Hand Sinks with foot pedal operation and paper towel/soap dispenser will be included, as necessary.

4. Food Storage Sensors and Monitoring
    A. Provide remote monitoring and senso network management of operating temperatures for walk-in coolers and freezers.
        i. Operating range of cooler sensors shall be no less than 5-degree Celsius to 35-degrees Celsius (40-degrees Fahrenheit to 95-degrees Fahrenheit).
        ii. Operating range of freezer sensors shall be no les than -40-degrees Celsius to 60-degrees Celsius (-40-degrees Fahrenheit to 140-degrees Fahrenheit).
    B. System shall be equipped with probes, sensors, display screens, battery back-up, and cellular service to provide 24/7/365 moitoring.
    C. Screens shall provide high-contrast displays and be equipped with audible/visual alarms.
    D. Batteries shall provide up to 24 hours of back-up power in the event of power outage.
5. Additional Requirements
    A. (1-2) Concession/Distributed Serving Areas supported by the main kitchen featuring distributed quick lunch grab-n-go service items.
    B. The Distributed Serving Areas locations are still to be determined, locations near Athletics/Band Hall and adjacent to main student parking lot have been discussed. The goal is to encourage more participation by providing easier access during the single lunch period for students to eat

AUSTIN
Independent School District

DLRGROUP

This Project Development Manual document was co-created between Austin ISD and DLR Group.