ADDENDUM 1

DATE: **May 23, 2025**

PROJECT NAME: **LXT General Aviation Terminal**
Lee's Summit City Project #17932172

ADDRESS: **2720 Northeast Hagan Road**
Lee's Summit, MO 64064

TO: **All Plan Holders and Potential Bidders**

ADDENDUM No. **1**

This addendum forms a part of the bidding and contract documents and modifies the original bidding documents dated May 7, 2025.

This addendum must be signed on the last page and included with the submitted Bid Package uploaded to the QuestCDN website.

FAILURE TO RECOGNIZE THE ADDENDUM ON THE PROPOSAL FORM MAY SUBJECT THE BIDDER TO DISQUALIFICATION.

Contracting Requirements:

Questions:
Questions received via email were posted on the QuestCDN website. Refer to the website for all answers to questions asked via email and the website.

Clarifications:

1. **Clarification – Addressable Fire alarm system (specification 283111, riser diagram E-310):**
    - **a.** The fire alarm system shall be a fully new standalone addressable system. There are no plans to connect this panel to any airport central system.
    - **b.** The fire alarm control panel shall be furnished with an integral voice command center.
    - **c.** All notification appliances shall be speaker – strobes or separated ceiling speakers and wall strobes.
    - **d.** The intent of the fire alarm is a performance-based system. Should some devices be missing due to code / NFPA, fire alarm vendor shall include in their bid these devices whether indicated or not. This would include speaker/strobe coverage, smoke detectors at panel locations, exterior horn/strobe at FDC location, projected beam or heat detector coverage in hangar, etc.

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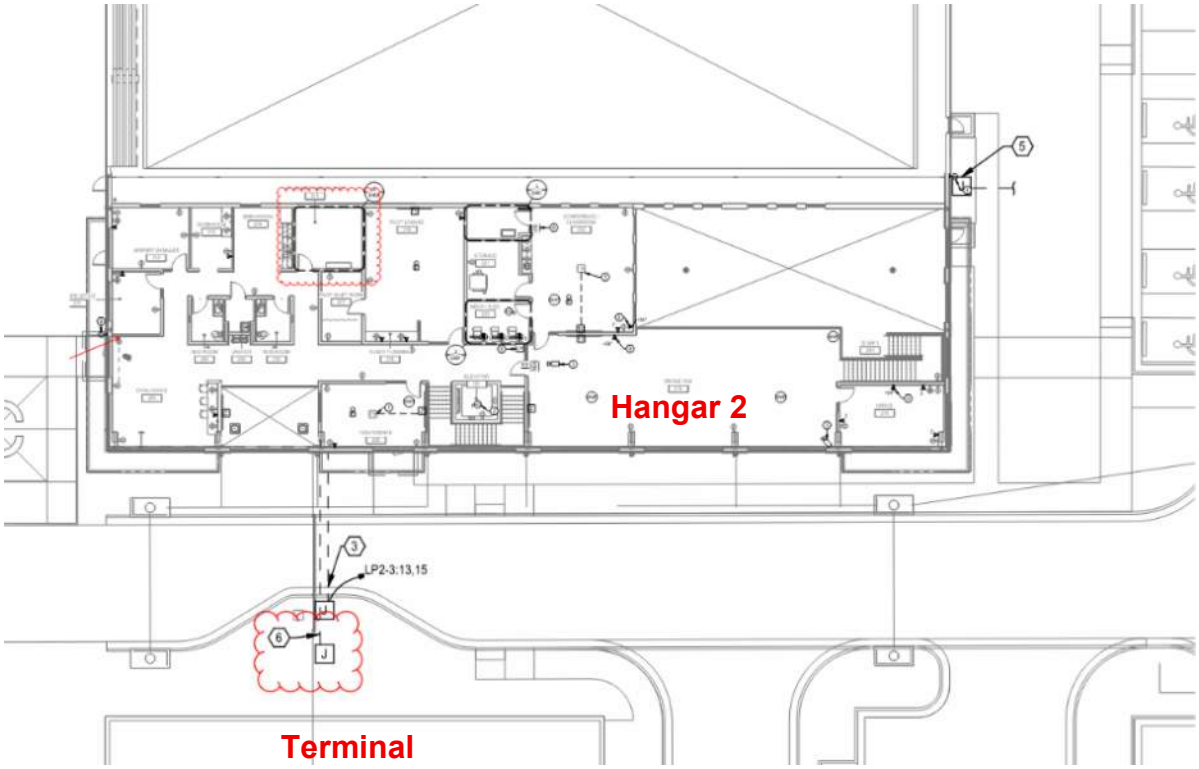
e. Adjacent to the annunciator panel shall be a recessed voice cabinet with remote mic / PA capabilities on the communication system.
f. The voice evacuation system should have preprogrammed voice and tone alerts for shelter in place, weather emergency, general fire alarm, etc.
g. A digital weather radio should be installed with the fire alarm system and shall be equal to federal signal. Any national weather service alert via antenna shall have digital signal be programmed for voice evac weather alert / tones.

2. **Clarification – Low Voltage Systems:**
   a. The contractor shall be responsible for including in his bid new systems for audio/visual, access control, and surveillance. Coordinate with City of Lee's summit for approved vendors/contractors to complete low voltage work.
   b. The contractor shall be responsible for including in his bid all data cabling from outlet/keystone to patch panel termination at racks. All testing/certification, labeling, grounding, etc. shall be furnished by the contractor. The city will do all rack level work.
   c. For all data terminations contractors shall be responsible for IT room infrastructure, including cable tray, ladder tray, 2-post racks, rack mounted UPS, telecommunications grounding bars and grounding.
   d. The audio/visual Crestron system shall be furnished by contractor per the plans.

3. **Clarification - E-120 SPECIAL SYSTEMS PLAN**
   a. **CLARIFY** all televisions shown on this sheet and AV sheets shall receive CAT-6 only per details; no coaxial cabling at televisions.

4. **Clarification – ME002/E-120, Fiber connection to Hangar 2 building.**
   a. As part of the Hangar 2 project, they terminated a 4" conduit into a quazite box on south side of our drive line to AOA fence (we do not need to cross the road). This is the point of conduit connection for fiber connectivity to the adjacent Hangar 2 building. This 6-strand fiber will need to be pulled from Hangar 2 second floor IT room/demarc into the new Terminal IT room as shown on E-120.

      See sketch below indicating the point of connection for conduit within north Terminal boundary and location in Hangar 2 second floor for City's IT room:



Substitution Requests:

Approved Equal Modifications:

1. **Accepted: Section 23 74 13** – Carrier shall also be listed as an approved manufacturer.
2. **Accepted: Section 23 09 23** – Schnieder Electric shall also be listed as an approved vendor.
3. **Accepted: Lighting Packages, Section 26 57 19 and exterior lighting** – Preliminary equal packages submitted by Premier Lighting, C&O Sales, and Mercer Zimmerman have been tentatively approved. Final approval after award during shop drawing phase is subject to meeting the aesthetics, performance, shape/size, etc.
4. **Accepted: Section 26 09 43** – Approved equals for distributed lighting controls are N-Light, Wattstopper, Crestron

Specifications:

1. **Project Manual, Section 5, Technical Specifications**
    a. **SECTION 01120 – Measurement & Payment**
        i. REMOVE and REPLACE entire section.

2. **Project Manual, Section 9**
    a. **Proposal and Bid Form**
        i. REMOVE and REPLACE the bid proposal forms with the attached revised bid forms. The revised proposal sheets can be inserted into the book with a staple or paper clip or added to the comb binding and included with the bid.

3. **SECTION 08 71 00 – DOOR HARDWARE**
    a. **REVISE** SET 02 to remove reference to automatic opener and add another core & housing.
    b. **REVISE** SET 04 to remove 200.1 and add 201.1.
    c. **REVISE** SET 08 to remove 108.2.
    d. **REVISE** SET 15 to add 200.1.
    e. **REVISE** SET 16 DOOR NUMBERS.
    f. **ADD** SET 17.

4. **SECTION 12 36 61 – SIMULATED STONE COUNTERTOPS (not reissued)**
    a. **DELETE** 1.2.B.6.
    b. **DELETE** 2.1.A.2.

5. **SECTION 23 87 29 – VARIABLE REFRIGERANT FLOW HVAC SYSTEMS**
    a. **ADD** section.

6. **SECTION 27 41 16 – AUDIO VIDEO SYSTEMS EQUIPMENT**
    a. **REPLACE** entire section.

Drawings:

1. **A-401 ENLARGED 1ST FLOOR PLAN - NORTH**
    a. **REVISE** note to shelving HEAVY-DUTY STEEL BOLTLESS SHELVING WITH PARTICLEBOARD DECKING.

2. **A-602 INTERIOR ELEVATIONS**
    a. **ADD** HPL-2 casework callout.

3. **A-603 INTERIOR ELEVATIONS**
    b. **ADD** HPL-2 casework and QTZ-1 countertops callout.

4. **A-701 DOOR SCHEDULE & LEGENDS**
    a. **ADD** note DOOR HARDWARE SCHEDULE ON THESE DRAWINGS ARE A CONVENIENCE REFER TO 08 71 00 DOOR HARDWARE SCHEDULE.
    b. **REVISE** SET 02 to remove reference to automatic opener and add another core & housing.
    c. **REVISE** SET 04 to remove 200.1 and add 201.1.
    d. **REVISE** SET 07 to remove operational note.
    e. **REVISE** SET 08 to remove 108.2.
    f. **REVISE** SET 15 to add 200.1.
    g. **REVISE** SET 16 DOOR NUMBERS.
    h. **ADD** SET 17.

5. **A-712 FINISH SCHEDULE**
    a. **REVISE** to include "FLAT CUT VENEER, CLEAR FINISH" to WF-2.

Attachments:

1. Pre-Bid Meeting – Minutes
2. Pre-Bid Meeting – Attendance Log

END OF ADDENDUM BRIEF

SECTION 01120

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED AND DEFINITIONS

A. The term “all costs”, as used in the payment descriptions within Part 2, is defined as full compensation for all equipment, labor, material and incidental costs.

B. The Work of this Contract (and subsequent payment) consists of furnishing all equipment, labor, material and incidentals, as well as performing all construction, installation and testing of all improvements, modifications and additions, all as shown on the Drawings and detailed in the Specifications.

C. All work shown on the Drawings or detailed in the Specifications and not specifically set forth in Article 5 of the Agreement as a pay item shall be considered a subsidiary obligation of the Contractor, and all costs in connection therewith shall be included in the prices named in the proposal.

D. Progress measurements (for progress payments on the pay applications) shall be determined by the amount of work performed during a given period.

1. Payments for items with a lump sum unit shall be based on one of the three options below, with the payment method being agreed upon by all parties.

i. Field measured to determine the actual value.

ii. An estimated value of the work performed.

iii. Pro-rated over the life of the contract, based off contract time or based off the total value of work performed percentage.

2. Payments for items with a unit that may be measured to the tenth may be paid to the tenth. However, rounding will only occur during the final pay application and shall not be applied to any progress measurements.

E. Final measurement is to be applied to the final pay application. Items not requiring final measurement will pay the full amount in Article 5 of the Agreement, unless appreciable errors are found or changes are authorized by the Owner.

F. Rounding shall be performed during the final pay application, and rounding shall be to the nearest whole number, with 0 thru 4 being rounded down, and 5 thru 9 being rounded up. The following items will not be rounded, and shall be paid to the nearest tenth:

1. Seed and Mulching.

PART 2 PAY ITEMS (IN ORDER OF BID ITEMS)

2.01 MOBILIZATION

A. Mobilization will be measured as a lump sum item.

B. Partial payment for the mobilization pay item will be based on the contract lump sum bid price for mobilization and will be made in accordance with the following Payment Schedule:

1. Twenty-five percent, when five percent or more of the original contract amount is earned.

2. Fifty percent, when ten percent or more of the original contract amount is earned.

3. Seventy-five percent, when twenty-five percent or more of the original contract amount is earned.

4. One hundred percent, when fifty percent or more of the original contract amount is earned.

Payment will be made under:

C-105-5.1 Mobilization - per lump sum

2.02 TEMPORARY TRAFFIC CONTROL

A. The unit of measurement for traffic control will be by lump sum.

Payment for temporary traffic control shall be per lump sum as set forth in the Agreement. Said price shall include all costs necessary to complete the work including, but not limited to, temporary striping, arrow boards, construction signs, barricades, concrete jersey barriers and channelization devices as required by drawings and specifications. Payment for relocating and maintaining several types of traffic control devices in full operating order including light operational and relocating the items multiple time to meets the project phasing and safety for the full duration of the project shall be considered subsidiary to the lump sum pay item.

B. Payment for traffic control will be made in equal increments for the duration of the project.

Payment will be made under:

C-101-5.1 Temporary Traffic Control - per lump sum

2.03 INLET PROTECTION

A. Method of Measurement. The unit of measurement for Inlet Protection shall be the number per each, installed and accepted as necessary to maintain compliance with the project SWPPP requirements. No distinction shall be made regarding the type or size of each individual inlet protection for measurement and payment purposes.

The contractor shall regularly inspect, maintain and repair inlet protection as often and as necessary to maintain compliance with project SWPPP requirements. Maintaining inlet protection including silt and erosion removal, are subsidiary to inlet protection and no separate measurement will be made.

B. Basis of Payment. Payment shall be made at contract unit price for the unit of measurement as specified above. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

C. Removal of inlet protection including re-grading, smoothing and reseeding are subsidiary to inlet protection and not separate measurement will be made.

Payment will be made under:

C-102-5.1 Inlet Protection - per each

2.04 12" FILTER SOCK

A. Method of Measurement. The unit of measurement for 12" filter sock shall be the number of linear feet of 12" filter sock installed regardless of type or size installed by the Contractor and accepted by the engineer as in-place and operational,

B. Basis of Payment. Payment shall be made at the contract unit price for the unit of measurement as specified above. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

C-102-5.2 12" Filter Sock - per linear foot.

2.10 REMOVAL OF CHAIN LINK FENCE

A. The unit of measurement for Removal of Chain Link Fence shall be the length in linear feet of existing chain link fence removed by the Contractor, regardless of type or actual size encountered in the field. Any fencing removed outside the limits of removal because the fence was damaged by negligence on the part of the Contractor shall not be included in the measurement for payment. Removal of any existing posts and concrete foundations shall be incidental to this item and no separate measurement will be made.

B. Payment shall be made at the contract unit price for the unit of measurement as specified above. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

P-101-5.2 Removal of Chain Linke Fence – per linear foot.

2.05 REMOVAL OF CONCRETE CURB AND GUTTER

A. The unit of measurement for Removal of Concrete Curb and Gutter shall be the length in linear feet of all curb and gutter actually removed to its full-depth by the Contractor, regardless of type or actual size encountered in the field. Any curb and gutter removed outside the limits of removal because the pavement was damaged by negligence on the part of the Contractor shall not be

included in the measurement for payment. No direct measurement or payment shall be made for saw cutting. Saw cutting shall be incidental to removal.

B. Payment shall be made at the contract unit price for the unit of measurement as specified above. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Removal of existing aggregate or subgrade layers underlying the existing curb and gutter to-be-removed, where deemed necessary, shall be incidental to this item and shall be included in this pay item.

Payment will be made under:

C-101-5.3 Removal of Concrete Curb and Gutter per linear foot

2.06 RELOCATION OF LIGHT POLE

A. Method of Measurement. The unit of measurement for light pole relocations shall be the number per each, installed and accepted by the engineer. No distinction shall be made regarding the type or size or foundation type of each individual light pole for measurement and payment purposes.

B. Removal of light pole ding are subsidiary to inlet protection and not separate measurement will be made.

C. Basis of Payment. Payment shall be made at contract unit price for the unit of measurement as specified above. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item

Payment will be made under:

C-101-5.4 Relocation of Light Pole - per each

2.11 EXCAVATION – AGGREGATE OR SOIL MATERIAL

A. Method of Measurement: The unit of measurement for Excavation –Aggregate or Soil Material shall be made at the contract unit price per cubic yard of the excavation of any existing aggregate or soil from the site as required by the plans that is permanently relocated, installed and compacted in another area of the site that requires soil or aggregate fill material. Specifically, this pay item shall include general excavation on site (earth, rock shale), excavation required for the excavation of soils and existing aggregate that is replaced in a new permanent location on (or below) site. If contractor elects to store material in temporary stockpiles intended for the staging of material until final placement of material on site or the eventual removal of the material from site - the relocation of material to these temporary storage stockpiles will not be measured for payment under this (or any) pay item. These temporarily relocated materials will not be measured for payment until moved into their permanent location.

B. Any excavation or backfill for proposed building footings or utility trenches on the project site shall not be included as measurement for payment for this pay item but incidental to the pay items for the work is required for.

C. This pay item shall not include the cost of topsoiling. Topsoiling shall be measured separately per the Topsoiling pay item

D. Measurement for payment specified by the cubic yard shall be computed by the comparison of digital terrain model (DTM) surfaces for computation of neat line design quantities. After completion of pavement removal and excavation operations, contractor shall conduct field survey in the presence of the Engineer to record elevations at ground-line beneath existing pavements. Upon completion of final grading operations, Engineer will conduct topographic survey of final surface grades. The end area is that bound by the original ground line established by field cross-sections and the final theoretical pay line established by cross-sections shown on the plans, subject to verification by the Engineer. Load counts will not be accepted for method of measurement of excavation. If contractor elects not to conduct a field survey as described above, final quantity of excavation shall be the plan quantity specified in the bid form.

C. Basis of Payment: Payment shall be made at contract unit price for the unit of measurement as specified above. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

P-152-5.1 Excavation – Aggregate or Soil Material - per cubic yard

2.12 12” 6% CEMENT-TREATED SUBGRADE

A. The amount of cement-treated subgrade soil stabilization shall be based on the number of square yards complete in place, meeting the specified thickness, grade, and density standards and accepted by the RPR.

Cement shall be added at an application rate of **6 percent** of dry unit weight of soil. The amount of cement used shall be paid for under the Cement (Soil Stabilization) project item and shall not be included in the price of this item.

Cement treatment beneath the building footprint shall be included for measurement for payment per this item.

B. Payment for installation will be made at the contract unit price per square yard for 12” 6% cement-treated subgrade for the thickness specified. The price shall be full compensation for all preparation, placing and mixing these materials, and all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

C-155-5.1 12” 6% Cement Treated Subgrade - per square yard

2.13 CEMENT (SOIL STABILIZATION)

A. Method of Measurement. Measurement of cement will be made to the nearest ton weighed on certified scales reports provided to the engineer.

B. Basis of Payment. Payment shall be made at the contract unit price for the unit of measurement as specified above.

C. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

C-155-5.2 Cement (Soil Stabilization) - per square

2.14 4" COMPACTED AGGREGATE BASE COURSE

A. Final measurement will not be made unless changes to the bid quantity are authorized.

B. Method of Measurement. Measurement for 4" compacted aggregate base course shall be per the per square yard as set forth in the Agreement for the type of material and thickness of the installed item. Said measurement shall include all costs necessary to complete the work including, but not limited to, placing, mixing, compacting, processing, moisture control, and maintaining as required by the drawings and specifications.

C. Basis of Payment. Payment for 4" compacted aggregate base course shall be based on the unit price per square yard as set forth in the Agreement. This price shall be full compensation for all preparation, placing and mixing these materials, and all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

P-209-5.1 4" Compacted Aggregate Base Course - per square yard

2.15 8" PORTLAND CEMENT CONCRETE SIDEWALK

A. Final measurement will be based on the square yard of the completed and installed item.

B. Payment for sidewalks shall be based on the unit price per square yard as set forth in the Agreement, per thickness of the installed item. Said price shall include all costs necessary to complete the work including, but not limited to, placing, compacting, aggregate course, saw cutting, milling, doweling, jointing, curing and sealing, as required by the drawings and specifications. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

P-501-8.1 8" Portland Cement Concrete Sidewalk - per square yard

2.16 8" PORTLAND CEMENT CONCRETE PAVEMENT

A. Method of Measurement. Final measurement will not be made unless changes to the bid quantity are authorized.

Measurement for this item will be per square yard.

The proposed building slab on grade concrete shall not be included for measurement for payment per this item. Building slab on grade to be included in pricing for the General Aviation Building Complete pay item.

B. Payment for pavement shall be based on the unit price per square yard as set forth in the Agreement, per type of pavement and thickness of the installed item. Said price shall include all costs necessary to complete the work including, but not limited to, forming, reinforcing, placing, compacting, saw cutting, connections to existing pavement, milling, doweling, jointing, curing and sealing, as required by the drawings and specifications.

D. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

P-501-8.2 8" Portland Cement Concrete Pavement - per square yard

2.17 4" PORTLAND CEMENT CONCRETE SIDEWALK

A. Final measurement will be based on the square yard of the completed and installed item.

B. Payment for sidewalks shall be based on the unit price per square yard as set forth in the Agreement, per thickness of the installed item. Said price shall include all costs necessary to complete the work including, but not limited to, placing, compacting, aggregate course, saw cutting, milling, doweling, jointing, curing and sealing, as required by the drawings and specifications.

E. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

P-501-8.3 4" Portland Cement Concrete Sidewalk - per square yard

2.18 2' WIDE WHITE STOP BAR MARKING THERMOPLASTIC

A. Final measurement will not be made unless changes to the bid quantity are authorized.

B. Method of Measurement. Pavement marking will be measured by the in-place linear foot installed per the plans and specifications and accepted by the engineer.

Measurement for 2' wide white stop bar marking will be based on the unit price per linear foot as set forth in the Agreement.

C. Basis of Payment. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and

incidentals necessary to complete this item.

Payment will be made under:

P-620-5.1 2” Wide white stop bar markings - per linear foot

2.19 4" YELLOW PARKING STALL WATERBORNE MARKINGS

A. Final measurement will not be made unless changes to the bid quantity are authorized.

B. Method of Measurement. Pavement marking will be measured by the in-place linear foot installed per the plans and specifications and accepted by the engineer.

Measurement for 4” yellow parking stall waterborne markings (striping) will be based on the unit price per linear foot as set forth in the Agreement. Measurement for skip stripe marking will be the number of linear feet of the applied stripe; gaps between the stripes will not be measured.

Measurement for double yellow centerline shall be measured based on the linear footage of each stripe applied. Said price shall include all costs necessary to complete the work and incidentals as required by the drawings and specifications.

C. Basis of Payment. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

P-620-5.2 4” yellow parking stall waterborne marking - per linear foot

2.20 4” NON-PERFORATED ROOF DRAIN

A. Method of Measurement. Roof drain line shall be measured by the linear foot installed in-place and accepted by the engineer.

B. Final measurement will be based on the centerline length of the completed and installed item.

C. Payment for roof drain line installation shall be based on the unit price per linear foot as set forth in the Agreement, per type or size of pipe. Said price shall include all costs necessary to complete the work including, but not limited to, all excavation (earth, rock, shale), dewatering, trench checks, bedding, polyethylene encasement, placing, pipe to pipe connections, restraint measures, flushing, disinfection, pressure testing, backfilling, compacting, grading and removal of excess or unsuitable material, as required by the drawings and specifications.

D. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

D-701-5.1 4” Non perforated roof drain - per linear foot

2.21 6” NON-PERFORATED ROOF DRAIN

A. Method of Measurement. Roof drain line shall be measured by the linear foot installed in-place and accepted by the engineer.

B. Final measurement will be based on the centerline length of the completed and installed item.

C. Payment for roof drain line installation shall be based on the unit price per linear foot as set forth in the Agreement, per type or size of pipe. Said price shall include all costs necessary to complete the work including, but not limited to, all excavation (earth, rock, shale), dewatering, trench checks, bedding, polyethylene encasement, placing, pipe to pipe connections, restraint measures, flushing, disinfection, pressure testing, backfilling, compacting, grading and removal of excess or unsuitable material, as required by the drawings and specifications.

D. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

D-701-5.2 6” Non perforated roof drain - per linear foot

2.22 8” NON-PERFORATED ROOF DRAIN

A. Method of Measurement. Roof drain line shall be measured by the linear foot installed in-place and accepted by the engineer.

B. Final measurement will be based on the centerline length of the completed and installed item.

C. Payment for roof drain line installation shall be based on the unit price per linear foot as set forth in the Agreement, per type or size of pipe. Said price shall include all costs necessary to complete the work including, but not limited to, all excavation (earth, rock, shale), dewatering, trench checks, bedding, polyethylene encasement, placing, pipe to pipe connections, restraint measures, flushing, disinfection, pressure testing, backfilling, compacting, grading and removal of excess or unsuitable material, as required by the drawings and specifications.

D. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

D-701-5.3 8” Non perforated roof drain - per linear foot

2.23 10” NON-PERFORATED ROOF DRAIN

A. Method of Measurement. Roof drain line shall be measured by the linear foot installed in-place and accepted by the engineer.

B. Final measurement will be based on the centerline length of the completed and installed item.

C. Payment for roof drain line installation shall be based on the unit price per linear foot as set forth in the Agreement, per type or size of pipe. Said price shall include all costs necessary to complete the work including, but not limited to, all excavation (earth, rock, shale), dewatering, trench checks, bedding, polyethylene encasement, placing, pipe, pipe connections, restraint measures, backfilling, compacting, grading and removal of excess or unsuitable material, as required by the drawings and specifications.

D. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

D-701-5.4 10" Non perforated roof drain - per linear foot

2.24 ROOF DRAIN INLET CONNECTION

A. Method of Measurement. The roof drain inlet connections shall be measured by the unit installed in-place and accepted by the engineer.

Final measurement will be based on each completed and installed item.

B. Basis of Payment. Payment for roof drain inlet connections shall be based on the unit price per each as set forth in the Agreement. Said price shall include all costs necessary to complete the work including, but not limited to, all excavation (earth, rock, shale), final grade adjustments, sealing, connections, backfilling, compacting, grading and removal of excess or unsuitable material, as required by the drawings and specifications.

C. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

D-705-5.5 Roof drain connection - per each

2.25 TYPE CG-1 CURB AND GUTTER

A. Final measurement will not be made unless changes to the bid quantity are authorized.

B. Payment for curb and gutter shall be based on the unit price per linear foot as set forth in the Agreement, per the type of curb and gutter. Said price shall include all costs necessary to complete the work including, but not limited to, subgrade preparation, forming, reinforcing, placing, doweling, jointing, throat construction, deflector construction, weep holes, finishing, curing and backfilling, as required by the drawings and specifications.

F. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

D-752-5.1 Type CG-1 Concrete Curb and Gutter - per linear foot

2.26 ROLLING CURB

A. Method of Measurement. Rolling curb will be measured per linear foot installed and accepted by the engineer.

B. Basis of Payment. Payment for curb and gutter shall be based on the unit price per linear foot as set forth in the Agreement, per the type of curb and gutter. Said price shall include all costs necessary to complete the work including, but not limited to, subgrade preparation, forming, reinforcing, placing, doweling, jointing, throat construction, deflector construction, weep holes, finishing, curing and backfilling, as required by the drawings and specifications.

C. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

D-752-5.2 Rolling Curb - per linear foot

2.27 TYPE CG-1 CURB AND GUTTER (MODIFIED)

A. Final measurement will not be made unless changes to the bid quantity are authorized.

B. Payment for curb and gutter shall be based on the unit price per linear foot as set forth in the Agreement, per the type of curb and gutter. Said price shall include all costs necessary to complete the work including, but not limited to, subgrade preparation, forming, reinforcing, placing, doweling, jointing, throat construction, deflector construction, weep holes, finishing, curing and backfilling, as required by the drawings and specifications.

C. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

D-752-5.3 Type CG-1 Concrete Curb and Gutter (Modified) - per linear foot

2.28 SEEDING

A. Method of Measurement. The measurement for seeding will be the number of acres of seeding installed, measured in place and accepted by the engineer as compliant with the specification requirements. No distinction shall be made for type of seed. Measurement will not be made for ground that does not meet the turf density as specified for seeding.

B. Basis of Payment. Payment for seeding shall be based on the unit price per acre as set forth in the Agreement

Said price shall include all costs necessary to complete the work including, but not limited to, aeration, applying lime, fertilization, and watering, as required by the drawings and specifications. The Contractor shall water seed as needed until final acceptance.

C. Basis of Payment. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

T-901-5.1 Seeding - per acre

2.29 MULCHING

A. Method of Measurement. Measurement for mulching will be the number of acres of mulching installed measured in place and accepted by the engineer as compliant with the specification requirements.

B. Basis of Payment. Payment for mulching shall be based on the unit price per acre as set forth in the Agreement. No distinction shall be made for the type of mulching.

C. Basis of Payment. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

T-908-5.1 Mulching - per acre

2.30 SODDING

A. Method of Measurement. Measurement for sodding will be the number of acres of sodding, installed measured in place and accepted by the engineer as compliant with the specification requirements.

B. Basis of Payment. Payment for sodding shall be based on the unit price per acre as set forth in the Agreement.

C. Basis of Payment. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

T-904-5.1 Mulching - per acre

2.31 2” WATER METER INSTALLATION

A. Method of Measurement. Measurement for 2” water meters will be made per the unit of the number of water meters, installed measured in place, operational and accepted by the engineer as compliant with the specification requirements.

B. Basis of Payment. Payment for 2” water meter installation shall be based on the unit price per each as set forth in the Agreement.

C. Basis of Payment. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

SP-1-5.1 2" Water meter - per each

2.32 2" DOMESTIC WATER LINE

A. Final measurement will be based on the centerline length of the completed and installed item.

B. Method of Measurement. Water line shall be measured by the linear foot installed in-place and accepted by the engineer.

C. Basis of Payment. Payment for 2" Domestic Water Line Installation shall be based on the unit price per linear foot as set forth in the Agreement, per type or size of pipe.

Said price shall include all costs necessary to complete the work including, but not limited to, all excavation (earth, rock, shale), dewatering, trench checks, bedding, polyethylene encasement, placing, pipe to pipe connections, restraint measures, flushing, disinfection, pressure testing, backfilling, compacting, grading and removal of excess or unsuitable material, as required by the drawings and specifications.

D. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

SP-2-5.1 2" Domestic water line - per linear foot

2.33 6" FIRE SPRINKLER LINE

A. Final measurement will be based on the centerline length of the completed and installed item.

B. Method of Measurement. Water line shall be measured by the linear foot installed in-place and accepted by the engineer.

C. Basis of Payment. Payment for the fire line installation shall be based on the unit price per linear foot as set forth in the Agreement, per type or size of pipe.

Said price shall include all costs necessary to complete the work including, but not limited to, all excavation (earth, rock, shale), dewatering, trench checks, bedding, polyethylene encasement, placing, pipe to pipe connections, restraint measures, flushing, disinfection, pressure testing, backfilling, compacting, grading and removal of excess or unsuitable material, as required by the drawings and specifications.

D. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to

complete this item.

Payment will be made under:

SP-2-5.2 6” Fire sprinkler line - per linear foot

2.34 8” C900 DR18 WATER LINE

A. Final measurement will be based on the centerline length of the completed and installed item.

B. Method of Measurement. Water line shall be measured by the linear foot installed in-place and accepted by the engineer.

C. Payment for 8” water line installation shall be based on the unit price per linear foot as set forth in the Agreement, per type or size of pipe. Said price shall include all costs necessary to complete the work including, but not limited to, all excavation (earth, rock, shale), dewatering, trench checks, bedding, polyethylene encasement, placing, pipe to pipe connections, restraint measures, flushing, disinfection, pressure testing, backfilling, compacting, grading and removal of excess or unsuitable material, as required by the drawings and specifications.

D. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

SP-2-5.3 8” C900 DR18 Water line - per linear foot

2.35 2.5” COPPER WATER LINE INSTALLATION

A. Method of Measurement. Water line shall be measured by the linear foot installed in-place and accepted by the engineer.

B. Final measurement will be based on the centerline length of the completed and installed item.

C. Basis of Payment. Payment for water line Installation shall be based on the unit price per linear foot as set forth in the Agreement, per type or size of pipe.

Said price will include all costs necessary to complete the work including, but not limited to, all excavation (earth, rock, shale), dewatering, trench checks, bedding, polyethylene encasement, placing, pipe to pipe connections, restraint measures, flushing, disinfection, pressure testing, backfilling, compacting, grading and removal of excess or unsuitable material, as required by the drawings and specifications.

D. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

SP-2-5.4 2.5” Copper water line installation - per linear foot

2.36 8" WATER LINE INSTALLATION

A. Method of Measurement. Water line shall be measured by the linear foot installed in-place and accepted by the engineer.

B. Final measurement will be based on the centerline length of the completed and installed item.

C. Payment for 8" water line installation shall be based on the unit price per linear foot as set forth in the Agreement, per type or size of pipe. Said price shall include all costs necessary to complete the work including, but not limited to, all excavation (earth, rock, shale), dewatering, trench checks, bedding, polyethylene encasement, placing, pipe to pipe connections, restraint measures, flushing, disinfection, pressure testing, backfilling, compacting, grading and removal of excess or unsuitable material, as required by the drawings and specifications.

D. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

SP-2-5.5 8" Water line installation - per linear foot

2.37 WATER LINE VALVES

A. Method of Measurement. Water line valves shall be measured by the unit installed in-place and accepted by the engineer.

B. Final measurement will be based on each completed and installed item.

C. Basis of Payment. Payment for water line valves shall be based on the unit price per each as set forth in the Agreement (per City of Lee's Summit Standard Detail) regardless of size. Said price shall include all costs necessary to complete the work including, but not limited to, all excavation (earth, rock, shale), dewatering, bedding, polyethylene encasement, placing, pipe to valve connections, restraint measures, flushing, disinfection, pressure testing, backfilling, compacting, grading and removal of excess or unsuitable material, as required by the drawings and specifications.

Valves for hydrant assemblies shall not be included in this pay item, but included in the Fire Hydrant Assembly pay item.

D. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

SP-2-5.6 Water line valves - per each

2.38 WATER LINE BENDS WITH THRUST BLOCKING

A. Method of Measurement. Water line valves shall be measured by the unit installed in-place and accepted by the engineer.

B. Final measurement will be based on each completed and installed item.

C. Payment for water line bends with thrust blocking shall be based on the unit price per each as set forth in the Agreement (per City of Lee's Summit Standard Detail), horizontal or vertical, regardless of size or angle. Said price shall include all costs necessary to complete the work including, but not limited to, all excavation (earth, rock, shale), dewatering, bedding, polyethylene encasement, placing, pipe to fitting connections, restraint measures, flushing, disinfection, pressure testing, backfilling, compacting, grading and removal of excess or unsuitable material, as required by the drawings and specifications.

Payment will be made under:

SP-2-5.7 Water line bends with thrust blocking - per each

2.39 4" PVC SANITARY SEWER

A. Method of Measurement. The sanitary sewer line shall be measured by the linear foot installed in-place and accepted by the engineer.

B. Final measurement will be based on the centerline length of the completed and installed item.

C. Payment for 4"sanitary sewer line installation shall be based on the unit price per linear foot as set forth in the Agreement, per type or size of pipe. Said price shall include all costs necessary to complete the work including, but not limited to, all excavation (earth, rock, shale), dewatering, trench checks, bedding, polyethylene encasement, placing, pipe to pipe connections, restraint measures, flushing, disinfection, pressure testing, backfilling, compacting, grading and removal of excess or unsuitable material, as required by the drawings and specifications.

D. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

SP-3-5.1 4" PVC Sanitary sewer - per linear foot

2.40 SANITARY SEWER MANHOLES

A. Method of Measurement. The sanitary sewer manholes shall be measured by the unit installed in-place and accepted by the engineer.

B. Final measurement will be based on each completed and installed item.

C. Payment for sanitary sewer manholes shall be based on the unit price per each as set forth in the Agreement. No distinction shall be made for type or size of structure. Said price shall include all costs necessary to complete the work including, but not limited to, all excavation (earth, rock, shale), by-pass pumping, bedding, placing or building structure, invert construction, structure to pipe connections, final grade adjustments to the top, sealing, curing,

backfilling, compacting, grading, testing and reporting, and removal of excess or unsuitable material, as required by the drawings and specifications.

D. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

SP-3-5.2 Sanitary sewer manholes - per each

2.41 SANITARY SEWER CONNECTION

A. Method of Measurement. The sanitary sewer connections shall be measured by the unit installed in-place and accepted by the engineer.

Final measurement will be based on each completed and installed item.

B. Payment for sanitary sewer connections shall be based on the unit price per each as set forth in the Agreement. Said price shall include all costs necessary to complete the work including, but not limited to, all excavation (earth, rock, shale), final grade adjustments, to the top, sealing, curing, backfilling, compacting, grading and removal of excess or unsuitable material, as required by the drawings and specifications.

C. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

SP-3-5.3 Sanitary sewer connection - per each

2.42 8” CONCRETE BOLLARD

A. Method of Measurement. The concrete bollards shall be measured by the unit installed in-place and accepted by the engineer.

B. Basis of Payment. Payment for concrete bollards shall be based on the unit price per each as set forth in the Agreement. Said price shall include all costs necessary to complete the work including, but not limited to, all excavation (earth, rock, shale), final grade adjustments, sealing, curing, backfilling, compacting, grading and removal of excess or unsuitable material, as required by the drawings and specifications.

C. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

SP-4-5.1 8” Concrete Bollard - per each

2.43 TRUNCATED DOME

A. Method of Measurement. The truncated dome shall be measured by the square foot installed in-place and accepted by the engineer.

B. Final measurement will be based on the square foot of the completed and installed item.

C. Basis of Payment. Payment for truncated dome shall be based on the unit price per square foot as set forth in the Agreement. Said price shall include all costs necessary to complete the work including, but not limited to, placing, curing and sealing, as required by the drawings and specifications.

D. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

SP-4-5.2 Truncated Dome - per square foot

2.44 CONCRETE PARKING BUMPER

A. Method of Measurement. The parking bumpers shall be measured by the unit installed in-place and accepted by the engineer.

Final measurement will be based on each completed and installed item.

B. Payment for concrete parking bumper shall be based on the unit price per each as set forth in the Agreement. Said price shall include all costs necessary to complete the work including but not limited to labor, materials and equipment.

This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

SP-4-5.3 Concrete parking bumper - per each

2.45 ADA ACCESIBLE BOLLARD MOUNTED PARKING SIGN

A. Method of Measurement. The ADA accessible bollard mounted parking signs shall be measured by the unit installed in-place and accepted by the engineer.

B. Payment for parking signs shall be based on the unit price per each as set forth in the Agreement. Said price shall include all costs necessary to complete the work including, but not limited to, all materials, connections, equipment and labor as required to install according to the drawings and specifications.

C. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to

complete this item.

Payment will be made under:

SP-4-5.4 ADA Accessible Bollard Mounted Parking Sign - per each

2.46 THERMOPLASTIC ADA ACCESIBLE PARKING SYMBOL MARKING

A. Method of Measurement. The ADA accessible parking symbol marking shall be measured by the unit installed in-place and accepted by the engineer.

B. Payment for parking symbol marking will be based on the unit price per each as set forth in the Agreement. Said price shall include all costs necessary to complete the work including, but not limited to, all excavation (earth, rock, shale), final grade adjustments, to the top, sealing, curing, backfilling, compacting, grading and removal of excess or unsuitable material, as required by the drawings and specifications.

C. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

SP-5-5.1 Thermoplastic ADA Accessible Parking Symbol Marking - per each

2.47 THERMOPLASTIC TRAFFIC FLOW ARROWS

A. Method of Measurement. The thermoplastic traffic flow arrows shall be measured by the unit installed in-place and accepted by the engineer.

Final measurement will be based on each completed and installed item.

Payment for traffic flow arrows shall be based on the unit price per each as set forth in the Agreement. Said price shall include all costs necessary to complete the work including material, labor and equipment and any incidentals to install as required by the drawings and specifications.

B. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

SP-5-5.2 Thermoplastic Traffic Flow Arrows - per each

2.48 THERMOPLASTIC WHITE 24” CROSSWALK MARKINGS

A. Method of Measurement. The crosswalk marking shall be measured by the linear foot installed in-place and accepted by the engineer.

Final measurement will be based on each completed and installed item.

B. Payment for crosswalk marking shall be based on the unit price per each as set forth in the Agreement. Said price shall include all costs necessary to complete the work including, but not limited to, all excavation (earth, rock, shale), final grade adjustments, to the top, sealing, curing, backfilling, compacting, grading and removal of excess or unsuitable material, as required by the drawings and specifications.

C. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

SP-5-5.3 Thermoplastic white 24" crosswalk markings - per linear foot

2.49 NO PARKING SIGN WITH CANOPY COLUMN BASE

A. Method of Measurement. The no parking sign with canopy column bases shall be measured by the unit installed in-place and accepted by the engineer.

Payment for the no parking signs with canopy column bases shall be based on the unit price per each as set forth in the Agreement. Said price shall include all costs necessary to complete the work including material, labor and equipment and any incidentals to install as required by the drawings and specifications.

B. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

SP-6-5.1 No parking sign with canopy column base - per each

2.50 STOP SIGN

A. Method of Measurement. The stop sign will be measured by the unit installed in-place and accepted by the engineer.

Payment for stop signs shall be based on the unit price per each as set forth in the Agreement. Said price shall include all costs necessary to complete the work including material, labor and equipment and any incidentals to install as required by the drawings and specifications.

B. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

SP-7-5.1 Stop Sign - per each

2.51 PEDESTRIAN CROSSWALK SIGN

A. Method of Measurement. The pedestrian crosswalk sign shall be measured by the unit installed in-place and accepted by the engineer.

Final measurement will be based on each completed and installed item.

B. Payment for parking signs shall be based on the unit price per each as set forth in the Agreement. Said price shall include all costs necessary to complete the work including, but not limited to, all excavation (earth, rock, shale), final grade adjustments, to the top, sealing, curing, backfilling, compacting, grading and removal of excess or unsuitable material, as required by the drawings and specifications.

C. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

SP-8-5.1 Pedestrian crosswalk Sign - per each

2.52 UTILITY – ELECTRIC

A. Allowance: Evergy Allowance.

Evergy did not have their electrical design completed by the time this project was bid. The purpose of this Allowance is intended to be utilized to cover the costs required by the contractor to complete electrical design as intended by Evergy. Design is expected to supply power to the TM Aviation Hangar starting from Hagan Rd. Once design is complete, Owner will issue revised drawings/specifications as necessary to solicit cost proposal from contractor to complete the intended work. Any costs charged directly by Evergy to complete the work shall also be included in this Allowance. Pricing must be reviewed and accepted by Owner via Allowance Authorization prior to implementation.

The electric utility allowance is made under item:

SP-9-5.1 Utility Electric - per lump sum

2.53 UTILITY – GAS

A. Allowance 2: Spire Allowance
Spire did not have their gas design completed by the time this project was bid. The purpose of this Allowance is intended to be utilized to cover the costs required by contractor to complete gas design as intended by Spire. Design is expected to supply gas to the TM Aviation Hangar. Once design is complete, Owner will issue revised drawings/specifications as necessary to solicit cost proposal from contractor to complete the intended work. Any costs charged directly by Spire to complete the work shall also be included in this Allowance. Pricing must be reviewed and accepted by Owner via Allowance Authorization prior to implementation.

The electric utility allowance is made under item:

SP-10-5.1 Utility Electric - per lump sum

2.54 GENERAL AVIATION BUILDING COMPLETE

A. Method of Measurement. The terminal building and within 5 feet of the building exterior shall be measured per lump sum, complete and accepted in place, and operational by the City of Lees Summit.

B. Basis of Payment. Payment shall be made at the respective contract price per lump sum for the hangar building**.**

These prices shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item SP-13-5.1 General Aviation Building Complete --per lump sum

2.55 IRRIGATION SYSTEM

A. Method of Measurement. The irrigation system shall be measured by the lump sum installed in-place and accepted by the engineer.

Basis of Payment

Payment for the irrigation system shall be per lump sum as set forth in the Agreement. Said price shall include all costs necessary to complete the work including but not limited to materials, labor and equipment.

B. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

SP-14-5.1 Irrigation - per lump sum

BID PACKET

BID PROPOSAL & BUY AMERICAN FORMS

FOR BID OPENING DATE OF MAY 29, 2025

15 PAGES

RETURN ALL 15 PAGES WITH BID

BID PROPOSAL FORM

MAY 29, 2025

City of Lee's Summit, MO

TO: The City of Lee's Summit, Missouri

The undersigned, in compliance with the request for bids for the construction of the following project:

LXT – GENERAL AVIATION TERMINAL PROJECT

Lee's Summit City Project
#17932172

hereby proposes to furnish all labor, permits, material, machinery, tools, supplies and equipment to faithfully perform all work required for construction of the Project in accordance with the project manual, project drawings and issued Addenda within the specified time of performance for the following prices:

ACKNOWLEDGEMENTS BY BIDDER

a. By submittal of a proposal, the BIDDER acknowledges and accepts that the quantities established by the OWNER are an approximate estimate of the quantities required to fully complete the Project and that the estimated quantities are principally intended to serve as a basis for evaluation of bids. The BIDDER further acknowledges and accepts that payment under this contract will be made only for actual quantities and that quantities will vary in accordance with the General Provisions subsection entitled "Alteration of Work and Quantities".

b. The BIDDER acknowledges and accepts that the Bid Documents are comprised of the documents identified within the General Provisions. The BIDDER further acknowledges that each of the individual documents that comprise the Bid Documents are complementary to one another and together establishes the complete terms, conditions and obligations of the successful BIDDER.

c. As evidence of good faith in submitting this proposal, the undersigned encloses a bid guaranty in the form of a certified check or bid bond in the amount equivalent to 5% of the total bid amount including any alternate bid items. The BIDDER acknowledges and accepts that refusal or failure to accept award and execute a contract within the terms and conditions established herein will result in forfeiture of the bid guaranty to the owner as a liquidated damage.

d. The BIDDER acknowledges and accepts the OWNER'S right to reject any or all bids.

e. The BIDDER acknowledges and accepts the OWNER'S right to hold all Proposals for purposes of review and evaluation and not issue a notice-of-award for a period not to exceed **one hundred and twenty (120)** calendar days from the stated date of the bid opening.

f. The undersigned agrees that upon written notice of the award of the contract, they will execute the contract, payment, and performance bonds within fifteen (15) days of the notice-of-award or shall result in forfeiture of the bid guaranty to the owner as a liquidated damage.

g. Time of Performance: By submittal of this proposal, the undersigned acknowledges and agrees to commence work within ten (10) calendar days of the date specified in the written "Notice-to- Proceed" as issued by the OWNER. The undersigned further agrees to complete the Building and site improvement components of the Project within **Four Hundred Twenty-Five (425)** calendar days from the commencement date specified in the Notice-to- Proceed.

h. The undersigned acknowledges and accepts that for each and every Calendar day the project remains incomplete beyond the awarded contract time of performance, the Contractor shall pay the non-penal amount of **$3,000.00 per calendar day** as a liquidated damage to the OWNER.

i. The undersigned prime contractor, if not a MoDOT certified DBE, hereby assures that they will subcontract at least **twelve (12.0%) percent** of the dollar value of the

prime contract to DBE firms or make good faith efforts to meet the DBE contract goal. In addition, the prime contractor will include the DBE clauses (see Supplementary Provision No. 6 of the Federal and State Provisions) required by the DBE Program adopted by MoDOT and the Sponsor in all contracts and subcontracts relating to this project. The undersigned will complete the DBE Participation information included herein when a DBE goal has been established, including a demonstration of good faith efforts if the DBE goal is not met. If the undersigned prime contractor is a MoDOT certified DBE firm, then **the prime contractor must perform at least five percent (5%) of the total contract value work with its own forces**, and will receive DBE credit for all work which the prime contractor and any other MoDOT certified DBE firm performs directly.

j. The BIDDER, by submission of a proposal, acknowledges that award of this contract is subject to the provisions of the Davis-Bacon Act and the Missouri Prevailing Wage Law. The BIDDER accepts the requirement to pay prevailing wages for each classification and type of worker as established in the attached wage rate determinations as issued by the United States Department of Labor and the Missouri Division of Labor Standards. The BIDDER further acknowledges and accepts their requirement to incorporate the provision to pay the established prevailing wages in every subcontract agreement entered into by the Bidder under this project. The highest rate between the two (Federal and State) for each job classification shall be considered the prevailing wage.

k. Compliance Reports (41 CFR Part 60-1.7): Within 30 days after award of this contract, the Contractor/Subcontractor shall file a compliance report (Standard Form 100) if s/he has not submitted a complete compliance report within 12 months preceding the date of award. This report is required if the Contractor/Subcontractor meets all of the following conditions:

1. Contractors/Subcontractors are not exempt based on 41 CFR 60-1,5.
2. Has 50 or more employees.
3. Is a prime contractor or first tier subcontractor.
4. There is a contract, subcontract, or purchase order amounting to $50,000 or more

l. The undersigned acknowledges receipt of the following addenda:

Addendum No. _____, dated _____ Date Received _____
Addendum No. _____, dated _____ Date Received _____
Addendum No. _____, dated _____ Date Received _____
Addendum No. _____, dated _____ Date Received _____
Addendum No. _____, dated _____ Date Received _____

m. Buy American. The prime Contractor with this assures that they will conform to the FAA Buy American Requirements and submit the required Buy American documents, including the checklist form in this bid package dated 7 14 2023. Within 3 week after the bid opening the Contractor must submit the FAA detailed

Cost Calculation forms with a breakdown of the Buy American for all component parts of the project.

Appendix B, Buy American Preference Requirements and Worksheets, and Appendix C, Contract Provision Guidelines for Obligated Sponsor and Airport Improvement Program (AIP) Projects, summarize the (FAA) Buy American requirements. The AIP Buy American preference does NOT recognize US trade agreements such as NAFTA. The American Recovery and Reinvestment Act (ARRA) does not satisfy the AIP Buy American requirement.

REPRESENTATIONS BY BIDDER

By submittal of a proposal (bid), the BIDDER represents the following:

a. The BIDDER has read and thoroughly examined the bid documents including all authorized addenda.

b. The BIDDER has a complete understanding of the terms and conditions required for the satisfactory performance of project work.

c. The BIDDER has fully informed themselves of the project site, the project site conditions and the surrounding area.

d. The BIDDER has familiarized themselves of the requirements of working on an operating airport and understands the conditions that may in any manner affect cost, progress or performance of the work

e. The BIDDER has correlated their observations with that of the project documents.

f. The BIDDER has found no errors, conflicts, ambiguities or omissions in the project documents, except as previously submitted in writing to the owner that would affect cost, progress or performance of the work.

g. The BIDDER is familiar with all applicable Federal, State and local laws, rules and regulations pertaining to execution of the contract and the project work.

h. The BIDDER has complied with all requirements of these instructions and the associated project documents.

CERTIFICATION BY BIDDER

a. The undersigned hereby declares and certifies that the only parties interested in this proposal are named herein and that this proposal is made without collusion with any other person, firm or corporation.

b. Compliance With Federal Provisions as detailed in Part II, General Construction Items, Part A, Federal Provisions:

1. Access to Records and Reports
2. Affirmative Action Requirement: 41 CFR Part 60-4 and EO 11246
3. Breach of Contract Terms: 2 CFR 200, Appendix II(A)
4. Buy American Preference: 49 USC 50101
5. Civil Rights – General & Title VI Assurances: 49 USC § 47123
6. Clean Air/Water Pollution
7. Contract Workhours and Safety Standards Act Requirements: 2 CFR, 200 Appendix II (E)
8. Copeland' Anti-Kickback' Act
9. Davis Bacon Requirements: 2 CFR Part 5
10. Debarment and Suspension: 2 CFR Part 180, Subpart C; 2 CFR Part 1200; DOT Order 4200.5
11. Disadvantaged Business Enterprise 49 CFR Part 26
12. Distracted Driving: EO 13513

13. Equal Employment Opportunity (EEO): 2 CFR 200
14. Federal Fair Labor Standards Act (Federal Minimum Wage)
15. Foreign Trade Restriction: 49 CFR Part 30
16. Lobbying and Influencing Federal Employees: Appendix A to 49 CFR Part 20
17. Occupational Safety and Health Act of 1970
18. Prohibition of Certain Telecommunications and Video Surveillance Services or Equipment
19. Prohibition of Segregated Facilities
20. Procurement of Recovered Materials: 40 CFR Part 247
21. Rights to Inventions
22. Seismic Safety
23. Tax delinquency and Felony Convictions
24. Termination of Contract
25. Veteran's Preferences

c. Compliance with the Work Authorization Law (as required by Section 285.530, Revised Statues of Missouri)

For all contracts which include state or local funds in excess of $5,000, the Bidder, by submission of an offer and by signing the Worker Eligibility Verification Affidavit for All Contract Agreements in Excess of $5,000, certifies that it:

1. does not knowingly employ any person who is an unauthorized alien in connection with the contracted services.

2. has enrolled and actively participates in a federal work authorization program.

A general contractor or subcontractor of any tier shall not be liable under sections 285.525 to 285.550 when such general contractor or subcontractor contracts with its direct subcontractor who violates subsection 1 of this section, if the contract binding the contractor and subcontractor affirmatively states that the direct subcontractor is not knowingly in violation of subsection 1 of this section and shall not henceforth be in such violation and the contractor or subcontractor receives a sworn affidavit under the penalty of perjury attesting to the fact that the direct subcontractor's employees are lawfully present in the United States.

WORKER ELIGIBILITY VERIFICATION AFFIDAVIT FOR ALL CONTRACT AGREEMENTS IN EXCESS OF $5,000

(for joint ventures, a separate affidavit is required for each business entity)

STATE OF _____)
)
ss COUNTY OF _____)

On this _____ day of _____, 20_____, before me appeared _____, personally known to me or proved to me on the basis of satisfactory evidence to be a person whose name is subscribed to this affidavit, who being by me duly sworn, deposed as follows:

My name is _____, and I am of sound mind, capable of making this affidavit, and personally certify the facts herein stated, as required by Section 285.530, RSMo, to enter into any contract agreement with the state or any of its political subdivisions to perform any job, task, employment, labor, personal services, or any other activity for which compensation is provided, expected, or due, including but not limited to all activities conducted by business entities:

I am the _____ of _____, and I am duly authorized, directed, and/or
(title) (business name)
empowered to act officially and properly on behalf of this business entity.

I hereby affirm and warrant that the aforementioned business entity is enrolled in a federal work authorization program operated by the United States Department of Homeland Security, and the aforementioned business entity shall participate in said program to verify information (employment eligibility) of newly hired employees working in connection to work under the within contract agreement. I have attached documentation to this affidavit to evidence enrollment/participation by the aforementioned business entity in a federal work authorization program, as required by Section 285.530, RSMo.

In addition, I hereby affirm and warrant that the aforementioned business entity does not and shall not knowingly employ, in connection to work under the within contract agreement, any alien who does not have the legal right or authorization under federal law to work in the United States, as defined in 8 USC § 1324a(h)(3).

I am aware and recognize that, unless certain contract and affidavit conditions are satisfied pursuant to Section 285.530, RSMo, the aforementioned business entity may be held liable under Sections 285.525 through 285.550, RSMo, for subcontractors that knowingly employ or continue to employ any unauthorized alien to work within the state of Missouri.

I acknowledge that I am signing this affidavit as a free act and deed of the aforementioned business entity and not under duress.

(Affiant Signature)

Subscribed and sworn to before me this _____day of _____, 20_____.

_____
(Notary Public)

My commission expires:

[Documentation of enrollment/participation in a federal work authorization program is attached. Acceptable enrollment and participation documentation consists of the following two pages of the E-Verify Memorandum of Understanding: (1) A valid, completed copy of the first page identifying the business entity; and (2) A valid copy of the signature page completed and signed by the business entity, the Social Security Administration, and the Department of Homeland Security – Verification Division.]

DISADVANTAGED BUSINESS ENTERPRISE (DBE) PARTICIPATION

The information shown in this section must be completed when a DBE contract goal has been established. The percentage must equal or exceed the DBE contract goal. If the percentage is below the contract goal, then the bidder must submit complete written documentation of good faith efforts taken to meet the DBE contract goal. The prime contractor, if not a MoDOT certified DBE, hereby assures that they will subcontract at least **Twelve (12.0%) percent** of the dollar value of the prime contract to DBE firms or make good faith efforts to meet the DBE contract goal.

a. The undersigned submits the following list of DBEs to be used in accomplishing the work of this contract. The work, supplies or services, applicable value and percent of total federal contract each DBE is to perform or furnish is as follows:

b. Joint venture with a DBE. The undersigned submits the following list of bid items the DBE prime is responsible for and any items that will be subcontracted out are noted with an asterisk or a similar notation. The work, applicable value and percentage of total federal contract the DBE prime is responsible for are as follows:

(A) DBE Name and Address	(B) Bid Item Number(s) Or Work Performed	(C) Dollar Value of DBE Work **	(D) Percent Applicable to DBE Goal (100%, 60%)	(E) Dollar Amount Applicable to DBE Goal (C x D)	(F) Percent of Total Contract (C / Total Contract Amount)
TOTAL DBE PARTICIPATION				$	%

**Cannot exceed contract amount for given item of work.
Trucking services credited at 100% if the DBE owns the trucks or is leasing from a DBE firm
Merchant wholesalers (supply) are credited at 60%.
Brokered services will only receive credit for fees.

(Please reproduce the above sheet if additional space is needed.)

THIS EXECUTED PROPOSAL FORM MUST BE SUBMITTED IN THE BID PACKET CONSISTING OF 18 PAGES.

SIGNATURE OF BIDDER

The undersigned states that the correct LEGAL NAME AND ADDRESS of (1) the individual bidder, (2) each partner or joint venturer (whether individuals or corporations, and whether doing business under a fictitious name), or (3) the corporation (with the state in which it is incorporated) are shown below; that (if not signing with the intention to bind themselves to become responsible and sole bidder) they are the agent of, and they are signing and executing this (as indicated in the proper spaces below) as the bid of a

( ) sole individual ( ) partnership ( ) joint venture

( ) corporation, incorporated under the laws of state of _____.

Executed by bidder this _____day of _____20_____.

Name of individual, all partners or joint venturers:	Address of each:
_____	_____
_____	_____
_____	_____
doing business under the name of:	Address of principal place of business in Missouri:
_____	_____
(If using a fictitious name, show this name above in addition to legal names)	_____
_____	_____
(If a corporation, show its name above)	_____
ATTEST: (SEAL)	
_____	_____
(Signature) Secretary	(Signature) (Title)
_____	_____
Please print name	Please print name

NOTE: If bidder is doing business under a fictitious name, the bid shall be executed in the legal name of the individual partners, joint ventures, or corporation, with the legal address shown, and registration of fictitious name filed with the secretary of state, as required by sections 417.200 to 417.230 RSMo. If the bidder is a corporation not organized under the laws of Missouri, it shall procure a certificate of authority to do business in Missouri, as required by section 351.572 et seq RSMo.

FAA BUY AMERICAN PREFERENCE

The Contractor certifies that its bid/offer is in compliance with 49 USC § 50101, BABA and other related Made in America Laws,[1] U.S. statutes, guidance, and FAA policies, which provide that Federal funds may not be obligated unless all iron, steel and manufactured goods used in AIP funded projects are produced in the United States, unless the Federal Aviation Administration has issued a waiver for the product; the product is listed as an Excepted Article, Material Or Supply in Federal Acquisition Regulation subpart 25.108; or is included in the FAA Nationwide Buy American Waivers Issued list.

The bidder or offeror must complete and submit the certification of compliance with FAA's Buy American Preference, BABA and Made in America laws included herein with their bid or offer. The Airport Sponsor/Owner will reject as nonresponsive any bid or offer that does not include a completed certification of compliance with FAA's Buy American Preference and BABA.

The bidder or offeror certifies that all constructions materials, defined to mean an article, material, or supply other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives that are or consist primarily of: non-ferrous metals; plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables); glass (including optic glass); lumber; or drywall used in the project are manufactured in the U.S.

A 1.1.1 Certification of Compliance with FAA Buy American Preference – Construction Projects

As a matter of bid responsiveness, the bidder or offeror must complete, sign, date, and submit this certification statement with its proposal. The bidder or offeror must indicate how it intends to comply with 49 USC § 50101, BABA and other related Made in America Laws, U.S. statutes, guidance, and FAA policies, by selecting one of the following certification statements. These statements are mutually exclusive. Bidder must select one or the other (i.e., not both) by inserting a checkmark (□) or the letter "X".

□ Bidder or offeror hereby certifies that it will comply with 49 USC § 50101, BABA and other related U.S. statutes, guidance, and policies of the FAA by:

a) Only installing iron, steel and manufactured products produced in the United States;

b) Only installing construction materials defined as: an article, material, or supply – other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives that are or consist primarily of non-ferrous metals; plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables); glass (including optic glass); lumber or drywall that have been manufactured in the United States.

c) Installing manufactured products for which the Federal Aviation Administration (FAA) has issued a waiver as indicated by inclusion on the current FAA Nationwide Buy American Waivers Issued listing; or

d) Installing products listed as an Excepted Article, Material or Supply in Federal Acquisition Regulation Subpart 25.108.

[1] Per Executive Order 14005 "Made in America Laws" means all statutes, regulations, rules, and Executive Orders relating to federal financial assistance awards or federal procurement, including those that refer to "Buy

America" or "Buy American," that require, or provide a preference for, the purchase or acquisition of goods, products, or materials produced in the United States, including iron, steel, and manufactured products offered in the United States.

By selecting this certification statement, the bidder or offeror agrees:

a) To provide to the Airport Sponsor or the FAA evidence that documents the source and origin of the iron, steel, and/or manufactured product.
b) To faithfully comply with providing U.S. domestic products.
c) To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.
d) Certify that all construction materials used in the project are manufactured in the U.S.

☐ The bidder or offeror hereby certifies it cannot comply with the 100 percent Buy American Preferences of 49 USC § 50101(a) but may qualify for a Type 3 or Type 4 waiver under 49 USC § 50101(b). By selecting this certification statement, the apparent bidder or offeror with the apparent low bid agrees:

a) To the submit to the Airport Sponsor or FAA within 15 calendar days of being selected as the responsive bidder, a formal waiver request and required documentation that supports the type of waiver being requested.
b) That failure to submit the required documentation within the specified timeframe is cause for a non- responsive determination that may result in rejection of the proposal.
c) To faithfully comply with providing U.S. domestic products at or above the approved U.S. domestic content percentage as approved by the FAA.
d) To furnish U.S. domestic product for any waiver request that the FAA rejects.
e) To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.

Required Documentation

Type 2 Waiver (Nonavailability) - The iron, steel, manufactured goods or construction materials or manufactured goods are not available in sufficient quantity or quality in the United States. The required documentation for the Nonavailability waiver is

a) Completed Content Percentage Worksheet and Final Assembly Questionnaire
b) Record of thorough market research, consideration where appropriate of qualifying alternate items, products, or materials including;
c) A description of the market research activities and methods used to identify domestically manufactured items capable of satisfying the requirement, including the timing of the research and conclusions reached on the availability of sources.

Type 3 Waiver – The cost of components and subcomponents produced in the United States is more than 60 percent of the cost of all components and subcomponents of the “facility/project.” The required documentation for a Type 3 waiver is:

a) Completed Content Percentage Worksheet and Final Assembly Questionnaire including;
b) Listing of all manufactured products that are not comprised of 100 percent U.S. domestic content (excludes products listed on the FAA Nationwide Buy American Waivers Issued listing and products excluded by Federal Acquisition Regulation Subpart 25.108; products of unknown origin must be considered as non-domestic products in their entirety).
c) Cost of non-domestic components and subcomponents, excluding labor costs associated with final assembly and installation at project location.
d) Percentage of non-domestic component and subcomponent cost as compared to total “facility” component and subcomponent costs, excluding labor costs associated with final assembly and installation at project location.

Type 4 Waiver (Unreasonable Costs) - Applying this provision for iron, steel, manufactured goods or construction materials would increase the cost of the overall project by more than 25 percent. The required documentation for this waiver is:

a) A completed Content Percentage Worksheet and Final Assembly Questionnaire from
b) At minimum two comparable equal bids and/or offers;
c) Receipt or record that demonstrates that supplier scouting called for in Executive Order 14005, indicates that no domestic source exists for the project and/or component;
d) Completed waiver applications for each comparable bid and/or offer.

False Statements: Per 49 USC § 47126, this certification concerns a matter within the jurisdiction of the Federal Aviation Administration and the making of a false, fictitious, or fraudulent certification may render the maker subject to prosecution under Title 18, United States Code.

Date Signature

Company Title

A1.1.2 Certification of Compliance with FAA Buy American Preference – Equipment / Building Projects

As a matter of bid responsiveness, the bidder or offeror must complete, sign, date, and submit this certification statement with their proposal. The bidder or offeror must indicate how they intend to comply with 49 USC § 50101, and other Made in America Laws, U.S. statutes, guidance, and FAA policies by selecting one on the following certification statements. These statements are mutually exclusive. Bidder must select one or the other (not both) by inserting a checkmark (□) or the letter "X".

□ Bidder or offeror hereby certifies that it will comply with 49 USC § 50101, BABA and other related U.S. statutes, guidance, and policies of the FAA by:

a) Only installing steel and manufactured products produced in the United States;

b) Only installing construction materials defined as: an article, material, or supply – other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives that are or consist primarily of non- ferrous metals; plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables); glass (including optic glass); lumber or drywall that have been manufactured in the United States.

c) Installing manufactured products for which the Federal Aviation Administration (FAA) has issued a waiver as indicated by inclusion on the current FAA Nationwide Buy American Waivers Issued listing; or

d) Installing products listed as an Excepted Article, Material or Supply in Federal Acquisition Regulation Subpart 25.108.

By selecting this certification statement, the bidder or offeror agrees:

a) To provide to the Airport Sponsor or FAA evidence that documents the source and origin of the steel and manufactured product.

b) To faithfully comply with providing U.S. domestic product.

c) To furnish U.S. domestic product for any waiver request that the FAA rejects.

d) To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.

☐ The bidder or offeror hereby certifies it cannot comply with the 100 percent Buy American Preferences of 49 USC § 50101(a) but may qualify for a Type 3 waiver under 49 USC § 50101(b). By selecting this certification statement, the apparent bidder or offeror with the apparent low bid agrees:

a) To submit to the Airport Sponsor or FAA within 15 calendar days of being selected as the responsive bidder, a formal waiver request and required documentation that supports the type of waiver being requested.

b) That failure to submit the required documentation within the specified timeframe is cause for a non- responsive determination that may result in rejection of the proposal.

c) To faithfully comply with providing U.S. domestic products at or above the approved U.S. domestic content percentage as approved by the FAA.

d) To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.

Required Documentation

Type 2 Waiver (**Nonavailability)** - The iron, steel, manufactured goods or construction materials are not available in sufficient quantity or quality in the United States. The required documentation for the Nonavailability waiver is:

a) Completed Content Percentage Worksheet and Final Assembly Questionnaire
b) Record of thorough market research, consideration where appropriate of qualifying alternate items, products, or materials including;
c) A description of the market research activities and methods used to identify domestically manufactured items capable of satisfying the requirement, including the timing of the research and conclusions reached on the availability of sources.

Type 3 Waiver – The cost of the item components and subcomponents produced in the United States is more that 60 percent of the cost of all components and subcomponents of the "item". The required documentation for a Type 3 waiver is:

a) Completed Content Percentage Worksheet and Final Assembly Questionnaire including;
b) Listing of all product components and subcomponents that are not comprised of 100 percent U.S. domestic content (Excludes products listed on the FAA Nationwide Buy American Waivers Issued listing and products excluded by Federal Acquisition Regulation Subpart 25.108 (products of unknown origin must be considered as non-domestic products in their entirety).
c) Cost of non-domestic components and subcomponents, excluding labor costs associated with final assembly at place of manufacture.
d) Percentage of non-domestic component and subcomponent cost as compared to total "item" component and subcomponent costs, excluding labor costs associated with final assembly at place of manufacture.

Type 4 Waiver (Unreasonable Costs) - Applying this provision for iron, steel, manufactured goods or construction materials, would increase the cost of the overall project by more than 25 percent. The required documentation for this waiver is:

a) Completed Content Percentage Worksheet and Final Assembly Questionnaire from
b) At minimum two comparable equal bidders and/or offerors;
c) Receipt or record that demonstrates that supplier scouting called for in Executive Order 14005, indicates that no domestic source exists for the project and/or component;
d) Completed waiver applications for each comparable bid and/or offer.

False Statements: Per 49 USC § 47126, this certification concerns a matter within the jurisdiction of the Federal Aviation Administration and the making of a false, fictitious, or fraudulent certification may render the maker subject to prosecution under Title 18, United States Code.

Date	Signature

SECTION 08 71 00 - DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Mechanical door hardware for the following:

a. Swinging doors.

2. Cylinders for door hardware specified in other Sections.
3. Electrified door hardware.

B. Related Sections:

1. Section 08 11 13 "Hollow Metal Doors and Frames" for astragals provided as part of labeled fire-rated assemblies.
2. Section 08 41 13 "Aluminum-Framed Entrances and Storefronts" for door silencers provided as part of aluminum frames.
3. Section 08 14 16 "Flush Wood Doors" for provided as part of labeled fire-rated assemblies.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include construction and installation details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Other Action Submittals:

1. Door Hardware Schedule: Prepared by or under the supervision of Installer, detailing fabrication and assembly of door hardware, as well as installation procedures and diagrams. Coordinate final door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

a. Submittal Sequence: Submit door hardware schedule concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate the fabrication of other work that is critical in Project construction schedule.
b. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule." Double space entries, and number and date each page.
c. Format: Use same scheduling sequence and format and use same door numbers as in the Contract Documents.

d. Content: Include the following information:

1) Identification number, location, hand, fire rating, size, and material of each door and frame.
2) Locations of each door hardware set, cross-referenced to Drawings on floor plans and to door and frame schedule.
3) Complete designations, including name and manufacturer, type, style, function, size, quantity, function, and finish of each door hardware product.
4) Fastenings and other pertinent information.
5) Explanation of abbreviations, symbols, and codes contained in schedule.
6) Mounting locations for door hardware.
7) List of related door devices specified in other Sections for each door and frame.

2. Keying Schedule: Prepared by or under the supervision of Installer, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations that are coordinated with the Contract Documents.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Architectural Hardware Consultant.

B. Product Test Reports: For compliance with accessibility requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for door hardware on doors located in accessible routes.

C. Warranty: Special warranty specified in this Section.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of door hardware to include in maintenance manuals. Include final hardware and keying schedule.

1.5 QUALITY ASSURANCE

A. Architectural Hardware Consultant Qualifications: A person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and who is currently certified by DHI as follows:

1. For door hardware, an Architectural Hardware Consultant (AHC).

B. Source Limitations: Obtain each type of door hardware from a single manufacturer.

C. Fire-Rated Door Assemblies: Where fire-rated door assemblies are indicated, provide door hardware rated for use in assemblies complying with NFPA 80 that are listed and

labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C, unless otherwise indicated.

D. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meet requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.

1. Air Leakage Rate: Maximum air leakage of0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) at the tested pressure differential of 0.3-inch wg (75 Pa) of water.

E. Means of Egress Doors: Latches do not require more than 15 lbf (67 N) to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.

F. Accessibility Requirements: For door hardware on doors in an accessible route, comply with the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines.

1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf (22.2 N).
2. Comply with the following maximum opening-force requirements:

    a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf (22.2 N) applied perpendicular to door.
    b. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.

3. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch (13 mm) high.
4. Adjust door closer sweep periods so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches (75 mm) from the latch, measured to the leading edge of the door.

G. Keying Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination." In addition to Owner, Contractor, and Architect, conference participants shall also include Installer's Architectural Hardware Consultant. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including, but not limited to, the following:

1. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
2. Preliminary key system schematic diagram.
3. Requirements for key control system.
4. Requirements for access control.
5. Address for delivery of keys.

H. Preinstallation Conference: Conduct conference at Project site.

1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Inspect and discuss preparatory work performed by other trades.
3. Review sequence of operation for each type of electrified door hardware.
4. Review required testing, inspecting, and certifying procedures.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.

B. Tag each item or package separately with identification coordinated with the final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.

C. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

D. Deliver keys and permanent cores to Owner by registered mail or overnight package service.

1.7 COORDINATION

A. Installation Templates: Distribute for doors, frames, and other work specified to be factory prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

B. Electrical System Roughing-in: Coordinate layout and installation of electrified door hardware with connections to power supplies, fire alarm system and detection devices, access control system, security system, and building control system, as applicable.

C. Existing Openings: Where hardware components are scheduled for application to existing construction or where modifications to existing door hardware are required, field verify existing conditions and coordinate installation of door hardware to suit opening conditions and to provide proper door operation.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including excessive deflection, cracking, or breakage.
b. Faulty operation of doors and door hardware.
c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.

2. Warranty Period: Three years from date of Substantial Completion, unless otherwise indicated.

    a. Exit Devices: Two years from date of Substantial Completion.
    b. Manual Closers: 10 years from date of Substantial Completion.

1.9 MAINTENANCE SERVICE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

B. Maintenance Service: Beginning at Substantial Completion, provide six months' full maintenance by skilled employees of door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door and door hardware operation. Provide parts and supplies that are the same as those used in the manufacture and installation of original products.

1.10 SCHEDULED DOOR HARDWARE

A. Provide door hardware for each door as scheduled in Part 3 "Door Hardware Schedule" Article to comply with requirements in this Section.

1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and products equivalent in function and comparable in quality to named products.

B. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated in Part 3 "Door Hardware Schedule" Article. Products are identified by using door hardware designations, as follows:

1. Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in Part 3 "Door Hardware Schedule" Article.
2. References to BHMA Designations: Provide products complying with these designations and requirements for description, quality, and function.

1.11 HINGES

A. Hinges: BHMA A156.1. Provide template-produced hinges for hinges installed on hollow-metal doors and hollow-metal frames.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Baldwin Hardware Corporation.
    b. Bommer Industries, Inc.
    c. IVES Hardware; an Allegion company.

1.12 CONTINUOUS HINGES

A. Continuous Hinges: BHMA A156.26; minimum 0.120-inch- (3.0-mm-) thick, hinge leaves with minimum overall width of 4 inches (102 mm); fabricated to full height of door and frame and to template screw locations; with components finished after milling and drilling are complete.

B. Continuous, Gear-Type Hinges: Extruded-aluminum, pinless, geared hinge leaves joined by a continuous extruded-aluminum channel cap; with concealed, self-lubricating thrust bearings.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Bommer Industries, Inc.
b. IVES Hardware; an Allegion company.
c. Select Products Limited.

1.13 MECHANICAL LOCKS AND LATCHES

A. Lock Functions: As indicated in door hardware schedule.

B. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:

1. Bored Locks: Minimum 1/2-inch (13-mm) latchbolt throw.
2. Mortise Locks: Minimum 3/4-inch (19-mm) latchbolt throw.

C. Lock Backset: 2-3/4 inches (70 mm), unless otherwise indicated.

D. Lock Trim:

1. Operating Device: Lever with escutcheons (roses). Lever style to match existing locks.

E. Strikes: Provide manufacturer's standard strike for each lock bolt or latchbolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.

1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.

F. Bored Locks: BHMA A156.2; Grade 1; Series 4000.

1. Manufacturers: Subject to compliance with requirements, provide products by the following.

a. Schlage Commercial Lock Division; an Allegion company. No substitutions.

G. Mortise Locks: BHMA A156.13; Grade 1; stamped steel case with steel or brass parts; Series 1000.

1. Manufacturers: Subject to compliance with requirements provide products by the following.

    a. Schlage Commercial Lock Division; an Allegion company. No substitutions.

2. Additional Requirements:

    a. Where specified, provide locks with indicator. Indicator window shall measure a minimum 2 inch x 1/2 inch with 180 degree visibility. Provide messages color-coded with full text and/or symbols, as scheduled, for easy visibility.
    b. Provide trim to match existing locksets.
    c. Tornado Applications: Provide multipoint lockset assembly UL approved to FEMA 361 guidelines. Must be used with tested and approved door and frame system.

1.14 EXIT DEVICES AND AUXILIARY ITEMS

A. Exit Devices and Auxiliary Items: BHMA A156.3.

1. Manufacturers: Subject to compliance with requirements, provide products by the following.

    a. Von Duprin; an Allegion company. No substitutions.

2. Additional Requirements:

    a. Exit devices shall incorporate a fluid damper or other device that eliminates noise associated with exit device operation. Touchpad shall extend a minimum of one half of the door width, but not the full length of the exit device rail. End-cap will have two-point attachment to door.
    b. Removable mullions shall be a 2-inch by 3-inch steel tube. All mullions shall be of a type that can be removed by use of a keyed cylinder, which is self-locking when reinstalled. All mullions to be powder coated, provide custom color mullions where specified to match door/frame.
    c. Non-fire-rated exit devices shall have cylinder dogging, provide special dogging (SD) in device head where specified.
    d. All exit devices into educational spaces to have classroom security (-2SI) function allowing trim to be locked/unlocked from inside.
    e. Tornado Applications: Provide assembly UL approved to FEMA 361 guidelines for outswing single or pair doors. Must be used with tested and approved door and frame system.
    f. Provide electrical options as scheduled.

1.15 LOCK CYLINDERS

A. Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver.

1. Manufacturers: Subject to compliance with requirements provide products by the following.

    a. Schlage Commercial Lock Division; an Allegion company unless another key system exists.

B. Standard Lock Cylinders: BHMA A156.5; Grade 1; permanent cores that are removable (where specified); face finished to match lockset.

1.16 KEYING

A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, Appendix A. Incorporate decisions made in keying conference.

1. Existing System:

    a. Master key or grand master key locks to Owner's existing system. Exterior doors shall have Schlage Primus cylinders, interior cylinders shall be Everest restricted. Hardware Supplier to verify proper key system.
        1) All exterior doors to be supplied with temporary cores.

B. Keys: Brass.

1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:

    a. Notation: "DO NOT DUPLICATE."

2. Quantity: In addition to one extra key blank for each lock, provide the following:

    a. Cylinder Change Keys: Three.
    b. Master Keys: Five.

1.17 OPERATING TRIM

A. Operating Trim: BHMA A156.6; brass, unless otherwise indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. IVES Hardware; an Allegion company.
    b. Rockwood Manufacturing Company.
    c. Trimco.

1.18 ACCESSORIES FOR PAIRS OF DOORS

A. Coordinators: BHMA A156.3; consisting of active-leaf, hold-open lever and inactive-leaf release trigger; fabricated from steel with nylon-coated strike plates; with built-in, adjustable safety release; and with internal override.

B. Astragals: BHMA A156.22.

1.19 SURFACE CLOSERS

A. Surface Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

1. Manufacturers: Subject to compliance with requirements provide products by the following.

    a. LCN Closers; an Allegion company. No substitutions.

2. Additional Requirements:

    a. All Closers UL Certified to be in compliance with UBC 7.2 and UL 10C.
    b. Provide closers with a solid forged steel main arms and factory assembled heavy-duty forged forearms for parallel arm closers.
    c. Closers shall have certification by an independent testing laboratory of 10,000,000 cycles without failure.
    d. Closers with pressure relief values will not be acceptable.
    e. Through bolt all closer units, using sex bolt fasteners.
    f. Closer cylinders, arms, adapter plates, and metal covers shall have a powder coating finish which has been certified to exceed 100 hours salt spray testing as described in ANSI Standard A156.4 and ASTM B117, or shall have special rust inhibitor (SRI).
    g. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

1.20 MECHANICAL STOPS AND HOLDERS

A. Wall- and Floor-Mounted Stops: BHMA A156.16; polished cast brass, bronze, or aluminum base metal.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. IVES Hardware; an Allegion company.
    b. Rockwood Manufacturing Company.
    c. Trimco.

1.21 ELECTROMAGNETIC STOPS AND HOLDERS

A. Electromagnetic Door Holders: BHMA A156.15, Grade 1; wall-mounted electromagnetic single unit with strike plate attached to swinging door; coordinated with fire detectors and interface with fire alarm system for labeled fire-rated door assemblies.

1. Manufacturers: Subject to compliance with requirements, provide products by the following:

a. LCN Closers; an Allegion company.

1.22 OVERHEAD STOPS AND HOLDERS

A. Overhead Stops and Holders: BHMA A156.8.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Architectural Builders Hardware Mfg., Inc.
b. Glynn-Johnson; an Allegion company.
c. Rockwood Manufacturing Company.

1.23 THRESHOLDS

A. Thresholds: BHMA A156.21; fabricated to full width of opening indicated.

1. Manufacturers: Subject to compliance with requirements provide products by one of the following:

a. National Guard Products.
b. Pemko Manufacturing Co.; an ASSA ABLOY Group company.
c. Zero Companies.

1.24 METAL PROTECTIVE TRIM UNITS

A. Metal Protective Trim Units: BHMA A156.6; fabricated from 0.050-inch- (1.3-mm-) thick stainless steel; with manufacturer's standard machine or self-tapping screw fasteners.

1. Manufacturers: Subject to compliance with requirements provide products by one of the following:

a. IVES Hardware; an Allegion company.
b. Rockwood Manufacturing Company.
c. Trimco.

1.25 AUXILIARY DOOR HARDWARE

A. Auxiliary Hardware: BHMA A156.16.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. IVES Hardware; an Allegion company.
    b. Hager Companies.
    c. Rockwood Manufacturing Company.
    d. Trimco.

1.26 FABRICATION

A. Manufacturer's Nameplate: Do not provide products that have manufacturer's name or trade name displayed in a visible location except in conjunction with required fire-rated labels and as otherwise approved by Architect.

    1. Manufacturer's identification is permitted on rim of lock cylinders only.

B. Base Metals: Produce door hardware units of base metal indicated, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18.

C. Fasteners: Provide door hardware manufactured to comply with published templates prepared for machine, wood, and sheet metal screws. Provide screws that comply with commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.

    1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
    2. Fire-Rated Applications:

        a. Wood or Machine Screws: For the following:

            1) Hinges mortised to doors or frames; use threaded-to-the-head wood screws for wood doors and frames.
            2) Strike plates to frames.
            3) Closers to doors and frames.

        b. Steel Through Bolts: For the following unless door blocking is provided:

            1) Surface hinges to doors.
            2) Closers to doors and frames.
            3) Surface-mounted exit devices.

    3. Spacers or Sex Bolts: For through bolting of hollow-metal doors.

4. Fasteners for Wood Doors: Comply with requirements in DHI WDHS.2, "Recommended Fasteners for Wood Doors."
5. Gasketing Fasteners: Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

1.27 FINISHES

A. Provide finishes complying with BHMA A156.18 as indicated in door hardware schedule.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 2 - EXECUTION

2.1 EXAMINATION

A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

2.2 PREPARATION

A. Steel Doors and Frames: For surface applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.

B. Wood Doors: Comply with DHI WDHS.5 "Recommended Hardware Reinforcement Locations for Mineral Core Wood Flush Doors."

2.3 INSTALLATION

A. Mounting Heights: Mount door hardware units at heights to comply with the following unless otherwise indicated or required to comply with governing regulations.

1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."

B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that

are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing. Do not install surface-mounted items until finishes have been completed on substrates involved.

1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards. Self-tapping screws are not an acceptable means of installation.

C. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30 inches (750 mm) of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.

D. Lock Cylinders: Install construction cores to secure building and areas during construction period.

1. Replace construction cores with permanent cores as indicated in keying schedule or directed by Owner.
2. Furnish permanent high security cores to Owner for installation.

E. Thresholds: Set thresholds for doors indicated in full bed of sealant complying with requirements specified in Section 079200 "Joint Sealants."

F. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they will impede traffic.

G. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame. Where gasketing is soffit mounted install prior to any soffit mounted hardware to ensure continuous perimeter seal.

H. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.

I. Door Bottoms: Apply to bottom of door, forming seal with threshold or floor when door is closed.

2.4 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

1. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.

B. Occupancy Adjustment: Approximately three after date of Substantial Completion, Installer's Architectural Hardware Consultant shall examine and readjust each item of

door hardware, including adjusting operating forces, as necessary to ensure function of doors, door hardware, and electrified door hardware.

2.5 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.

B. Clean operating items as necessary to restore proper function and finish.

C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

2.6 DEMONSTRATION

A. Contractor to instruct owner's personnel to adjust, operate, and maintain door hardware and door hardware finishes.

2.7 DOOR HARDWARE SCHEDULE

A. The hardware sets listed below represent the design intent and direction of the owner and Architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the Architect with corrections made prior to the bidding process.

HARDWARE SET: 01
DOOR NUMBER:
119.2 121.2
EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
4	EA	Hinge	5BB1HW NRP	630	IVE
1	EA	Power Transfer	EPT10 CON	689	VON
1	EA	Elec Panic Hardware	RX-LC-QEL-99-NL-CON 24 VDC	626	VON
1	EA	Rim Housing	20-079	626	SCH
1	EA	FSIC Perm. Core	23-030 EV29 T	626	SCH
1	EA	FSIC Constr. Core	23-030 ICX	ORG	SCH
1	EA	Surface Closer	4040XP SCUSH	689	LCN
1	EA	Kick Plate	8400 10" X 2" LDW B-CS	630	IVE
1	EA	Door Sweep	8198AA	AA	ZER
1	EA	Threshold	103A-223	A	ZER
2	EA	Wire Harness	CON X Length Req'd		SCH
1	EA	Door Contact	7764	628	SCE
1	EA	Power Supply	By Security System Integrator		B/O
1	EA	Door Call Station	By Security System Integrator		
1	EA	Card Reader	By Security System Integrator		
1	EA	Weatherstrip	By Door/Frame Manufacturer		B/O
1	EA	Wiring Diagram	By Security System Integrator		

OPERATION: Door normally closed and locked. Access via valid card read. Panic may be dogged (made push/pull) electronically. Outside ADA actuator only operable when door is dogged or after valid card read, inside actuator always operable. Always free egress.

HARDWARE SET: 02
DOOR NUMBER:
106.1
EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	Cont. Hinge	112XY EPT	628	IVE
2	EA	Power Transfer	EPT10 CON	689	VON
1	EA	Removable Mullion	KR4954	689	VON
1	EA	Elec Panic Hardware	RX-LC-QEL-99-EO-CON 24 VDC	626	VON
1	EA	Elec Panic Hardware	RX-LC-QEL-99-NL-CON 24 VDC	626	VON
1	EA	Rim Housing	20-079	626	SCH
1	**EA**	**Mortice Housing**	**26-064**	**626**	**SCH**
2	EA	FSIC Perm. Core	23-030 EV29 T	626	SCH
1	EA	FSIC Constr. Core	23-030 ICX	ORG	SCH
2	EA	Surface Closer	4040XP SCUSH	689	LCN
2	EA	Cush Shoe Support	4040XP-30 SRT	689	LCN
2	EA	Blade Stop Spacer	4040XP-61 SRT	689	LCN
1	EA	Mullion Seal	8780NBK PSA	BK	ZER
2	EA	Door Sweep	8198AA	AA	ZER
1	EA	Threshold	103A-223	A	ZER
4	EA	Wire Harness	CON X Length Req'd		SCH
2	EA	Door Contact	7764	628	SCE
1	EA	Power Supply	By Security System Integrator		B/O
1	EA	Door Call Station	By Security System Integrator		
1	EA	Card Reader	By Security System Integrator		
1	EA	Weatherstrip	By Door/Frame Manufacturer		B/O
1	EA	Wiring Diagram	By Security System Integrator		

OPERATION: Door normally closed and locked. Access via valid card read. Panic may be dogged (made push/pull) electronically. ~~**Outside ADA actuator only operable when door is dogged or after valid card read, inside actuator always operable.**~~ Always free egress.

HARDWARE SET: 03
DOOR NUMBER:
129.2
EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
4	EA	Hinge	5BB1HW NRP	630	IVE
1	EA	Panic Hardware	99-EO	626	VON
1	EA	Accessory	Less Dogging Plate	626	VON
1	EA	Surface Closer	4040XP SCUSH	689	LCN
1	EA	Kick Plate	8400 10" X 2" LDW B-CS	630	IVE
1	EA	Rain Drip	142AA	AA	ZER
1	SET	Gasketing	429AA-S	AA	ZER
1	EA	Door Sweep	8197AA	AA	ZER
1	EA	Threshold	103A-223	A	ZER
1	EA	Door Contact	679-05 HM/WD As Req'd	BLK	SCE
1	EA	Motion Sensor	SCANII 12/24 VDC	WHT	SCE
1	EA	Wiring Diagram	By Security System Integrator		

OPERATION: Door contact monitors door position.

NOTE: Install weatherstrip at frame head first, then install closer pa bracket on weatherstrip.

HARDWARE SET: 04
DOOR NUMBER:
~~**200.1**~~ **201.1**
EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
4	EA	Hinge	5BB1HW	652	IVE
1	EA	Power Transfer	EPT10 CON	689	VON
1	EA	EU Storeroom Lock	ND80P6DEU RHO RX CON 12V/24V DC	626	SCH
1	EA	Surface Closer	4040XP RW/PA	689	LCN
1	EA	Kick Plate	8400 10" X 2" LDW B-CS	630	IVE
1	EA	Wall Stop	WS406/407CCV	630	IVE
1	EA	Gasketing	488SBK PSA	BK	ZER
1	EA	Door Sweep	39A	A	ZER
1	EA	Threshold	655A-223	A	ZER
1	EA	Door Contact	679-05 HM/WD As Req'd	BLK	SCE
1	EA	Power Supply	BY SECURITY SYSTEM INTEGRATOR		B/O
1	EA	Card Reader	BY SECURITY SYSTEM INTEGRATOR		

HARDWARE SET: 05
DOOR NUMBER:
104.1 108.1 121.1 123.1
EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	Hinge	5BB1HW 4.5 X 4.5 NRP	652	IVE
1	EA	Power Transfer	EPT10 CON	689	VON
1	EA	EU Storeroom Lock	ND80P6DEU RHO RX CON 12V/24V DC	626	SCH
1	EA	Surface Closer	4040XP RW/PA	689	LCN
1	EA	Kick Plate	8400 10" X 2" LDW B-CS	630	IVE
1	EA	Floor Stop	FS410 (AT 123.1 ONLY)	626	IVE
1	EA	Wall Stop	WS406/407CCV	630	IVE
1	EA	Gasketing	488SBK PSA	BK	ZER
1	EA	Door Contact	679-05 HM/WD As Req'd	BLK	SCE
1	EA	Power Supply	By Security System Integrator		B/O
1	EA	Card Reader	By Security System Integrator		

OPERATION: Door normally closed and locked. Access via valid card read. Always free egress.

HARDWARE SET: 06
DOOR NUMBER:
107.1
EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	Hinge	5BB1HW	652	IVE
1	EA	Power Transfer	EPT10 CON	689	VON
1	EA	Const Latching Bolt	FB51T	630	IVE
1	EA	EU Storeroom Lock	ND80P6DEU RHO RX CON 12V/24V DC	626	SCH
2	EA	Oh Stop	90S	630	GLY
2	EA	Surface Closer	4040XP RW/PA	689	LCN
1	EA	Kick Plate	8400 10" X 1" LDW B-CS	630	IVE
1	EA	Meeting Stile	383AA	AA	ZER
2	EA	Door Contact	679-05 HM/WD As Req'd	BLK	SCE
1	EA	Power Supply	By Security System Integrator		B/O
1	EA	Card Reader	By Security System Integrator		

OPERATION: Door normally closed and locked. Access via valid card read. Always free egress.

HARDWARE SET: 07
DOOR NUMBER:
109.1
EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
4	EA	Hinge	5BB1HW	652	IVE
1	EA	Storeroom Lock	ND80P6D RHO	626	SCH
1	EA	Surface Closer	4040XP RW/PA	689	LCN
1	EA	Kick Plate	8400 10" X 2" LDW B-CS	630	IVE
1	EA	Wall Stop	WS406/407CCV	630	IVE
3	EA	Silencer	SR64	GRY	IVE

HARDWARE SET: 08
DOOR NUMBER:
~~**108.2**~~ 124.1 129.1 136.1
EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
4	EA	Hinge	5BB1HW	652	IVE
1	EA	Classroom Lock	ND70P6D RHO	626	SCH
1	EA	Surface Closer	4040XP	689	LCN
1	EA	Kick Plate	8400 10" X 2" LDW B-CS	630	IVE
1	EA	Wall Stop	WS406/407CCV	630	IVE
1	EA	Gasketing	488SBK PSA	BK	ZER

HARDWARE SET: 09
DOOR NUMBER:
103.1 114.1 116.1 117.1 119.1
EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
4	EA	Hinge	5BB1HW	652	IVE
1	EA	Entrance Lock	ND53P6D RHO	626	SCH
1	EA	Wall Stop	WS406/407CCV	630	IVE
3	EA	Silencer	SR64	GRY	IVE

NOTE: Provide floor stop in lieu of wall stop where required.

HARDWARE SET: 10
DOOR NUMBER:
111.1 113.1 115.1 133.1 129.3
EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
4	EA	Hinge	5BB1HW	652	IVE
1	EA	Office w/ Sim Retract w/ Outside Indicator	L9056J 06A L583-363 OS-OCC	626	SCH
1	EA	FSIC Perm. Core	23-030 EV29 T	626	SCH
1	EA	Surface Closer	4040XP RW/PA	689	LCN
1	EA	Kick Plate	8400 10" X 2" LDW B-CS	630	IVE
1	EA	Wall Stop	WS406/407CCV	630	IVE
1	EA	Gasketing	488SBK PSA	BK	ZER

HARDWARE SET: 11
DOOR NUMBER:
131.1 132.1 135.1
EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	Cont. Hinge	224XY	628	IVE
1	EA	Classroom Sec W/Db	L9457J 06A	626	SCH
2	EA	FSIC Perm. Core	23-030 EV29 T	626	SCH
1	EA	Surface Closer	4040XP RW/PA	689	LCN
1	EA	Kick Plate	8400 10" X 2" LDW B-CS	630	IVE
1	EA	Wall Stop	WS406/407CCV	630	IVE
3	EA	Silencer	SR64	GRY	IVE

HARDWARE SET: 12
DOOR NUMBER:
134.1
EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
4	EA	Hinge	5BB1HW	652	IVE
1	EA	Passage Set	ND10S RHO	626	SCH
1	EA	Wall Stop	WS406/407CCV	630	IVE
3	EA	Silencer	SR64	GRY	IVE

HARDWARE SET: 13
DOOR NUMBER:
100.1 100.2 127.1 127.2
EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	Mortise Housing	26-064	626	SCH
1	EA	FSIC Perm. Core	23-030 EV29 T	626	SCH
1	EA	Local Control Switch	By Door Manufacturer		

NOTE: Balance of hardware by door system manufacturer. Verify cylinder type/quantity required with door manufacturer.

HARDWARE SET: 14
DOOR NUMBER:
118.1
EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
4	EA	HINGE	5BB1HW	652	IVE
1	EA	CLASSROOM DEADBOLT	B663P6	626	SCH
1	EA	PUSH PLATE	8200 6" X 16"	630	IVE
1	EA	PULL PLATE	8303 8" 6" X 16"	630	IVE
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER

HARDWARE SET: 15
DOOR NUMBER:
105.1 **200.1**
EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	Hinge	5BB1HW 4.5 X 4.5 NRP	652	IVE
1	EA	Power Transfer	EPT10 CON	689	VON
1	EA	Elec Panic Hardware	RX-LC-QEL-98-NL-CON 24 VDC	626	VON
1	EA	Rim Housing	20-079	626	SCH
1	EA	FSIC Perm. Core	23-030 EV29 T	626	SCH
1	EA	Surface Closer	4040XP RW/PA	689	LCN
1	EA	Kick Plate	8400 10" X 2" LDW B-CS	630	IVE
1	EA	Wall Stop	WS406/407CCV	630	IVE
1	EA	Gasketing	488SBK PSA	BK	ZER
2	EA	Wire Harness	CON X Length Req'd		SCH
1	EA	Door Contact	679-05 HM/WD AS REQ'D	BLK	SCE
1	EA	Power Supply	By Security System Integrator		B/O
1	EA	Card Reader	By Security System Integrator		
1	EA	Wiring Diagram	By Security System Integrator		

OPERATION: Door normally closed and locked. Access via valid card read. Always free egress.

HARDWARE SET: 16
DOOR NUMBER:
131.2 **131.3** **115.1** **132.2** **132.3**
EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	Hinge	5BB1HW	652	IVE
2	EA	Spring Hinge	3SP1	652	IVE
1	EA	Privacy w/ Outside Indicator	ND40 RHO OS-OCC	626	SCH
1	EA	FSIC Perm. Core	23-030 EV29 T	626	SCH
1	EA	Kick Plate	8400 10" X 2" LDW B-CS	630	IVE
1	EA	Wall Stop	WS406/407CCV	630	IVE
3	EA	Silencer	SR64	GRY	IVE

NOTE: Door in 8'-0" frame under and over cut door by 4".

HARDWARE SET: 17
DOOR NUMBER:
108.2
EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
4	**EA**	**Hinge**	**5BB1HW**	**652**	**IVE**
1	**EA**	**Passage Lock**	**ND10 RHO**	**626**	**SCH**
1	**EA**	**Surface Closer**	**4040XP**	**689**	**LCN**
1	**EA**	**Kick Plate**	**8400 10" X 2" LDW B-CS**	**630**	**IVE**
1	**EA**	**Wall Stop**	**WS406/407CCV**	**630**	**IVE**
1	**EA**	**Gasketing**	**488SBK PSA**	**BK**	**ZER**

END OF SECTION 08 71 00

SECTION 23 81 29 – VARIABLE REFRIGERANT FLOW HVAC SYSTEMS

PART 1. GENERAL

1.1 SUMMARY

A. A. Section Includes: VRF HVAC systems.

1. Indoor, concealed, floor-mounted units for ducting.
2. Outdoor, air-source heat-pump units.
3. System controls.
4. System refrigerant and oil.
5. System condensate drain piping.
6. System refrigerant piping.
7. Metal hangers and supports.
8. Pipe stands.
9. Outdoor equipment stands.
10. Piping and tubing insulation.

1.2 DEFINITIONS

A. Air-Conditioning System Operation: System capable of operation with all zones in cooling only.

B. Heat-Pump System Operation: System capable of operation with all zones in either heating or cooling, but not with simultaneous heating and cooling zones that transfer heat between zones.

C. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control, signaling power-limited circuits.

D. Plenum: A space forming part of the air distribution system to which one or more air ducts are connected. An air duct is a passageway, other than a plenum, for transporting air to or from heating, ventilating, or air-conditioning equipment.

E. Three-Pipe System Design: One high pressure refrigerant vapor line, one low pressure refrigerant vapor line, and one refrigerant liquid line connect a single outdoor unit or multiple manifold outdoor units in a single system to associated system HRCUs. One liquid line and refrigerant vapor line connect HRCUs to associated indoor units.

F. Two-Pipe System Design: One refrigerant vapor line and one refrigerant liquid line connect a single outdoor unit or multiple manifold outdoor units in a single system to associated system HRCUs. One refrigerant liquid line and refrigerant vapor line connect HRCUs to associated indoor units. HRCUs used in two pipe systems act as an intermediate heat exchanger and include diverting valves and gas/liquid separators to move high and low pressure refrigerant between indoor units.

G. VRF: Variable refrigerant flow.

1.3 ACTION SUBMITTALS

A. Product Data: For VRF HVAC system components.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for indoor and outdoor units.
2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
3. Include operating performance at design conditions and at extreme maximum and minimum outdoor ambient conditions.

4. Include description of system controllers, dimensions, features, control interfaces and connections, power requirements, and connections.Include system operating sequence of operation in narrative form for each unique indoor- and outdoor-unit control.
5. Include description of control software features.
6. Include total refrigerant required and a comprehensive breakdown of refrigerant required by each system installed.
7. Include refrigerant type and data sheets showing compliance with requirements indicated.

B. Indicate location and type of service access.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data:

1. For Installer: Certificate from VRF HVAC system manufacturer certifying that Installer has successfully completed prerequisite training administered by manufacturer for proper installation of systems, including but not limited to, equipment, piping, controls, and accessories indicated and furnished for installation.
   a. Retain copies of Installer certificates on-site and make available on request.
2. For VRF HVAC system manufacturer.
3. For VRF HVAC system provider.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store products in a clean and dry place.

B. Comply with manufacturer's written rigging and installation instructions for unloading and moving to final installed location.

C. Handle products carefully to prevent damage, breaking, denting, and scoring. Do not install damaged products.

D. Protect products from weather, dirt, dust, water, construction debris, and physical damage.

1. Retain factory-applied coverings on equipment to protect finishes during construction and remove just prior to operating unit.
2. Cover unit openings before installation to prevent dirt and dust from entering inside of units. If required to remover coverings during unit installation, reapply coverings over openings after unit installation and remove just prior to operating unit.

E. Replace installed products damaged during construction.

PART 2. PART PRODUCTS

2.1 VRF HVAC SYSTEMS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Daikin Applied.
2. LG Electronics USA, Inc.; LG Electronics Inc.
3. Mitsubishi Electric & Electronics USA, Inc.
4. Trane Inc.
5. Carrier
6. Lennox

B. Source Limitations: Obtain products from single source from single manufacturer including, but not limited to, the following:

1. Indoor and outdoor units, including accessories.
2. Controls and software.
3. HRCUs.
4. Refrigerant isolation valves.
5. Specialty refrigerant pipe fittings.

2.2 SYSTEM DESCRIPTION

A. Direct-expansion (DX) VRF HVAC system(s) with variable capacity in response to varying cooling and heating loads. System shall consist of multiple indoor units, HRCUs, outdoor unit(s), piping, controls, and electrical power to make complete operating system(s) complying with requirements indicated.

1. Two-pipe or three-pipe system design.
2. System(s) operation, heat pump as indicated on Drawings.
3. Each system with one refrigerant circuit shared by all indoor units connected to system.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. AHRI Compliance: System and equipment performance certified according to AHRI 1230 and products listed in AHRI directory.

D. ASHRAE Compliance:

1. ASHRAE 15: For safety code for mechanical refrigeration.
2. ASHRAE 62.1: For indoor air quality.
3. ASHRAE 135: For control network protocol with remote communication.
4. ASHRAE/IES 90.1 Compliance: For system and component energy efficiency.

E. UL Compliance: Comply with UL 1995.

F. The variable capacity, heat recovery air conditioning system shall be a Variable Refrigerant Volume Series (heat and cool model) split system as specified. The system shall consist of multiple evaporators, branch selector boxes, joints and headers, a three pipe refrigeration distribution system using PID control, and Daikin VRV□□outdoor unit. The outdoor unit is a direct expansion (DX), air-cooled heat recovery, multi-zone air- conditioning system with variable speed driven compressors using R-410A refrigerant. The outdoor unit may connect an indoor evaporator capacity up to 200% of the outdoor condensing unit capacity. All zones are each capable of operating separately with individual temperature control.

G. Operation of the system shall permit either individual cooling or heating of each fan coil simultaneously or all of the fan coil units associated with one branch cool/heat selector box (BSQ). Each fan coil or group of fan coils shall be able to provide set temperature independently via a local remote controller, an Intelligent Controller, an Intelligent Manager or a BMS interface.

H. Branch selector boxes shall be located as shown on the drawing. The branch selector boxes shall have the capacity to control up to 290 MBH (cooling) downstream of the branch selector box. Each branch of the branch selector box shall consist of three electronic expansion valves, refrigerant control piping and electronics to facilitate communications between the box and main processor and between the box and indoor units. The branch selector box shall control the operational mode of the subordinate indoor units. The use of three EEV's ensures continuous heating during defrost (multiple condenser systems), no heating impact during changeover and reduced sound levels.

1. If proposed alternate manufacturer has solenoid valves in their branch selector box, the alternate manufacturer shall provide a secondary, removable sheet metal fabricated enclosure to completely

encapsulate the VRV branch selector box. This secondary enclosure shall be filled with fiberglass or foam for sound mitigation purposes.

I. Check manufacturer's requirements for the number of units that can be connected together. Each individual condensing unit module is specified to have dual compressors so the module can continue to run on one compressor in emergency mode if the other compressor fails. For manufacturers proposing any individual module with a single compressor, a backup (spare compressor) must be provided to the owner to stock for every condensing unit module on the project that has a single compressor. In the event of compressor failure the remaining compressors shall continue to operate and provide heating or cooling as required at a proportionally reduced capacity. Each indoor unit or group of indoor units shall be independently controlled.

J. REQUIRED FEATURES

1. Voltage Platform – Heat pump and heat recovery condensing units shall be available with a 208-230V/3/1/60 power supply.
2. Advanced Zoning – A single system shall provide for up to 64 zones.
3. Auto charging – Each condensing unit is specified to be provided with an automatic charging feature that does not require manual calculation ofrefrigerant line lengths. If the proposed manufacturer does not have an automatic charge feature, spare R-410A refrigerant totaling the entire amount provided in the VRV system shall be provided to the owner to stock at the facility.
4. Charge Checking – Each system shall have a refrigerant charge checking function.
5. Heat During Defrost and Heat during Oil Recovery – For proposed alternate manufacturer that does not heat during all cycles of defrost and oil recovery, supplemental electric heat must be provided at each fan coil. The proposed alternate manufacturer shall not only provide the supplemental electric heat in each zone, but also shall include all cost from power electrician to power these heaters and interlock the heaters into the VRV system.
6. Independent Control – Each fan coil shall use a dedicated electronic expansion valve for independent control.
7. VFD Inverter Control – Each condensing unit shall use a high efficiency, variable speed "inverter" compressor coupled with inverter fan motors for superior part load performance. All variable frequency drives located in the outdoor condensing unit shall be refrigerant cooled by the outdoor condensing unit refrigerant circuit to allow for stable operation and maximum life. Alternate manufacturers that use ambient air to cool the variable frequency drives shall provide a spare variable frequency drive for each condensing unit on the project.
8. Compressor capacity shall be modulated automatically to maintain a constant suction pressure, while varying the refrigerant volume for the needs of the cooling or heating loads.
9. Indoor fan coil units shall use PID control to control superheat to deliver a comfortable room temperature condition.
10. Configurator software – Each system shall be available with configurator software package to allow for remote configuration of operational settings and also for assessment of operational data and error codes. If this software is not provided by an alternate manufacturer, for each individual outdoor unit the contractor shall do the settings manually and keep detailed records for future maintenance purposes.
11. Flexible Design
    a. Systems shall be capable of up to 540ft (640ft equivalent) of linear piping between the condensing unit and furthest located fan coil unit.
    b. Systems shall be capable of up to 3,280ft total "one-way" piping in the piping network.
    c. Systems shall have a vertical (height) separation of up to 295ft between the condensing unit and the fan coil units.
    d. Systems shall be capable of 295ft from the first branch point.

e. The outdoor unit shall connect an indoor evaporator capacity up to 200% of the outdoor condensing unit capacity.

f. Systems shall be capable of 98ft between fan coil units.

g. Condensing units shall be supported with a fan/fan motor ESP up to 0.32" WG as standard to allow connection of discharge ductwork and to prevent discharge air short circuiting.

12. Simple Wiring – Systems shall use 16 AWG, 2 wire, multi-stranded, non- shielded and non-polarized daisy chain control wiring.

13. Energy Efficiency – System shall have equivalent or better performance than high efficiency air cooled or water cooled chiller systems.

14. Outside Air – Systems shall provide outside air capability.

15. Space Saving – Each system shall have a condensing unit module footprint as small as 3' 5/8" x 2' 6-1/8" (7.66sq ft).

16. Advanced Diagnostics – Systems shall include a self-diagnostic, auto-check function to detect a malfunction and display the type and location.

17. Advanced Controls – Each system shall have at least one remote controller capable of controlling up to 16 fan coil units.

18. Compressors in the outdoor units must be provided with a dome temperature sensor. Alternate manufacturers that do not have on-board compressor temperature sensors must provide a third party temperature sensor. This sensor must report to the on-board control system to stop operation based on elevated temperatures to not only protect the compressor from failure and increase compressor life.

19. Low Sound Levels – Each system shall use indoor and outdoor units with quiet operation as low as 27 dB(A).

2.3 PERFORMANCE REQUIREMENTS

A. Service Access:

1. Provide and document service access requirements.

2. Locate equipment, system isolation valves, and other system components that require service and inspection in easily accessible locations. Avoid locations that are difficult to access if possible.

3. Where serviceable components are installed behind walls and above inaccessible ceilings, provide finished assembly with access doors or panels to gain access. Properly size the openings to allow for service, removal, and replacement.

4. If less than full and unrestricted access is provided, locate components within an 18-inch reach of the finished assembly.

5. Where ladder access is required to service elevated components, provide an installation that provides for sufficient access within ladder manufacturer's written instructions for use.

6. Comply with OSHA regulations.

B. System Design and Installation Requirements:

1. Design and install systems indicated according to manufacturer's recommendations and written instructions.

2. Where manufacturer's requirements differ from requirements indicated, contact Architect for direction. The most stringent requirements should apply unless otherwise directed in writing by Architect.

C. Isolation of Equipment: Provide isolation valves to isolate each indoor unit and outdoor unit for service, removal, and replacement without interrupting system operation.

D. System Capacity Ratio: The sum of connected capacity of all indoor units shall be within the following range of outdoor-unit rated capacity:As scheduled on drawings.

E. System Turndown: Stable operation down to 20 percent of outdoor-unit capacity.

2.4 4 WAY CEILING CASSETTE UNIT (3'X3')

A. General: The ceiling cassette fan coil unit, operable with R-410A refrigerant, equipped with an electronic expansion valve, for installation into the ceiling cavity equipped with an air panel grill. It shall be available from 7,500 Btu/h to 48,000 Btu/h. It shall be a 360 degree air distribution type, ivory white, impact resistant, and washable decoration panel. The supply air is distributed via motorized louvers which can be horizontally and vertically adjusted from 0° to 90°. Computerized PID control shall be used to maintain room temperature within 1°F. Equipped with a

programmed drying mechanism that dehumidifies while inhibiting changes in room temperature when used with remote control. The indoor units sound pressure shall range from 28 dB(A) to 33 dB(A) at low speed measured at 5 feet below the unit.

B. Indoor Unit:
   1. The indoor unit shall be completely factory assembled and tested. Included in the unit is factory wiring, piping, electronic proportional expansion valve, control circuit board, fan motor thermal protector, flare connections, condensate drain pan, condensate drain pump, self-diagnostics, auto-restart function, 3-minute fused time delay, and test run switch.
   2. Indoor unit and refrigerant pipes will be charged with dehydrated air prior to shipment from the factory.
   3. Both refrigerant lines shall be insulated from the outdoor unit.
   4. Return air shall be through the concentric panel, which includes a resin net mold resistant filter.
   5. The indoor units shall be equipped with a condensate pan and condensate pump. The condensate pump provides up to 33-1/2" of lift.
   6. The indoor units shall be equipped with a return air thermistor.
   7. The indoor unit will be separately powered with 208~230V/1-phase/60Hz.
   8. The voltage range will be 253 volts maximum and 187 volts minimum.
   9. Each ceiling cassette fan coil is specified as single zone VAV with proximity sensors and occupancy sensors. If the proposed manufacture cannot do all three of these items, they must (at a minimum) provide a wall mounted occupancy sensor for each fan coil unit that will put the unit in unoccupied mode when the space is empty. Occupied / Unoccupied space must be reported back through the centralized / Web Based front end control system.
   10. Each ceiling cassette fan coil is specified to have a self-cleaning filter. If the proposed manufacturer does not have a self-cleaning filter, (10) sets of spare washable filters must be provided. Additionally, a differential pressure filter switch shall be hard wired in the proposed alternate fan coil to alarm the centralized / web-based front end control system of a dirty filter.
   11. If proposed alternate manufacturer does not meet the specified fan coil airflow on high speed fan, the proposed manufacturer must go to the next fan coil unit size larger or provide two fan coils in the space to meet the specified high speed fan mode that ensures proper designed air circulation.

C. Unit Cabinet:
   1. The cabinet shall be space saving and shall be located into the ceiling.
   2. Three auto-swing positions shall be available to choose, which include standard, draft prevention and ceiling stain prevention.
   3. The airflow of the unit shall have the ability to shut down one or two sides allowing for simpler corner installation.
   4. Fresh air intake shall be possible by way of fresh air intake kit.
   5. A branch duct knockout shall exist for branch ducting supply air.
   6. The cabinet shall be constructed with sound absorbing foamed polystyrene and polyethylene insulation.
   7. Optional high efficiency air filters are available for each model unit.

D. Fan:
   1. The fan shall be direct-drive turbo fan type with statically and dynamically balanced impeller with high and low fan speeds available.
   2. The fan motor shall operate on 208/230 volts, 1 phase, 60 hertz with a motor output range from 0.06 to 0.12 HP.
   3. The airflow rate shall be available in high and low settings.
   4. The fan motor shall be thermally protected.

E. Filter:

1. The ceiling cassette decoration panel shall be provided with a self-cleaning filter panel, which performs automatic filter cleaning up to once a day, with dust collection box that indicates when to be emptied

F. Coil:
1. Coils shall be of the direct expansion type constructed from copper tubes expanded into aluminum fins to form a mechanical bond.
2. The coil shall be of a waffle louver fin and high heat exchange, rifled bore tube design to ensure highly efficient performance.
3. The coil shall be a 2-row cross fin copper evaporator coil with 17 FPI design completely factory tested.
4. The refrigerant connections shall be flare connections and the condensate will be 1 -1/4 inch outside diameter PVC.
5. A condensate pan shall be located under the coil.
6. A condensate pump with a 33-1/2 inch lift shall be located below the coil in the condensate pan with a built in safety alarm.
7. A thermistor will be located on the liquid and gas line.

G. Electrical:
1. A separate power supply will be required of 208/230 volts, 1 phase, 60 hertz. The acceptable voltage range shall be 187 to 253 volts.
2. Transmission (control) wiring between the indoor and outdoor unit shall be a maximum of 3,280 feet (total 6,560 feet).
3. Transmission (control) wiring between the indoor and remote controller shall be a maximum distance of 1,640 feet.

H. Control:
1. The unit shall have manufacturer provided controls to perform input functions necessary to operate the system.

2.5 4 WAY CEILING CASSETTE UNIT (2'X2')

A. General: The indoor unit shall be a ceiling cassette fan coil unit, operable with R-410A refrigerant, equipped with an electronic expansion valve, for installation into the ceiling cavity equipped with an air panel grill. It shall be available from 7,500 Btu/h to 18,000 Btu/h. Units to be connected to an outdoor heat pump heat recovery model. It shall be a four-way air distribution type, ivory white, impact resistant, and washable decoration panel. The supply air is distributed via motorized louvers which can be horizontally and vertically adjusted from 0° to 90°. Computerized PID control shall be used to maintain room temperature within 1°F. Equipped with a programmed drying mechanism that dehumidifies while inhibiting changes in room temperature when used with remote control. The indoor units sound pressure shall range from 25 dB(A) to 33 dB(A) at low speed measured at 5 feet below the unit.

B. Performance: Each unit's performance is based on nominal operating conditions.

C. Indoor Unit:
1. The indoor unit shall be completely factory assembled and tested. Included in the unit is factory wiring, piping, electronic proportional expansion valve, control circuit board, fan motor thermal protector, flare connections, condensate drain pan, condensate drain pump, self- diagnostics, auto-restart function, 3-minute fused time delay, and test run switch.

2. Indoor unit and refrigerant pipes will be charged with dehydrated air prior to shipment from the factory.
3. Both refrigerant lines shall be insulated from the outdoor unit.
4. The 4-way supply air flow can be field modified to 3-way and 2-way airflow to accommodate various installation configurations including corner installations.
5. Return air shall be through the concentric panel, which includes a resin net mold resistant filter.
6. The indoor units shall be equipped with a condensate pan and condensate pump. The condensate pump provides up to 21" of lift.
7. The indoor units shall be equipped with a return air thermistor.
8. The indoor unit will be separately powered with 208~230V/1-phase/60Hz.
9. The voltage range will be 253 volts maximum and 187 volts minimum.

D. Unit Cabinet:

1. The cabinet shall be space saving and shall be located into the ceiling.
2. Three auto-swing positions shall be available to choose, which include standard, draft prevention and ceiling stain prevention.
3. The airflow of the unit shall have the ability to shut down one or two sides allowing for simpler corner installation.
4. Fresh air intake shall be possible by way of Daikin's optional fresh intake kit.
5. A branch duct knockout shall exist for branch ducting supply air.
6. The cabinet shall be constructed with sound absorbing foamed polystyrene and polyethylene insulation.

E. Fan:

1. The fan shall be direct-drive turbo fan type with statically and dynamically balanced impeller with high and low fan speeds available.
2. The fan motor shall operate on 208/230 volts, 1 phase, 60 hertz with a motor output range from 0.06 to 0.12 HP.
3. The airflow rate shall be available in high and low settings.
4. The fan motor shall be thermally protected.

F. Filter:

1. The return air shall be filtered by means of a washable long-life filter with mildew proof resin.

G. Coil:

1. Coils shall be of the direct expansion type constructed from copper tubes expanded into aluminum fins to form a mechanical bond.
2. The coil shall be of a waffle louver fin and high heat exchange, rifled bore tube design to ensure highly efficient performance.
3. The coil shall be a 2-row cross fin copper evaporator coil with 17 FPI design completely factory tested.
4. The refrigerant connections shall be flare connections and the condensate will be 1 -1/4 inch outside diameter PVC.
5. A condensate pan shall be located under the coil.
6. A condensate pump with a 21 inch lift shall be located below the coil in the condensate pan with a built in safety alarm.
7. A thermistor will be located on the liquid and gas line.

H. Electrical:

1. A separate power supply will be required of 208/230 volts, 1 phase, 60 hertz. The acceptable voltage range shall be 187 to 253 volts.
2. Transmission (control) wiring between the indoor and outdoor unit shall be a maximum of 3,280 feet (total 6,560 feet).

3. Transmission (control) wiring between the indoor and remote controller shall be a maximum distance of 1,640 feet.

I. Control:

1. The unit shall have controls provided by Daikin to perform input functions necessary to operate the system.

2.6 OUTDOOR UNIT

A. General: The outdoor unit is designed specifically for use with VRV IV series components.

1. The outdoor unit shall be factory assembled in the USA and pre-wired with all necessary electronic and refrigerant controls. The refrigeration circuit of the condensing unit shall consist of Daikin scroll compressors, motors, fans, condenser coil, electronic expansion valves, solenoid valves, 4-way valve, distribution headers, capillaries, filters, shut off valves, oil separators, service ports and refrigerant regulator. All outdoor units must have a minimum of 2 compressors. Single compressor outdoor units will not be allowed as two compressors are required redundancy / backup. In the event of compressor failure the remaining compressors shall continue to operate and provide heating or cooling as required at a proportionally reduced capacity. High/low pressure gas line, liquid and suction lines must be individually insulated between the outdoor and indoor units.
2. The outdoor unit can be wired and piped with outdoor unit access from the left, right, rear or bottom.
3. The connection ratio of indoor units to outdoor unit shall be permitted up to 200%.
4. Each outdoor system shall be able to support the connection of up to 64 indoor units dependent on the model of the outdoor unit.
5. The sound pressure level standard shall be that value as listed in the Daikin engineering manual for the specified models at 3 feet from the front of the unit. The outdoor unit shall be capable of operating automatically at further reduced noise during night time.
6. The system will automatically restart operation after a power failure and will not cause any settings to be lost, thus eliminating the need for reprogramming.
7. The unit shall incorporate an auto-charging feature and a refrigerant charge check function.
8. The outdoor unit shall be modular in design and should allow for side-by-side installation with minimum spacing.
9. The following safety devices shall be included on the condensing unit; high pressure switch, control circuit fuses, crankcase heaters, fusible plug, high pressure switch, overload relay, inverter overload protector, thermal protectors for compressor and fan motors, over current protection for the inverter and anti-recycling timers.
10. To ensure the liquid refrigerant does not flash when supplying to the various fan coil units, the circuit shall be provided with a sub-cooling feature.
11. Oil recovery cycle shall be automatic occurring 2 hours after start of operation and then every 8 hours of operation.
12. The outdoor unit shall be capable of heating operation at down to -40°F dry bulb ambient temperature without additional low ambient controls.
13. The system shall continue to provide heat to the indoor units in heating operation while in the defrost mode.

B. Unit Cabinet:
1. The outdoor unit shall be completely weatherproof and corrosion resistant. The unit shall be constructed from rust-proofed mild steel panels coated with a baked enamel finish.

C. Fan:
1. The condensing unit shall consist of two or more propeller type, direct-drive 350 and 750 W fan motors that have multiple speed operation via a DC (digitally commutating)

inverter. All outdoor units must have a minimum of 2 fans. Single fan outdoor units will not be allowed as two fans are required redundancy / backup.

2. The condensing unit fan motor shall have multiple speed operation of the DC (digitally commutating) inverter type, and be of high external static pressure and shall be factory set as standard at 0.12 in. WG. A field setting switch to a maximum 0.32 in. WG pressure is available to accommodate field applied duct for indoor mounting of condensing units.
3. The fan shall be a vertical discharge configuration with a nominal airflow maximum range of 6,700 CFM to 14,120 CFM 5,544 CFM to 24,684 CFM dependent on model specified.
4. The fan motor shall have inherent protection and permanently lubricated bearings and be mounted.
5. The fan motor shall be provided with a fan guard to prevent contact with moving parts.
6. Night setback control of the fan motor for low noise operation by way of automatically limiting the maximum speed shall be a standard feature. Operation sound level shall be selectable from 3 steps as shown below.

Operation Sound (dB)	Night Mode Sound Pressure Level (dB)
Step 1 max.	55
Step 2 max.	50
Step 3 max.	45

D. Condenser Coil:
1. The condenser coil shall be manufactured from copper tubes expanded into aluminum fins to form a mechanical bond.
2. The heat exchanger coil shall be of a waffle louver fin and rifled bore tube design to ensure high efficiency performance.
3. The heat exchanger on the condensing units shall be manufactured from seamless copper tube with N-shape internal grooves mechanically bonded on to aluminum fins to an e-Pass Design.
4. The fins are to be covered with an anti-corrosion Ultra Gold coating as standard with a salt spray test rating of 1000hr (ASTM B117 & Blister Rating:10), Acetic acid salt spray test: 500hr (ASTM G85 & Blister Rating:10).
5. The pipe plates shall be treated with powdered polyester resin for corrosion prevention. The thickness of the coating must be between 2.0 to 3.0 microns.
6. The outdoor coil shall have three-circuit heat exchanger design eliminating the need for bottom plate heater. The lower part of the coil shall be used for inverter cooling and be on or off during heating operation enhancing the defrost operation.

E. Compressor:
1. The inverter scroll compressors shall be variable speed (PAM inverter) controlled which is capable of changing the speed to follow the variations in total cooling and heating load as determined by the suction gas pressure as measured in the condensing unit. In addition, samplings of evaporator and condenser temperatures shall be made so that the high/low pressures detected are read every 20 seconds and calculated. With each reading, the compressor capacity (INV frequency or STD ON/OFF) shall be controlled to eliminate deviation from target value.
2. The inverter driven compressor in each condensing unit shall be of highly efficient reluctance DC (digitally commutating), hermetically sealed scroll “G-type” with a maximum speed of 7,980 rpm.
3. Neodymium magnets shall be adopted in the rotor construction to yield a higher torque and efficiency in the compressor instead of the normal ferrite magnet type. At complete stop of the compressor, the neodymium magnets will position the rotor into the optimum position for a low torque start.
4. The capacity control range shall be as low as 6% to 100%.
5. Units with non-inverter (standard) compressors shall not be allowed.
6. Each compressor shall be equipped with a crankcase heater, high pressure safety switch, and internal thermal overload protector.

7. Oil separators shall be standard with the equipment together with an intelligent oil management system.
8. The compressor shall be spring mounted to avoid the transmission of vibration.
9. Units sized 8-12 ton shall contain a minimum of 2 compressors, 14-16 ton units shall contain a minimum of 3 compressors and 18-20 ton shall contain a minimum of 4 compressors. In the event of compressor failure the remaining compressors shall continue to operate and provide heating or cooling as required at a proportionally reduced capacity. The microprocessor and associated controls shall be designed to specifically address this condition.
10. In the case of multiple condenser modules, conjoined operation hours of the compressors shall be balanced by means of the Duty Cycling Function, ensuring sequential starting of each module at each start/stop cycle, completion of oil return, completion of defrost or every 8 hours.

F. Electrical:
1. The power supply to the outdoor unit shall be 208-230 volts, 3 phase, 60 hertz +/- 10%.
2. The control voltage between the indoor and outdoor unit shall be 16VDC non-shielded, stranded 2 conductor cable.
3. The control wiring shall be a two-wire multiplex transmission system, making it possible to connect multiple indoor units to one outdoor unit with one 2-cable wire, thus simplifying the wiring operation.
4. The control wiring lengths shall be as shown below.

	Outdoor to Indoor Unit	**Outdoor to Central Controller**	**Indoor Unit to Remote Control**
Control Wiring Length	6,665 ft	3,330 ft	1,665 ft
Wire Type	16 AWG, 2 wire, non-polarity, non-shielded, stranded		

2.7 BRANCH SELECTOR BOX FOR VRV HEAT RECOVERY SYSTEM

A. General:
1. The branch selector box shall consist of three electronic expansion valves, refrigerant control piping and electronics to facilitate communications between the box and main processor and between the box and indoor units. The branch selector box shall control the operational mode of the subordinate indoor units. The use of three EEV's ensures continuous heating during oil return and defrost, rapid heating/cooling changeover and reduced sound levels.
2. If solenoid valves are utilized in lieu of EEV's for changeover and pressure equalization, a double wall sound attenuation box shall be installed around each branch controller box to reduce refrigerant noise during changeover.
3. Use of multi-port branch selector boxes shall only be acceptable if no common valves are shared within the box. If manufacturer's branch controller box contain valves that are common between multiple different fan coil units, and individual box must be provided per each fan coil.
4. If manufacturer's branch controller box requires a condensate drain, a secondary drain pan with condensate pump and overflow shut down switch shall be provided. The condensate switch shall be interlocked with all downstream fan coils to prohibit operation in cooling when an overflow condition has been sensed.
5. These selector boxes shall be factory assembled, wired, and piped.
6. These branch controllers must be run tested at the factory.
7. These selector boxes must be mounted indoors.
8. When simultaneously heating and cooling, the units in heating mode shall energize their sub-cooling electronic expansion valve.

B. Unit Cabinet:
1. These units shall have a galvanized steel plate casing.

2. The cabinet shall contain one sub-cooling heat exchanger per branch.
3. The unit shall have sound absorption thermal insulation material made of flame and heat resistant foamed polyethylene.

C. Refrigerant Valves:

1. The unit shall be furnished with 3 electronic expansion valves per branch to control the direction of refrigerant flow. The use of solenoid valves for changeover and pressure equalization shall not be acceptable due to reliability, noise, and delays due to pressure equalization. For boxes that use solenoid valves, the following criteria must be met:
   a. Spare boxes must be provided to the owner for each box supplied.
   b. Sound attenuating enclosures should be provided to meet the specified sound levels. 3rd party testing must be provided showing operating and change-over sound.
2. The refrigerant connections must be of the braze type.

D. Electrical:

1. The unit electric al power shall be 208/230 volts, 1 phase, 60 hertz.
2. The unit shall be capable of operation within the limits of 187 volts to 253 volts.
3. The minimum circuit amps (MCA) shall be 0.1 and the maximum over current protection amps (MOP) shall be 15.
4. The control voltage between the indoor and condensing unit shall be 16VDC non-shielded 2 conductor cable

2.8 DDC CONTROL SYSTEM

A. Auto-Changeover:

1. Auto-changeover shall be programmed to allow for the optimal room temperature to be maintained by automatically switching mode between Cool and Heat in accordance with the room temperature and setpoint**.**
2. The setpoint differential should adjustable between 0°F to 13°F. The (Thermal) Differential is the tolerance for the indoor unit's setpoint.
3. The operational mode shall change from cooling to heating when the room setpoint is exceeded by 1°F (adjustable).
4. The operational mode shall change from heating to cooling when the room temperature drops 1°F (adjustable) below setpoint.
5. A guard timer (adjustable 15-60 minutes) should be in place to prevent rapid changing, but is overridden if the room setpoint is changed.

B. Zone Controllers

1. The Remote controller shall feature a Backlit LCD Display with contrast adjustment and auto off after 30 seconds.
2. Multiple display modes must be available: Detailed, Standard, and Simple
3. Zone controllers must have the capability of individual function button lockout (On/Off, Mode, Fan Speed, Up/Down/Left/Right Arrows)
4. Controller Face Plate must be available as an option to hide unnecessary (locked out) buttons. Face plate and simplified display mode shall enable the user full control of the system with minimum amount of user input.
5. The following is available to display errors and to assist service personnel in troubleshooting:
   a. A blinking LED will signal system abnormality/error
   b. Error codes will be displayed in the event of system abnormality/error directly on zone controller
6. Service personnel shall be able to access the following from the room controller:
   a. Return Air Temperature
   b. Liquid Line Temperature
   c. Gas Line Temperature
   d. Discharge Air Temperature (depending on unit)
   E. Remote Controller Sensor

PART 3.EXECUTION

3.1 INSTALLATION

A. The VRV system shall be installed per Manufacturer's Installation Instructions.

3.2 START-UP

A. Start-up. Test, and adjust system in accordance with manufacturer's start-up instructions.

B. Check and calibrate controls.

3.3 SEQUENCE OF OPERATIONS

A. Variable Refrigerant Flow System: Variable refrigerant flow system shall consist of indoor fan coil units, heat / cool branch selector boxes and outdoor heat recovery units with a minimum of two compressors per module.

1. Occupied Mode

    a. Heat recovery unit shall run a startup of the unit using PI control to equalize the system pressure and reducing start load. Inverter ON to charge capacitor.
    b. Compressor shall start and ramp to maintain load based on PI control
    c. Multiple compressors shall start based on load and PI step control.
    d. Heat recovery units and compressors on multiple units will rotate starting to equalize run time.
    e. Unit shall be equipped with multiple outdoor fans that step modulate on PI control to maintain head pressure.
    f. Heat recovery unit shall use PI control to maintain heating availability during the cooling mode to allow for heat recovery operation.
    g. Heat recovery unit shall use two condenser coils per unit to allow for heat rejection between the indoor and outdoor units during heat recovery using PI control.
    h. Fan coils shall operate in heating or cooling mode to maintain space set point.

2. Defrost Mode when Occupied

    a. Heat recovery unit shall perform defrost during the heating operation without disruption of the heating cycle
    b. Indoor fans shall remain on and never shut off during defrost mode.
    c. Heating operation shall stay operational during oil recovery.
    d. Condenser coils shall defrost independently and the heating operation shall stay operational.
    e. Heat recovery unit shall have multiple outdoor fan motors PI step controlled to maintain head pressure during defrost

3. Oil Recovery Mode when Occupied

    a. If anytime during operation, the heat recovery unit reaches eight hours of operation in heating or cooling, the unit will perform an oil recovery cycle without disruption of heating cycle.
    b. Indoor fans shall remain on and never shut off during oil recovery.
    c. Heating operation shall stay operational during oil recovery.
    d. Oil recovery cycle shall last between three and five minutes.

4. Unocuppied Mode

   a. During the unoccupied cycle the heat recovery unit shall cycle to maintain setpoint in heating or cooling based on demand from onboard DDC controls as required by indoor fan coil setback temperatures.
   b. Heat recovery unit function shall be the same as occupied, defrost and oil recovery
   c. Pump down operation will be available to remove refrigerant from evaporator coils prior to shutdown.

5. Safety Devices:

   Heat recovery unit shall be equipped with the following safety devices.
   a. High pressure safety operation.
   b. Low pressure safety operation
   c. Discharge pipe protection control.
   d. Inverter protection control
   e. Standard compressor overload protection.

   f. Heat recovery unit shall be capable of back up operation in event of a compressor failure (multiple condenser application with multiple compressors

END OF SECTION 238129

SECTION 27 41 16 – AUDIO VIDEO SYSTEMS AND EQUIPMENT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. These specifications and the associated AV-series drawings describe the requirements for the sound and audio-video (AV) system (hereafter referred to as the “Technical System”).

B. These specifications and the associated AV_ series drawings describe the audio-video (AV) systems (hereafter referred to as the “Technical System”) requirements to be furnished and installed as a portion of the project scope of work.

C. System is intended for the following spaces:
1. Public Media Center (103)

D. Work includes all such work indicated in all of the Contract Documents, including, but not limited to: Instructions to Bidders; Proposal Form; General Conditions; Supplementary General Conditions; Architectural, Structural, Communications, Fire Alarm and Electronic Safety and Security Drawings and Specifications; and Addenda.

E. Work under this section of the specifications includes all labor, equipment, and installation as required to provide a complete technical system in compliance with the contract documents.

F. All mounting and suspension schemes indicated on the drawings are shown for concept only. Submit shop drawings of all details and weights for review by the project’s Architect, Structural Engineer, and Design Consultant.

G. The work in this section shall be coordinated with other work to determine installation scope for conduit, outlet boxes, junction boxes, pull boxes, terminal cabinets, 120-volt AC power circuits, and insulated ground cables required for the technical system.
1. Provide related low-voltage “on/off" AC power control system wiring, low-voltage "on/off" control switches, and certain AC power/ground requirements internal to the equipment racks as specifically noted herein and/or on the drawings.

1.03 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section, as do the following:
1. Division 27 Section “General Communications Requirements”.
2. Division 27 Section “Common Work Results for Communications”.

3. Division 27 “Audio Video Systems”.

B. All Category 5e/6 and fiber optic cabling and terminations shall adhere to the Division 27

1.04 EXAMINATION OF SITE

A. This project is a new facility.

B. Prior to submitting a bid personally examine the site of the proposed work and verify the conditions which involve this work.

C. By the act of submitting a bid, the contractor will be deemed to have made reasonable allowances for site examinations, site conditions, and included all costs in his proposal. Failure to verify these conditions will not be considered a basis for the granting of additional compensation.

1.05 MATERIAL AND WORKMANSHIP

A. All equipment shall be new and in proper operating condition. All workmanship shall be of the finest quality by experienced installation technicians.

B. Contact the Architect, in writing, regarding the selection of colors for all exposed equipment.

C. In addition to a complete set of the system project drawings and specifications, maintain at the job site a complete set of manufacturer's original operation, instruction, installation, and service manuals for each equipment item, for reference.

1.06 QUALITY ASSURANCE

A. Refer to Division 27 “Audio Video Systems” for quality assurance requirements with the following modifications:

B. Contractor General Qualifications:
1. At least five (5) years of verifiable direct experience with the devices, equipment and systems of the type and scope specified herein.
2. Prior successful experience of projects of similar size, scope and type as outlined in the Construction Documents.
3. Active membership in the National Systems Contractors Association (NSCA).
4. Active membership in InfoCommth Audiovisual and Integrated Experience Association (AVIXA).
5. Authorized dealer for major components of Technical System. Major components include: loudspeakers, video projectors, control systems, power amplifiers, and Digital Signal Processors.

1.07 Contractor Personnel Qualifications:

A. Minimum of one full-time staff member who has attended technical system engineering courses taught by Syn-Aud-Con in the past 10 years.

B. Minimum of one InfoComm AVIXA CTS-I (Certified Technology Specialist - Installation) systems technician.

C. Minimum of one full-time staff member who has a minimum of three (3) years direct experience with and is factory-certified on the most recent version of the selected Digital Signal Processor (DSP) software and technology. This individual shall be responsible for the implementation of the DSP system including software. This individual shall be the same throughout the execution of the work unless illness, loss of personnel, or other reasonable circumstances intervene.

D. Minimum of one full-time staff member who has a minimum of three (3) years direct experience with network based-AV transport and is factory-certified on the most recent version of the selected AV transport technology. The individual shall hold a current manufacturer's certification (i.e., Crestron DMC-E). This individual shall be responsible for the implementation and preliminary testing of the AV transport system. This individual shall be the same throughout the execution of the work unless illness, loss of personnel, or other reasonable circumstances intervene.

1.08 SUBMITTALS

A. Refer to requirements in Division 27 Section "General Communications Requirements".

B. Include the following items specifically as it relates to AV:

C. Submittal: AV System Product Data (Pre-Construction)
1. Equipment List
2. Manufacturers' Cut-sheets
3. Product Substitutions
4. Schedule

D. AV System Shop Drawings (Pre-Construction)
1. AV Pathways, Devices, and Cabling – Follow requirements of Division 27 Section "Common Work Results for Communications". Indicate locations of all devices and equipment.
2. Signal Flow Shop Drawings – Any generic diagrams found within the Construction Documents shall be drawn to specific requirements. Alterations from basis of design found within the Construction Documents shall be reflected and identified. Include wire numbering scheme.
3. AV Control System - AV control system panel/screen layouts suitable for the Owner's Representative to understand the operation and flow (submitted no less than five months prior to system first use).
4. DSP Signal Flow (2D) - DSP signal flow configuration (submitted no less than three months prior to system first use).
5. Equipment Rack Shop Drawings - Equipment rack front elevation for each rack showing equipment, panel layout, and electrical circuiting.
6. Panel, Patch Panel, and Plate Shop Drawings - All panel, patch panel, and plate layouts indicating locations of connectors, engraving, nomenclature, panel material, and finish. Include Structured Cabling Work required by the technical system.

7. Millwork Shop Drawings - Sound console and mobile cart millwork details, and related equipment and panel layout (submitted no less than three months prior to the installation of other millwork).
8. Video Wall Shop Drawings – Dimensioned elevations (front and side) for each video wall showing panel layout, ancillary equipment at wall location, low voltage/signal circuiting, and electrical circuiting.
9. Submittal: AV System Test Results (Prior to Substantial Completion)
    a. Preliminary Testing Documentation Package – Provide preliminary results of system testing as described in Part 3 of this section for review prior to final acceptance. Include final results with Closeout Documentation.

1.09 WARRANTY

A. Warrant all work executed under this contract, including all in-shop and onsite material, parts and labor, for a period of EIGHTEEN (18) months after the date of final acceptance.
    1. Existing or any other Owner-furnished equipment shall not be included in this warranty.
    2. For equipment that has an advertised manufacturer's warranty longer than 18 months, include end date of warranty period.
    3. The warranty services are limited to normal business hours, unless additional agreements are made between the Owner's Representative and the contractor.
    4. Warranty work relating to technically complex equipment and/or programming such as for codecs, digital signal processing, control systems, and video projectors shall be performed by a factory authorized technician.

PART 2 - PRODUCTS

2.01 GENERAL

A. Unless otherwise designated, provide all of one type of equipment from one manufacturer; for example, microphones of one type by one manufacturer, data switches of one type by one manufacturer, cabling of one type by one manufacturer, or loudspeakers of one type by one manufacturer.

B. Equipment and wiring shown on the drawings represents the basis of design. Ensure similar or better performance is achieved by the use of equipment other than that shown.

C. All major components of technical system equipment shall be provided and installed by a qualified contractor as outlined in Part 1 of this section.

D. All equipment shall be new and of professional quality.

E. Some items listed in these specifications are custom-made products. Ensure when pricing and ordering equipment that the exact part number called out is used. If there is a discrepancy, contact the Design Consultant for clarification.

F. Each software programmable device furnished (i.e. Digital Signal Processor, control system, etc.) shall include most recent software and appropriate computer interface (wired cable or wireless). Cable, software, source (uncompiled) code and all related aspects of all software-controlled equipment shall become the property of the Owner and will be furnished as a portion of the Operation & Maintenance (O&M) Data manuals (see Operation & Maintenance Manuals)

G. The quantities of each item of portable or mobile equipment (and other portable or loose accessories), as well as those items associated with Alternates, are indicated in parenthesis. Such equipment is intended to be shared between rooms having technical systems, except where noted for use in one specific room.

2.02 WIRELESS SYSTEM INTERFACE

A. Wireless Control Pad, wireless control pad equipped with the necessary applications to allow for consistent operation from within the room or system, 10 hour battery life, approximately 10" x 8" x .5", with maximum storage available at time of purchase, and protective case and stylus (one required):
1. Apple new iPad Wi-Fi 128GB with included power supply and add-on protective case such as the Incase Book Jacket Select for Apple new iPad (Black) and add-on pen/stylus such as the Kensington Virtuoso Touch Stylus & Pen.
2. Register the iPad on an Owner's Representative-approved computer.
3. Load with all applications available to components within this system.
4. Furnish one Splashtop app when accessing a PC as a remote desktop.

2.03 ETHERNET SWITCHES & ACCESSORIES

A. Ethernet switches shall be as recommended by the manufacturer(s) of the connected technical system equipment. These devices shall also be coordinated with the Owner's Representative's IT department to maintain common products (where possible). Each shall be labeled as shownon the technical system drawings and as required to match the Owner's Representative's IT labeling standard.

B. Contractor shall be responsible for the selection of product(s) that are approved for use with all systems connected to the switch(es). Products listed in this portion of the specifications are representative at the time of design – furnish the most recent approved product.

C. Ethernet switches shall have IPv4 and IPv6 routing, multicast routing, advanced quality of service (QoS), and security features in hardware. Disabling of power saving and other blocking features shall be available for proper signal traffic.

D. Ethernet switches shall be provided with all licensing requirements, product activation requirements, etc. for proper operation.

E. Ethernet switches shall be configured for proper operation of the system. Configuration shall comply with Owner's network standards.

F. Ethernet Switch – (##)(M)(P)(G)(R)(-L3)(-AVB): Ethernet switch with SFP uplink capabilities and the following characteristics required as shown on the signal flows.
   1. Key to product identification: Example(**)(M)(P)(G)(R)(-L)(-AVB):
      a. a. ** = minimum quantity of ports
      b. (M) =managed (no symbol = unmanaged)
      c. (P) = PoE (P+ = PoE+) (no symbol = non-PoE)
      d. (*G) = 1 GB/s or 10 GB/s-capable ports as shown (no symbol = minimum 100 MB/s-capable ports)
      e. (R) = rack mount (no symbol = optional if not included)
      f. (-L) = minimum layer requirements (layer 2 or layer 3 enterprise level feature set)
      g. (-AVB) = AVB certified (no symbol = AVB capability not required)
   2. Layer 2:
      a. Cisco 2960X LAN Base Series; or
      b. Extreme Networks Summit Series; or
      c. HP 2530 Series; or
      d. Verified equal.
   3. Layer 3:
      a. Cisco 2960XR Series; or
      b. Extreme Networks Summit Series; or
      c. HP 5120 Series; or
      d. Verified equal
   4. Layer 3, AVB:
      a. Cisco 3650 or 3850 series; or
      b. Extreme Networks Summit X430 or X440 Series (AVB requires AVB feature pack); or
      c. Verified equal.

G. Ethernet Switch – 5PG: Ethernet switch, five port, no uplink, unmanaged, full PoE on all ports:
   1. Crestron CEN-SW-POE-5.

H. PoE Injector, 1 port Power over Ethernet injector:
   1. Crestron PWE-4803RU; or
   2. D-Link DWL-P200; or
   3. SonicWALL PoE Injector; or
   4. Approved equal.

2.04 DATA PATCH PANELS & ACCESSORIES

A. Data Patch Panels are acceptable for use in Ethernet, audio network, AVLAN, and digital multimedia network applications as required to provide a complete technical system.

B. All Category and Fiber Optic cabling (of the acceptable applications listed above) entering a technical system rack shall be terminated to a Data Patch Panel. Rack inter- and intra-connect cabling utilizing factory-terminated cable assemblies are not required to pass thru a Data Patch Panel unless shown otherwise.

C. Data Patch Panels shall be labeled per specification part 3 of this section.

D. Category Cabling Patch Panels –

1. Refer to Division 27 Section "Telecommunications Requirements for Audio Video Systems" for product information and additional installation requirements.

E. Fiber Optic Patch Panels & Enclosures –
1. Refer to Division 27 Section "Telecommunications Requirements for Audio Video Systems" for product information and additional installation requirements.

F. Cable Management – 19" wide horizontal patch cable management system, 1 rack unit, with pass-through opening to allow patch cables access to rear of rack (one required per 24 port patch panel / switch):
1. Chatsworth Velocity 13930-701
2. Cooper B-Line RCM+ SB87019S1
3. Panduit NetManager NMF1
4. Or approved equal

2.05 A/V CONTROL SYSTEM – GENERAL PROGRAMMING REQUIREMENTS

A. Touch screen control interfaces shall follow the guidelines outlined in the "Dashboard for Controls" documents created on behalf of AVIXA International. Reference the Design Guide, Design Reference, and Integrators Guide for this project. Documents are available for download on the AVIXA web site.

B. Contractor shall be responsible for complete configuration of the control system features including touch screen layouts, colors, appearance, operation, and coordination with systems external to the Technical System.

C. Participate in planning meeting(s) (web/phone) with Design Consultant and Owner's Representative to review programming concepts and requirements before commencement of work.

D. Panel layout and navigational flow concepts shall be developed during planning meeting(s) with Design Consultant and Owner's Representative.

E. Refer to submittal requirements for additional information.

F. This specification describes the initial touch screen programming concepts and requirements. Account for four (4) distinct changes for revisions requested by the Owner's Representative after the system is substantially complete.

G. Touch screen and keypad overall user interfaces shall comply with the following minimum requirements:
1. A common theme shall be employed and used with consistency throughout the layouts. Theme shall be discussed with the Owner's Representative. The Owner's standard theme template shall be used if available.
2. Where Owner logos or colors are used, Owner branding guidelines shall be followed. Trademarks shall be used appropriately. Official graphical representations (logos, word marks, logotypes, etc.) may not be altered. Owner colors shall utilize official and exact color (Pantone, CMYK, RGB, hex, etc.) as provided by the Owner, visual matching is not allowed. Content shall be obtained from an official and authorized source, e.g., the use of content from Google images is not appropriate. Owner branding is encouraged where

appropriate; however, proper use and compliance remains the responsibility of the Contractor.

3. The use of a password hierarchy shall be employed as directed by the Owner's Representative as they deem appropriate.
4. Power ON/OFF sequence shall control all applicable devices. Sequence time shall be the required time for all controlled devices to cycle. Projector lamp warm-up and cool-down period shall be taken into account. Shutdown shall utilize two-step verification.
5. Animated activity indicators (spinning ring, progress bar, etc.) shall be utilized to provide visual feedback while the system is processing tasks in the background. This will prohibit multiple button presses by the user and show feedback that the control system is processing the request. Relevant text shall be utilized where appropriate, e.g., "Please wait while the system shuts down."
6. Source selection shall be available for all devices. Sources shall be laid out and grouped in a logical manner. A 'blank source' or 'image blanking' feature shall be utilized to result in no image being displayed.
7. Button presses shall show instant visual feedback that they have been engaged and shall accurately reflect the response received from the device being controlled.
8. Current system status shall be visible at all times and be consistent across all adjoined screens. Buttons shall show current status (engaged or disengaged) via color, illumination, outline, greyscale, etc. as relevant. Sliders and level indicators shall show current and true system status (i.e. show true level based on system feedback, not status based on last touch screen input) via color, knob location, percentage, etc. as relevant.
9. Volume control of wired microphones, wireless microphones, and/or AV system program volume levels shall be discrete and shall be properly interfaced with the DSP (where applicable). The use of a master volume control is prohibited.
10. Audio Conferencing mode shall emulate a traditional audio conferencing unit, allowing for all typical operational controls including automated dialing, privacy microphone mute, level adjustments, control of individual microphones, storage of frequently called sites, manual dialing, answering, etc.
11. Where applicable, show the current operation mode. For example, in the case where two rooms combine/separate, the word "Combined" or "Separated" shall be displayed on each applicable screen.
12. Control of other building systems shall be coordinated with appropriate parties. Lighting and shading systems shall be controlled via preset recall. Refer to the TA series drawings showing required interfaces.

2.06 CABLE - BULK

A. The products in this section have been approved for use in the project as necessary to facilitate a complete and working system. Inclusion in this section does not indicate a requirement for use.

B. Product must be procured from the original cable manufacturer.

C. AWG wire sizes indicated herein or on the drawings are the minimum size conductors required. Larger size conductors (i.e., smaller AWG number) are permitted assuming no impact on the project will occur (such as the resulting need for larger or additional conduit, cable trays, chases, etc.) to accommodate such cable.

D. Where cable is run exposed (such as in ceiling plenums, cable trays, chases, or below accessible floors):

1. Verify which locations do and do not require plenum-rated cable.
2. Furnish the appropriate cable type.
3. Obtain written authorization from the Architect (or the Architect's designated Engineer) in this regard.

E. Category cabling:
1. Refer to Division 27 Section "Telecommunications Requirements for Audio Video Systems" for product information and additional installation requirements.

F. Fiber Optic cabling:
1. Refer to Division 27 Section "Telecommunications Requirements for Audio Video Systems" for product information and additional installation requirements.

G. Twisted Pair – Shielded: Twisted pair, shielded 22 AWG cable; interior rated 2 conductor cable with drain wire suitable for microphone, line, or production intercom level circuits:
1. Communications plenum rated cable (CMP) is suitable for use in all environments including environmental air plenums as defined per NEC Article 800.
   a. The use of performance equivalent substituted cables of lesser type is permitted at the Contractor's discretion where allowable by NEC Article 800, local codes, and the connected equipment manufacturer's listed requirements.
   b. Performance equivalence to the below specified products shall be determined by the cable manufacturer's listed product equivalents provided in tables and cut-sheets.
2. Tinned copper cables are required in locations subject to corrosion, such as natatoriums.
3. 22 AWG/CMP: 22 AWG Communications Plenum rated bare copper conductor cable:
   a. Belden 9451P or 6500FC; or
   b. Clark Wire SPA22GSP; or
   c. Gepco IP222AL or 61801HS; or
   d. West Penn 25291B.
4. 22 AWG/CMR: 22 AWG Communications Riser rated bare copper conductor cable:
   a. Belden 8451 or 9451 or 5500FE; or
   b. Clark Wire SPA22GS; or
   c. Gepco IR222AL or 61801 or 61801EZ; or
   d. West Penn 291 or 452.
   e.
5. 22 AWG/CMP/MC: 22 AWG Communications Plenum rated bare copper multi-conductor cable, individually shielded pairs, color coded (not for interconnection within equipment racks):
   a. 12 pair:
      1) Clark Wire 22EPS12P; or
      2) Gepco 6612HS
   b. 8 pair:
      1) Clark Wire 22EPS8P; or
      2) Gepco 6608HS
   c. 6 pair:
      1) Belden 6545PA; or
      2) Clark Wire 22EPS6P; or
      3) Gepco 6606HS.
   d. 4 pair:
      1) Clark Wire 22EPS4P; or
      2) Gepco 6604HS.

e. 3 pair:
1) Belden 6542PA.
f. 2 pair:
1) Belden 6541PA or 9451DP.

6. 22 AWG/CMR/MC: 22 AWG Communications Riser rated bare copper multi-conductor cable, individually shielded pairs, color coded (not for interconnection within equipment racks):
a. 24 pair:
1) Belden 1821R; or
2) Clark Wire 724; or
3) West Penn WP45424.
b. 16 pair:
1) Belden 1819R; or
2) Clark Wire 716; or
3) Gepco GA61816GFC; or
4) West Penn WP45416.
c. 12 pair:
1) Belden 1818R or 9768, or
2) Clark Wire 712; or
3) Gepco GA61812GFC; or
4) West Penn D434 or WP45412.
d. 8 pair:
1) Belden 1817R; or
2) Clark Wire 708; or
3) Gepco GA61808GFC; or
4) West Penn WP4548.
e. 6 pair:
1) Belden 1816R or 8778; or
2) Clark Wire 706; or
3) Gepco GA61804GFC; or
4) West Penn D432 or WP4546.
f. 4 pair:
1) Belden 1815R; or
2) Clark Wire 704; or
3) Gepco GA61804GFC.
g. 3 pair:
1) Belden 8777; or
2) West Penn D431.
h. 2 pair:
1) Belden 9451D; or
2) Clark Wire RS22G2; or
3) Gepco D61801EZGF; or
4) West Penn 77510.

H. Twisted Pair – Unshielded: Twisted pair, 2-conductor interior installation loudspeaker cable:
1. Class 3 remote-control, signaling, and power-limited plenum rated cable (CL3P) is suitable for use in all environments including environmental air plenums as defined per NEC Article 725.
a. The use of performance equivalent substituted cables of lesser type is permitted at the Contractor's discretion where allowable by NEC Article 725, local codes, and the connected equipment manufacturer's listed requirements.

b. Performance equivalence to the below specified products shall be determined by the cable manufacturer's listed product equivalents provided in tables and cut-sheets.
c. Wire gauge shall not be reduced to gain a higher cable rating.

2. Tinned copper cables are required in locations subject to corrosion, such as natatoriums.
3. ** AWG/CL3P: As listed AWG Class 3 Plenum rated bare copper conductor cable:
   a. Belden 1862A or 6200UE (16 AWG), 6300UE (18 AWG); or
   b. Gepco IP122BA19 (12 AWG), IP142BA19 (14 AWG), IP162BA19 (16 AWG), IP182BA7 (18 AWG); or
   c. West Penn 25210 (10 AWG), 25227B (12 AWG), 25226B (14 AWG), 25225B (16 AWG), 25224B (18 AWG).
4. ** AWG/CL2P: As listed AWG Class 2 Plenum rated bare copper conductor cable:
   a. Belden 6T00UP (10 AWG), 1860A or 6000UE (12 AWG), 1861A or 6100UE (14 AWG), 1863A (18 AWG); or
   b. Clark Wire CW1202P (12 AWG), CW1402P (14 AWG), CW1602P (16 AWG), CW1802P (18 AWG).
5. ** AWG/CL3R: As listed AWG Class 3 Riser rated bare copper conductor cable:
   a. Belden 5000UE (12 AWG), 5100UE (14 AWG), 5200UE (16 AWG), 5300UE (18 AWG); or
   b. Clark Wire CW1202HS (12 AWG), CW1402HS (14 AWG); or
   c. Gepco IR122BA19 (12 AWG), IR142BA19 (14 AWG), IR162BA19 (16 AWG), IR182BA7 (18 AWG); or
   d. West Penn 227 (12 AWG), 226 (14 AWG), 225 (16 AWG), 224 (18 AWG).
6. ** AWG/CL2R: As listed AWG Class 2 Riser rated bare copper conductor cable:
   a. Clark Wire CW1202 (12 AWG), CW1402 (14 AWG), CW1602 (16 AWG), CW1802 (18 AWG).
7. ** AWG/CL3: As listed AWG Class 3 rated bare copper conductor cable:
   a. Belden 1313A (10 AWG), 1311A (12 AWG), 1309A (14 AWG), 1307A (16 AWG); or
   b. Gepco 122HBW (12 AWG), 142HBW (14 AWG).
8. ** AWG/CL2: As listed AWG Class 2 rated bare copper conductor cable:
   a. Belden 5T00UP (10 AWG); or
   b. West Penn HA210 (10 AWG).

I. Twisted Pair – Unshielded – EXT: Twisted pair, unshielded exterior use cable; 2-conductor loudspeaker, sunlight resistant, direct burial:
1. Exterior cable shall be listed as suitable for use in Class 3 General Purpose indoor environments as defined per NEC Article 725.
2. ** AWG/EXT: As listed AWG indoor/outdoor rated bare copper conductor cable:
   a. Belden 8808WB (8 AWG), 1313A (10 AWG), 1311A (12 AWG), 1309A (14 AWG), 1307A (16 AWG); or
3. Clark Wire CW1002DB (10 AWG), CW1202DB (12 AWG), CW1402DB (14 AWG), CW1602DB (16 AWG); or
   a. Gepco SSU102P (10 AWG), SSUB122 (12 AWG), SSUB142 (14 AWG), SSUB162 (16 AWG); or
   b. West Penn C208 (8 AWG), C210 (10 AWG), AQ227 (12 AWG), AQ226 (14 AWG), AQ225 (16 AWG).

J. Single conductor – Unshielded: Single conductor, unshielded cable:
1. LS Cable, loudspeaker cable for use when conduit size is limited:

a. THHN or THWN single conductor stranded copper. Utilize the maximum available color range.

K. RG-59: Single 75-ohm coax, RG-59/U precision video cable:
1. RG-59/NP: Non-plenum cable installed in conduit, equipment racks, or other non-plenum spaces:
a. Belden 1505A; or
b. Clark Wire CD7559; or
c. Gepco VPM2000; or
d. West Penn 819.
2. RG-59/P: Plenum rated cable:
a. Belden 1506A; or
b. Clark Wire CD7559P; or
c. Gepco VPM2000TS; or
d. West Penn 25819.
3. RG-59/Flex: Non-plenum flexible cable, for use with portable cables, exposed, or other locations where cable movement can or does occur:
a. Belden 1505F; or
b. Clark Wire CD7559F; or
c. Gepco VHD2000M.

L. RG-6: Single 75-ohm coax, RG-6/U precision video cable:
1. RG-6/NP: Non-plenum cable installed in conduit, equipment racks, or other non-plenum spaces:
a. Belden 1694A or Gepco VSD2001; or
b. Belden 1694wb (outdoor water block); or
c. Clark Wire CD7506; or
d. Clark Wire CD7506DB (direct burial, water block); or
e. West Penn 6350.
2. RG-6/P: Plenum rated cable:
a. Belden 1695A; or
b. Clark Wire CD7506P; or
c. Gepco VSD2001TS; or
d. West Penn 256350.

M. RG-11: Single 75-ohm coax, RG-11/U precision video cable:
1. RG-11/NP: Non-plenum cable installed in conduit, equipment racks, or other non-plenum spaces:
a. Belden 7731A; or
b. Clark Wire CD7511; or
c. Gepco VHD1100; or
d. West Penn 1135.
2. RG-11/P: Plenum rated cable:
a. Belden 7732A; or
b. Clark Wire CD7511P; or
c. Gepco VHD1100TK.

N. Television Distribution, coax:
1. RG-59/TV-NP: Single 75-ohm coax, RG-59/U Television equipment room cable; Non-plenum cable installed in conduit, equipment racks, or other non-plenum spaces:
a. Belden 1505A; or

b. Clark Wire CD7559; or
c. Gepco VPM2000; or
d. West Penn 819.

2. RG-59/TV-P: Single 75-ohm coax, RG-59/U Television equipment room cable; Plenum rated:
   a. Belden 1506A; or
   b. Clark Wire CD7559P; or
   c. Gepco VPM2000TS; or
   d. West Penn 25819.
3. RG-6/TV-NP: Single 75-ohm coax, RG-6/U Television drop cable; Non-plenum cable installed in conduit, equipment racks, or other non-plenum spaces:
   a. Belden 7915A; or
   b. Belden 5399B5; or
   c. Clark Wire CV7506-CA; or
   d. West Penn 841.
4. RG-6/TV-P: Single 75-ohm coax, RG-6/U Television drop cable; Plenum rated:
   a. Belden 6339Q8 (quad shield); or
   b. Carol C3525 (quad shield); or
   c. Clark Wire CV7506P-CA (dual shield); or
   d. West Penn 25841 (dual shield); or
   e. Carol C3525 (dual shield).
5. RG-6/TV-DB: Single 75-ohm coax, RG-6/U Television drop cable; Suitable for direct burial:
   a. Belden 1190A; or
   b. West Penn 6310.
6. RG-11/TV-NP: Single 75-ohm coax, RG-11/U Television distribution cable; Non-plenum cable installed in conduit, equipment racks, or other non-plenum spaces:
   a. Belden 1523A; or
   b. Carol 495027; or
   c. Clark Wire CV7511-CA; or
   d. West Penn 821.
7. RG-11/TV-P: Single 75-ohm coax, RG-11/U Television distribution cable; Plenum rated:
   a. Belden 1153A; or
   b. Carol 395029; or
   c. Clark Wire CV7511P-CA; or
   d. West Penn 25821.
8. RG-11/TV-DB: Single 75-ohm coax, RG-11/U Television distribution cable; Suitable for direct burial:
   a. Belden 1525A; or
   b. Clark Wire CV7511DB-CA; or
   c. West Penn 1110.

O. RG-58: Single 50-ohm coax, RG-58/U radio frequency cable:
   1. RG-58/NP: Non-plenum cable installed in conduit, equipment racks, or other non-plenum spaces:
      a. Belden 7806R; or
      b. Clark Wire CV5058; or
      c. West Penn 812.
   2. RG-58/P: Plenum rated cable:
      a. Belden 82240 or 88240; or

b. Clark Wire CV5058P; or
c. West Penn 25812.

P. RG-8: Single 50-ohm coax, RG-8X and RG-8/U radio frequency cable:
1. RG-8X/NP: Non-plenum cable installed in conduit, equipment racks, or other non-plenum spaces:
a. Belden 7808R or 9258; or
b. Clark Wire CV5008X; or
c. Gepco V5020; or
d. West Penn 807.
2. RG-8X/P: Plenum rated cable:
a. West Penn 25810.
3. RG-8/U/NP: Non-plenum cable installed in conduit, equipment racks, or other non-plenum spaces:
a. Belden 9913; or
b. Clark Wire RF50LL; or
c. West Penn 810.
4. RG-8/U/P: Plenum rated cable:
a. Belden 89913; or
b. Clark Wire RF50LLP; or
c. West Penn 25812.

Q. RG-213: Single 50-ohm coax, RG-213/U radio frequency cable:
1. RG-213/NP: Non-plenum cable installed in conduit, equipment racks, or other non-plenum spaces:
a. Belden 8267; or
b. Clark Wire CV50213.

R. Control cable, power and control in one jacket, one unshielded 18 WG pair, one shielded 22 AWG pair:
1. Control cable - NP, not plenum rated:
a. Belden 1502R or Gepco 18/22AXL; or
b. Clark Wire ULK2218; or
c. Crestron CRESNET-NP; or
d. West Penn 77350.
2. Control cable - P, plenum rated:
a. Belden 1502P or Gepco 18/22AXLP; or
b. Clark Wire ULK2218P; or
c. Crestron CRESNET-P; or
d. West Penn D25350.

S. RS-232: Low capacitance computer cable for EIA RS-232/422, 24 AWG, 4-conductor, shielded, minimum conductor-to-conductor capacitance: 22pF/ft, PVC jacket:
1. RS-232/NP: Non-plenum cable installed in conduit, equipment racks, or other non-plenum spaces:
a. Belden 8102; or
b. Clark Wire SMP2404.
2. RS-232/P: Plenum rated cable:
a. Belden 88102; or
b. Clark Wire SMP2404P.

2.07 CABLES – FACTORY TERMINATED – INSTALLED

A. The products in this section have been approved for use in the project as necessary to facilitate a complete and working system. Inclusion in this subsection does not indicate a requirement for use.

B. Factory terminated cable assemblies specified in this subsection are only permitted for use within racks or between devices external to racks. Permitted for rack inter-connect when racks are in close proximity (same room) and may pass thru conduit if necessary in this situation. Not permitted for use in conduit unless specifically noted as such.

C. Factory terminated cable assemblies shall be the minimum length needed to accomplish the connection. Portable cable assemblies are specified in Division 27 Section "Audio Video Systems Equipment" and are required to be furnished in addition to those required for system installation.

D. All cable assemblies must be factory tested and certified.

E. Category cabling:
1. Refer to Division 27 Section "Telecommunications Requirements for Audio Video Systems" for product information and additional installation requirements.

F. Fiber Optic cabling:
1. Refer to Division 27 Section "Telecommunications Requirements for Audio Video Systems" for product information and additional installation requirements.

G. DisplayPort, version 1.1a or higher, Acceptable lengths: 1'-25':
1. Clark Wire DP Series (3', 6', 10', 15'); or
2. Comprehensive DisplayPort Standard Series (3', 6', 10', 15', 25'); or
3. Extron DisplayPort M-M Series (3', 6', 12', 25'); or
4. Approved Equal.

H. DVI, Dual Link DVI-D cable, Acceptable lengths: 1'-16':
1. Clark Wire DVID Series (3', 6', 10', 16'); or
2. Comprehensive Pro AV/IT Series (3', 6', 10', 15'); or
3. Extron DVID DL Pro Series (3', 6', 12'); or
4. West Penn CN-E08 Series (6', 10', 15'); or
5. Approved Equal.

I. DVI-Flex, Flexible Single Link DVI-D cable, Acceptable lengths: 1'-16':
1. Comprehensive MicroFlex Low Profile Series (1.5', 3', 6', 10', 15'); or
2. Extron DVID SL Ultra Series (1.5', 3', 6', 9', 12'); or
3. Approved Equal.

J. HDMI Locking Cable, version 1.4 or higher compliant, locking connectors, male HDMI to male HDMI, Acceptable lengths: 1'-25':
1. Belden HD-800 Series (2', 4', 8', 25'); or
2. Clark Wire HDMI-L Series (3', 6', 10', 16'); or
3. Perfect Path 700 Series (2', 4', 8', 16', 25'); or
4. Approved Equal.

K. HDMI Fiber Optic Cable, version 1.4 or higher compliant, male HDMI to male HDMI, Acceptable lengths: 25’-328’:
1. Celerity DFO Series (35’, 40’, 50’, 60’, 80’, 100’, 160’, 200’, 300’); or
2. Liberty DL-HDM-M-***M Series (8m, 10m, 15m, 23m, 30m, 50m, 60m, 100m); or
3. Cables To Go RapidRun Optical Series (25’, 35’, 50’, 65’, 80’, 100’, 125’, 150’, 175’, 200’); or
4. Approved Equal.

L. USB, Type B male (device = square) to Type A male (computer = flat) or Type A male to Type A male USB 2.0 compliant, Acceptable lengths: 1’-25’:
1. Comprehensive; or
2. Extron; or
3. Approved Equal.

M. Video Cable BNC, RG-59 BNC to BNC, 75 ohm, Acceptable lengths: 1’-25’:
1. Canare VAC Series (3’, 5’, 25’); or
2. Comprehensive Pro AV/IT Series (3’, 6’, 10’, 25’); or
3. Hosa BNC-59-1 Series (3’, 5’, 25’); or
4. Whirlwind VID BNC3 Series (5’, 25’); or
5. Approved Equal.

2.08 2.8 CONNECTORS

A. The products in this section have been approved for use in the project as necessary to facilitate a complete and working system. Inclusion in this section does not indicate a requirement for use.

B. All XLR receptacles located outdoors, in boxes that are located outdoors, in natatoriums, or in areas where moisture or other corrosive materials are present shall have gold plated contact pins.

C. XLR Cable Connector, cable mounted connector for line-level, microphone level, and intercom circuits:
1. Amphenol AC series; or
2. Neutrik X-series; or
3. Switchcraft E Series Q-G.

D. XLR Panel Connector, panel mounted audio connector for line-level, microphone level, and intercom circuits, color shall match plate color where possible:
1. Amphenol AC “DZ” series; or
2. Neutrik D-Series; or
3. Switchcraft standard AAA Series Q-G with metal handle.

E. XLR Combo Connector, female XLR and 1/4" TRS receptacle in one chassis-mount connector:
1. Neutrik NCJ6FI-S.

F. 1/4" TRS Cable Connector, three-conductor (Tip Ring Sleeve) connector with a metal barrel and solder lugs:
1. Amphenol TS3PN; or
2. Canare F-16; or
3. Neutrik NP3C; or

4. Switchcraft 267.

G. 1/4" TS Cable Connector, two-conductor (Tip Sleeve) connector with a metal barrel and solder lugs:
1. Amphenol TM2PN; or
2. Canare F-15 plug; or
3. Neutrik NP2C plugs; or
4. Switchcraft 250.

H. 1/4" TRS Panel Connector, three-conductor (Tip Ring Sleeve) connector with the sleeve contact isolated from the panel or plate to which it is mounted:
1. Neutrik NJ3FP6C; or
2. Switchcraft E112BL.

I. 1/8" TRS Cable Connector, 1/8" (3.5mm) three-conductor mini-plugs which have a metal barrel and solder lugs:
1. Amphenol KS3P; or
2. Canare F-12; or
3. Neutrik NTP3RC; or
4. Switchcraft 35HDNN plug.

J. Locking LS Cable Connector, twist-lock cable mount male loudspeaker connector, minimum 2-twoconductors. Coordinate connector with associated intended panel mount connector, including those on loudspeakers:
1. Amphenol SP-2-FN (two conductor); or
2. Neutrik speakON NL2FC (two conductor); or
3. Amphenol SP-4-FN (four conductor); or
4. Neutrik speakON NL4FC (four conductor); or
5. Neutrik speakON NL8FC (eight conductor).

K. Locking LS Panel Receptacle, twist-lock chassis mount female loudspeaker connector, minimum two conductors. Coordinate receptacle with associated intended cable connector:
1. Amphenol SP-2-MD (two conductor); or
2. Neutrik speakON NL2MP (two conductor); or
3. Amphenol SP-4-MD (four conductor); or
4. Neutrik speakON NL4MP. Male connector (four conductor); or
5. Neutrik speakON NL8MPR-BAG (eight conductor)

L. RJ45 Panel (Faceplate) Connector-6, data connector rated for shielded Category 6 cable:
1. Neutrik etherCON NE8FDY-C6* with SCDX cover *Division 27 "Telecommunications Requirements for Audio Video Systems" Contractor shall terminate cable onto etherCON connector installed in custom faceplate.

M. BNC Cable Connector, 75-ohm BNC, compression fitting for coaxial cable furnished:
1. Liberty CM-RG-BNC series; or
2. West Penn CN-CS-BNC and CN-FS-BNC series.

N. BNC Panel Connector, 75-ohm BNC, pass-through, D-style mounting:
1. Neutrik NBB75DFI; or
2. Approved Equal.

O. Terminator, RF or SDI terminator plug:
1. Extron T-BNC series; or
2. Pomonoa 3840 series; or
3. Trompeter TNA series.

P. Captive Screw Terminal Block, modular terminal blocks for mounting on DIN rails:
1. Entrelec Screw Clamp series; or
2. Approved Equal.

2.09 EQUIPMENT RACKS

A. Furnish complete equipment racks including all top, bottom, and sides as necessary.

B. Furnish all necessary accessories including ganging hardware, blank plates (to fill all unoccupied space), vent panels (as applicable), shelves, security covers, mounting screws, trim kits, lacing bars, cable management, leveling feet, casters, etc. to provide a complete solution which omplies with “best practice” guidelines.
1. Full-solution accessories are not detailed in this specification. They shall be provided as needed and shall be approved by the manufacturer for use with the intended rack series (i.e. Middle Atlantic casters must be used with a Middle Atlantic rack).

C. Furnish all required components for a complete thermal management solution within each location to ensure enclosure interior temperature does not exceed manufacturer’s recommended operating temperatures.
1. Rack fans shall be quiet, such as the Middle Atlantic QFAN.
2. Thermostatic fan control shall be utilized where available.

D. Furnish all required components for a complete rack ground isolation solution.
1. Racks shall be isolated from the floor by the use of isolated leveling feet (such as Middle Atlantic LF-ISO) or an isolation pad/system (such as Middle Atlantic ISO-1).

E. Equipment racks and all associated blank panels located in equipment rooms shall be factory finished semi-gloss black. Equipment racks and associated blank panels located in control booths or other visible locations shall be factory-finished color as selected by the Architect.

F. Furnish locking storage drawers, hinged security covers, and racks with locking doors all keyed alike. Furnish four keys total.

G. Equipment rack specification indicates the system basis of design. Verify equipment layout, rack size, and number of equipment racks required for equipment furnished. “**” in part number denotes rack height.

H. Floor Rack:
1. Open Sides, open-rack style with open sides, rear locking door, minimum 44RU height, minimum 27” depth. Furnish one side panel at each end of each row of equipment racks:
a. Lowell LGR-4427; or
b. Middle Atlantic Products BGR-4527; or
c. Middle Atlantic Products WRK-44-27; or
d. Chief NG1F4428.

2. Open Sides – XD, open-rack style with open sides, rear locking door, minimum 44RU height, minimum 32" extra deep. Furnish one side panel at each end of each row of equipment racks:
   a. Lowell LGR-4432; or
   b. Middle Atlantic Products BGR-4532; or
   c. Middle Atlantic Products WRK-44-32; or
   d. Chief NG1F4433.
3. SA, stand alone floor rack, rear locking door, minimum 44RU height, minimum 27" depth:
   a. Lowell LER-4427; or
   b. Middle Atlantic Products BGR-45SA-27; or
   c. Middle Atlantic Products WRK-44SA-27; or
   d. Chief NE1F4428.
4. SA – XD, stand alone floor rack, rear locking door, minimum 44RU height, minimum 32" extra deep:
   a. Lowell LER-4432; or
   b. Middle Atlantic Products BGR-45SA-32; or

I. Wall Rack:
1. Sectional - XS, wall-mount rack with separate back plane and rack sections, height as required , extra shallow minimum 17" depth:
   a. Lowell LWR-**19 series; or
   b. Middle Atlantic Products DWR-**-17 series; or
   c. Chief SWR-**-17 series.
2. Sectional – S, wall-mount rack with separate back plane and rack sections, height as required, shallow minimum 22" depth:
   a. Atlas Sound WMA**-23 series; or
   b. Lowell LWR-**23 series; or
   c. Middle Atlantic Products DWR-**-22 series.
3. Sectional, wall-mount rack with separate back plane and rack sections, height as required, minimum 26" depth:
   a. Lowell LWR-**28 series; or
   b. Middle Atlantic Products DWR-**-26 series.
4. Sectional – XD, wall-mount rack with separate back plane and rack sections, height as required , minimum 32" extra deep:
   a. Lowell LWR-**32 series; or
   b. Middle Atlantic Products DWR-**-32 series.
5. Floor Base, pivoting wall mounted rack with captive base, rack section hinges out for access to rear of equipment, height as required , minimum 27" depth:
   a. Lowell LWBR-**28 series; or
   b. Middle Atlantic Products SR-xx-28 series.
6. Floor Base – XD, pivoting wall mounted rack with captive base, rack section hinges out for access to rear of equipment, height as required , minimum 32" depth:
   a. Lowell LWBR-**32 series; or
   b. Middle Atlantic Products SR-**-32 series.

J. Rotating Rack:
1. Millwork, single millwork rack with slide-out internal mechanism that extends beyond the front of the rack and then can rotate up to 90 degrees in either direction for installation/servicing, height as shown on drawings , minimum 19" depth. Cable management loom techniques required:

a. Lowell LPTR4-**19 series; or
b. Middle Atlantic Products SRSR-4-** series; or
c. Chief ROTR-xx or series.

2. Millwork – XD, single millwork rack with slide-out internal mechanism that extends beyond the front of the rack and then can rotate up to 90 degrees in either direction for installation/servicing, height as shown on drawings , minimum 23” depth. Cable management loom techniques required:
   a. Lowell LPTR4-**23 series; or
   b. Middle Atlantic Products SRSR-X-** series; or
   c. Chief ROTR-XL-xx or ROTR-HD-** series.
3. SA, stand-alone rack with integrated rack sides and back, and with slide-out internal mechanism that extends beyond the front of the rack and can then rotate up to 90 degrees in either direction for installation/servicing, height as shown on drawings , minimum depth 32”. Use good cable management techniques to control the many conductors attached to the equipment:
   a. Lowell LHR-**32 series; or
   b. Middle Atlantic Products WR-**-32 series

2.010 EQUIPMENT RACK ACCESSORIES

A. The following equipment rack accessories shall be provided as indicated on the rack elevations or within this section.

B. Equipment rack accessories located in equipment rooms shall be factory finished semi-gloss black. Equipment rack accessories located in control booths or other visible locations shall be factory-finished color as selected by the Architect.

C. Logo rack panel, single vertical rack space, labeled with contact information for the contractor and Design Consultant. Panel specified is custom and already has the information for the Design Consultant; the contractor shall coordinate their logo/information with the panel manufacturer (shop drawing required). One required to be installed at the top of each bank of equipment racks:
   1. Liberty Wire and Cable model HEI-RHIM-TEMPLATE.

D. Storage drawer, specification indicates the system basis of design. “**” in part number denotes (RU) height as indicated in rack elevations.
   1. Locking rack drawer keyed to match rack rear door, approximately 16" deep, color to match adjacent rack-mounting panels:
      a. Atlas Sound SD**-14 with optional SD-LOCK installed; or
      b. Middle Atlantic D**-LK; or
      c. Chief SDR-**-L.
   2. Rack drawer, approximately 16" deep, color to match adjacent rack-mounting panels:
      a. Atlas Sound SD**-14; or
      b. Middle Atlantic D**; or
      c. Chief SDR-**.

E. Rack Shelf:
   1. 2, utility rack shelf, 3.5” high, approximately 16” deep, color to match adjacent rack-mounting panels:

a. Atlas Sound SH2-15; or
b. Middle Atlantic U2; or
c. Chief UTS-2.

2. Pull-out shelf, requires rear rack rails, approximately 1.75” high (1RU), color to match equipment rack:
   a. Atlas Sound VTD1-16; or
   b. Middle Atlantic SS; or
   c. Chief SLS-1.

F. Display rack mount, VESA mount for rack mounting a display, 3RU mount, provide one per display indicated in an equipment rack:
   1. Middle Atlantic RM-LCD-PNLK.

G. Gooseneck Lamp – LED – Rack, rack-mount, 1RU, dual LED, 12” gooseneck:
   1. Littlite Raklite RL-10-D-LED with included power supply; or
   2. Approved equal.

2.011 STORAGE

A. Cable Storage Bracket, one 2x4 wooden board eight feet long with eight 1-inch diameter wooden dowels each 12-inches long installed on one-foot centers. Paint color to match equipment racks if located in the same room, otherwise, color as selected by the Architect. Mount bracket(s) at wall location if shown on drawings, otherwise, mount as later directed by the Owner’s Representative (two required):
   1. Custom by contractor.

B. Lockable Steel Storage Cabinet, 36"W x 18"D x 72"T combination cabinet with 4 half-width adjustable shelves, full length top shelf, and half-width vertical cavity (for microphone stands). Glue and screw a rubber mat to the bottom of the cavity for microphone stands to prevent slippage. Color to match equipment racks if located in the same room, otherwise color as selected by the Architect. Mount cabinet if shown on drawings, otherwise mount as later directed by Owner’s Representative. (one cabinet required, four keys required):
   1. Globalindustrial.com WB894113 series; or
   2. Lockers.com model 9274 Combination Storage Cabinet; or
   3. Approved Equal.

2.012 AC POWER

A. General
   1. A complete AC power connection solution for each equipment rack and cabinet is required.
   2. Provide spare NEMA 5-15R or 5-20R outlets (single duplex receptacle) for temporary equipment (beyond that required for connected equipment, rack fan, etc.). These outlets shall be fed from an un-switched “Normal” power circuit.
      a. For racks 16 RU or less: two spare outlets (minimum)
      b. For racks greater than 16 RU: four spare outlets (minimum)
   3. All power strips shall maintain integrity of system grounding requirements.
   4. All equipment shall be connected such that maximum rated performance can be obtained without exceeding the AC circuit load capacity.

5. Coordinate with Electrical drawings and Division 26 specifications. Where outlets are provided under this section as a portion of power strips or power distribution units, receptacle types and colors shall match the supplied AC power circuit.
6. Comply with all NEC requirements, including separation of loads classified as Life Safety from Normal loads via an independent Vertical / Horizontal Power Strip, PDU, and/or UPS.

B. Uninterruptable Power Supply Requirements
1. UPS shall be provided in quantities as indicated on signal flows and/or rack elevations, and as described for components and equipment within this Section and associated Subsections.
2. A UPS connected to a Normal power load shall be provided with enough battery capacity to bridge short duration loss of power and brownout events. The intent is to protect and prolong the life of sensitive processor based equipment, reduce power cycle time upon restoration of Normal power, and/or allow the User time to safely shut down components.
3. A UPS connected to Emergency (NEC Article 700), Legally Required Standby (NEC Article 701), or Optional Standby (NEC Article 702) AC power circuits shall be provided with enough battery capacity to bridge the maximum operation load of the connected equipment during the time from loss of Normal power to load handover to the electrical standby power system (typically generator startup time).

C. PS/V: Vertical Power Strip, single 120V 20A circuit, NEMA 5-20P plug input, minimum fourteen NEMA 5-15R outlets, mount to rear of rack interior (furnish where provided electrical receptacle quantities do not meet system requirements):
1. APC AP7530 with 40170-6INCH L5-20P adaptor; or
2. Eaton EPBZ97; or
3. Middle Atlantic PD-2420SC-NS; or
4. Tripp Lite PDUV20 with included L5-20P adaptor; or
5. Approved equal.

D. PS/H: Horizontal Power Strip, single 120V 20A circuit, NEMA 5-20P plug input, minimum eight rear-facing NEMA 5-15R outlets, single rack space (furnish where provided electrical receptacle quantities do not meet system requirements):
1. APC AP9563; or
2. Eaton EPBZ85; or
3. Middle Atlantic PD-920R-NS; or
4. Tripp Lite PDU 1220; or
5. Approved equal.

E. PDU/V: Vertical Power Distribution Unit, capable of multiple circuits and outlets, configured for circuit quantity, voltage, and amperage provided to rack; mount to rear of rack interior (furnish in coordination with provided electrical power):
1. Juice Goose PD Series; or
2. Middle Atlantic MPR Series; or
3. Middle Atlantic PDW Series; or
4. Approved equal.

F. UPS:

1. 1RU: Uninterruptable Power Supply, single rack space chassis, line interactive, surge suppression, 120V 20A circuit, minimum 750VA load, plug input, minimum four rear-facing NEMA 5-15R outlets:
   a. APC Smart-UPS SUA750RM1U; or
   b. Eaton 5P750R; or
   c. Middle Atlantic UPS-S1000R; or
   d. Tripp Lite SmartPro SMART750RM1U; or
   e. Approved equal.
2. 2RU: Uninterruptable Power Supply, two rack space chassis, line interactive, surge suppression, 120V 20A circuit, minimum 1950VA load, plug input, minimum eight rear-facing NEMA 5-15R outlets:
   a. APC Smart-UPS SMT2200RMUS; or
   b. Eaton 5P2200RT; or
   c. Middle Atlantic UPS-2200R-8IP; or
   d. Tripp Lite SmartPro SM2200RMXL2UP; or
   e. Approved equal.
3. 3RU: Uninterruptable Power Supply, three rack space chassis, line interactive, surge suppression, 120/208V 3PH 5W 30A circuit, minimum 6000VA load, locking plug input, minimum four rear-facing NEMA 5-20R outlets:
   a. APC Smart-UPS RT 6000 VA RM 208V to 208/120V; or
   b. Approved equal.
4. SS – 2RU: uninterruptable power supply, surge suppression, two rack space, 1000 VA power rating, 15A input. UPS provides power conditioning and non-MOV based surge suppression. Two receptacles with battery back-up and surge suppression, four receptacles with surge suppression:
5. SurgeX SU-1000Li.

G. Power Distribution Unit (PDS):
   1. SS – 1RU: power distribution unit, surge suppression, single rack space, 20A power distribution with non-MOV based surge suppression, minimum of eight receptacles:
      a. Furman P-8 PRO SERIES II; or
      b. SurgeX SX-1120-RT.
      c. SS/IP – 1RU: power distribution unit, surge suppression, IP controllable, single rack space, 20A power distribution with non-MOV based surge suppression, minimum of eight receptacles:
   2. SurgeX SX-AX20.
   3. SS – Vertical: power distribution unit, surge suppression, 20A power distribution with non-MOVbased surge suppression, minimum of eight receptacles:
      a. Or approved equivalent from Furman
      b. Or approved equivalent from SurgeX

H. Power/Lights – 1RU: power distribution unit, front light, single rack space, 15 Amp, LED pull-out dimmable rack lighting, rear mounted AC power outlets, surge suppression:
   1. Furman PL-8 C; or
   2. Middle Atlantic Products PDLT-815RV-RN; or
   3. SurgeX SX-1115RT along with two Littlite 12XR-LED (12”) or 18XR-LED (18”) gooseneck lamp assemblies (purchased separately).

I. Power Sequencer – 1RU: AC power sequencer, single rack space, 15 Amp supply:
   1. Furman PS-8R II; or
   2. Middle Atlantic Products RLNK-SW series; or

3. Juice Goose CQR-1500; or
4. SurgeX SEQ-1U.

PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL

A. Install in accordance with manufacturer's instructions.

3.02 PREPARATION

A. Coordinate locations and sizes of junction boxes, outlets, and conduit with the work of other trades. Field verify compliance with the construction documents.

B. Carefully inspect areas where equipment will be installed. Notify the Architect of any conditions that would adversely affect the installation and subsequent operation of the system.
1. Repeat inspection on a regular basis to ensure ongoing work by other trades does not pose a conflict to Contractor's pending work.

3.03 INSTALLATION

A. General
1. Contractor shall demonstrate a reasonable standard of care. Installation shall be rendered in a workmanlike manner observing direction set forth herein as well as industry standard best practices.
2. In addition to any spare cabling shown on drawings, utilize industry best practice to pull additional spare cabling in conduit where logical. Neatly bundle a usable length of cable at each end of each spare circuit. All spare circuits shall be labeled and noted on the field drawings for inclusion into the record drawings.
3. Install any floor-mounted receptacles so that release buttons (for both receptacles and cable connectors) are easily accessible when cable connectors are installed.
4. Blank panels and/or vent panels shall be installed in unused rack spaces. Ensure that air flow within the rack is maintained (i.e. cool air can enter the rack and hot air can exit the rack).
5. Equipment racks and other exposed equipment shall be kept covered and protected from airborne contaminates. Clean all equipment racks and the interior rack floor, prior to system final acceptance activities.
6. For racks installed in credenzas, fasten carpet tiles or low friction sliders to the bottom of the rack to protect the finish of the furniture.
7. Where the design location requires products, materials, or equipment to be visible to the public, manufacturers logos shall be removed if possible. Unless otherwise directed, neatly remove or logos.
8. AC power switches located on the front panel of equipment mounted in racks shall be covered by a security cover or utilize front panel lockout features. Exclusions from this list are items requiring user interface such as tuners and wireless microphone receivers.

9. Furnish all equipment with factory finish where possible using the standard available factory color(s) as selected by the Architect. Notify the Architect regarding color options of relevant equipment prior to ordering equipment from each manufacturer.

B. Suspended Systems
   1. General
      a. Contractor shall provide Suspension system, including connection to structure, for all suspended components including but not limited to: loudspeakers, video projectors, flat panel displays, televisions, projection screens, etc.
      b. Suspension system design shall be created by the Contractor and include fully dimensioned detail documentation stamped by a structural engineer licensed in the location of the project per submittal requirements in Part 1 of this document.
      c. Contractor shall include a safety cable or other backup support mechanism.
      d. Suspension systems and installation shall conform to industry best practice standards as set forth in: 1) "Basic Principles for Suspending Loudspeaker Systems" (JBL Professional Technical Note Volume 1, Number 14)
      e. Coordinate with General Contractor any supplemental building structure necessary to facilitate the approved suspension design.
      f. Field verify conditions for compliance with the approved suspension plan prior to installation, placement of equipment orders, or material fabrication. Coordinate with other trades as necessary.
   2. Loudspeakers
      a. Install loudspeakers so there are no obstructions to loudspeakers' coverage pattern.
      b. Loudspeakers shall be installed such that they do not produce or cause mechanical rattles in the surrounding structure. There shall be no audible vibration or noise caused by improper mechanical installation or defective components.
      c. Paint loudspeaker and/or grille assembly (at discretion of Architect or Design Consultant) color as selected by the Architect. Use primer per manufacturer's recommendations. Do not paint loudspeaker cones or high frequency diaphragms. Materials and labor provided by Contractor.
      d. Provide access to loudspeakers during installation, testing, and final acceptance activities to allow for modifications to location or installation. Access includes all necessary resources required to obtain direct physical contact to loudspeakers (front and rear), including: scaffolding, motorized lift, etc.
      e. Provide ability to reorient loudspeakers in all axes (yaw, pitch, and/or roll) if so requested by Design Consultant during system final acceptance activities.
         1) Do not perform final suspension connections prior to final acceptance by the Design Consultant including: permanent cable swage, elimination of wire rope service loop, etc.

C. Video
   1. Coordinate structural backing required for wall mounted flat panel displays/televisions prior to the installation of drywall or other wall materials..

D. Grounding
   1. Comply with NEC and BICSI grounding requirements.
   2. Each equipment rack within a row of racks and each row of racks within a room shall be electrically bonded to each other. Bonding shall be via copper ground bus. Any bolts shall fasten to unpainted sheet metal.

E. Equipment Power Control
1. Low-voltage "ON/OFF" control of system equipment shall be provided via the control system.
2. Operation of the following components is required, at a minimum:
   a. Power amplifiers as indicated in Part 2 requirements
   b. UPS connected devices where components do not require power under system shutdown
   c. Components equipped with power state control
3. Make all low-voltage connections as required to provide a complete and working control system.
4. Refer to drawings for additional low-voltage sequencing system requirements.
5. Refer to electrical drawings for AC power information.
6. Coordinate with Electrical Contractor as necessary to verify proper circuit assignment and sequencing order.

3.04 CABLE MANAGEMENT AND TERMINATION

A. Employ cable management and installation techniques to fulfill ANSI/AVIXA 10:2013, 9.4 (ANS2013-12-20) “Cable Management, Termination, and Labelling Reference Verification Items” as a minimum standard with the additional requirements as described in this paragraph.

B. General
1. Do not violate the minimum cable bend radius as specified by the cable manufacturer.
2. Dress cables so terminations are free from stress due to gravity acting on the cabling. Use cable supports as required depending on the size and stiffness of the cable.
3. Terminate cables with sufficient service loop to allow at least one re-termination without having to open a cable bundle or pathway.
4. All circuits, including various audio signal levels, shall be separated according to function. Where audio and video circuits are installed in conduit or other raceway, separate conduits are required for the various circuit functions.
5. Where circuits are exposed in the equipment racks or large junction or pull boxes, circuits shall be bundled according to function. Refer to “Conduit/Circuit Group Divisions” and “Conduit Routing and Separation” schedules for additional information.
6. All solder connections shall be made with soldering iron and rosin core solder. All solder connections shall be checked for "cold" solder joints.
7. If equipment is removed or replaced for service, ensure the proper cable termination points are apparent when the equipment is re-installed.

C. Equipment Racks
1. Use Velcro tie wraps for dressing cables within the rack(s), hand tightened and spaced at various inconsistent distance intervals.
2. Do not use zip ties for UTP cables or any in-rack cables.
3. When dressing cables within the rack, do not tighten tie wraps so the cable is deformed.
4. Install rack-mounted equipment manufactured without IEC removable power cords so the power cords are dressed using removable fasteners such as Velcro and there are no obstructions to the item being pulled out from the front of the rack. Avoid coiled or bundled cable loops.
5. For rack-mounted equipment manufactured with IEC removable power cords, provide power cord assemblies of the minimum length needed to accomplish connection to the PDU. Avoid excess power cabling including coiled or bundled cable.

6. Factory terminated cable assemblies are only permitted for use within racks, between devices external to racks, as portable equipment, or for use in conduit as specifically noted as follows: Permitted for rack inter-connect when racks are in close proximity (same room) and may pass thru conduit if necessary in this situation. Cable assemblies shall be the minimum length needed to accomplish the connection.
7. Install rack equipment to enable repair or replacement without hindrance. If there are obstructions prohibiting the disconnection of terminations on the back side of the technical equipment, there must be sufficient cabling to permit the equipment to be pulled from the front allowing for easy disconnection and reconnection.

D. Paralleling and Extension Connections
1. Circuits shall not be joined by butt-splice, solder-splice, wire nut, or similar.
2. Circuits requiring parallel connection as indicated on signal flows shall be extended via approved termination in an appropriately sized junction box and shall conform to the following guidelines:
   a. Approved connections include DIN mounted terminal blocks as specified in Part 2.
   b. Field splicing techniques such as wire nuts, “twist and solder”, etc. are not allowed.
   c. Any circuit requiring parallel connection shall be permanently labelled on every cable as defined herein.
   d. Care must be taken to maintain appropriate protection and shielding of circuits in order to maintain a fully functional system.
3. Circuits requiring extension (non-data) due to field conditions such as excessive conduit bends, etc., shall be extended via approved termination in an appropriately sized junction box and shall conform to the following guidelines:
   a. Extension of circuits is to be avoided if at all possible.
   b. Contact the Design Consultant via documented project communication. Inform the Design Consultant of the circumstances regarding the desired extension. Contractor and Design Consultant will coordinate to determine the most appropriate course of action.
   c. Approved connections include DIN mounted terminal blocks as specified in Part 2.
   d. Any circuit requiring extension shall be permanently labelled on every cable as defined herein.
   e. Care must be taken to maintain appropriate protection and shielding of circuits in order to maintain a fully functional system.
4. Document each parallel connection and extension on the field drawings and transfer same to the final record drawings.

E. Telecommunications Cabling
1. Refer to Division 27 Section “Telecommunications Requirements for Audio Video Systems” for all work associated with data-related cabling including Category and Fiber Optic cabling.
2. All data-related cabling entering a rack shall be terminated to a Data Patch Panel. Rack inter- and intra-connect cabling utilizing factory-terminated cable assemblies are not required to pass thru a Data Patch Panel.
3. All Fiber Optic cabling entering a rack shall be terminated to a Fiber Patch Panel. Rack inter- and intra-connect cabling utilizing factory-terminated cable assemblies are not required to pass thru a Fiber Patch Panel.

F. Microphone/Line Level Audio
1. Audio circuit termination shall observe the methods set forth in "Sound System Interconnection" RaneNote 110, © 2011 by Rane Corporation. This reference document may be obtained at: http://www.rane.com/pdf/ranenotes/Sound_System_Interconnection.pdf

G. Loudspeaker Level Audio
1. Loudspeakers in the same acoustic space shall all be wired to produce consistent polarity with a mono input signal. They shall also be polarized such that a positive acoustic pressure on a microphone results in a positive acoustic pressure at all loudspeakers.

H. Video
1. Compression fittings shall be used for all BNC and F connector terminations.
2. Terminate all unused RF and SDI outputs with impedance matching terminators.
3. Neatly dress all cables behind a flat panel display/television. Cables and connections should not be visible from the viewing locations. Power cables for displays shall not be bundled with signal cables nor visible.
4. For fixed projector or pole mounted flat panel display installations, signal cables shall be routed within the mounted pipe. Signal cables shall not be tied to the outside of the pipe. Provide cabling of appropriate distance to minimize excess cable at device. Bundle excess cable above the ceiling, not at the device.

3.05 LABELING

A. Adhere to AVIXA F501.01:2015 "Cable Labeling for Audiovisual Systems" as a minimum standard with additional requirements as described in this paragraph.

3.06 SYSTEM CONFIGURATION

A. Coordination
1. Coordinate and take responsibility for the approval of all system configuration components as described in this paragraph.
2. Coordinate all aspects of the technical system network, including configuration and connection with to the Owner's LAN. Utilize Owner's designated configuration style, standards, and security requirements.

B. Software
1. Furnish, install, and configure the most recent approved, non-beta, software for each device or system.
2. Provide software as identified in other areas of these specifications or on the drawings.
3. Provide software not specifically identified but required to allow for system operation and/or to allow for more efficient system configuration, setup, and operation.

C. Firmware
1. Ensure the firmware for each device is the most recent manufacturer approved version and is installed and operational.

D. Operating Systems

1. Gain approval of the operating system version and type from the Owner's IT representative and associated equipment manufacturer(s).
2. Ensure the operating system for each device is the most recent, installed, and fully operational.
3. Ensure the latest security patches are installed.

E. Network Configuration
1. All technical system devices with an Ethernet port shall be connected to the associated network.
2. Secure the entire network, documenting all passwords. Comply with the Owner's IT representative's requirements with respect to password selection and network security implementation.

F. Network Documentation
1. Document the IP and MAC addresses of all IP capable equipment for inclusion with the Operation & Maintenance Manuals.

3.07 CONTRACTOR'S TESTING, ADJUSTMENT, AND SUBMITTAL REQUIREMENTS

A. At the completion of the installation, perform the following tests on the system to ensure proper installation and operation. The technical system shall be fully tested with all equipment on site, installed, connected, and fully operational.

B. The Contractor shall submit the results of all tests prior to on-site system review by the Design Consultant. Where available, provide documentation obtained directly from the test equipment. Other acceptable documentation includes screen captures, photos, and spreadsheets.

3.08 FINAL ACCEPTANCE

A. After completion of the system installation and after the preliminary tests and adjustments are complete, the contractor in conjunction with the Design Consultant shall perform on-site acceptance of the technical system. This process will include, but not be limited to the following, as applicable:
1. Random verification of contractor tests;
2. System check-out;
3. Tailoring of the technical system's frequency response to the facility's acoustical environment (where required);
4. Observation of video system to verify proper image display;
5. Function and operability of the control system.

B. Provide the services of the designated supervisor and any other technicians who are familiar with the system, for approximately one eight-hour day. Additional time may be required due to Alternates accepted by the Owner's Representative, or due to Addenda or Change Orders (if any) which modify the scope of work. The supervisor shall provide personal assistance during these activities. This time period does not include time for correcting wiring errors, equipment malfunctions, or problems related to the installation of the technical system. This work could occur at any time day, night, weekends, or holidays without additional claims for expense.

C. At the discretion of the Design Consultant, the Contractor shall participate in the control and adjustment of computer controlled systems including but not limited to the following systems: Main control (Crestron/AMX), DSP, wireless microphone, amplifier, active loudspeaker, etc.

D. At the completion of the final acceptance period, the Contractor shall compile all system configuration settings (files) with copies as required for inclusion in the O&M Manuals described later in these specifications.

E. In addition, provide the following: hand and power tools appropriate for the type of installation, ladders, lifts, and/or scaffolding as required to reach all high-mounted devices, spare wire and cable of the types used in the installation, selection of wiring fasteners used in the installation, complete set of the most recent reviewed shop drawings, complete set of all manufacturers' original installation/operation/maintenance manuals, and specific test equipment used during the preliminary testing activities.

F. After the technical system is operational, the Contractor shall provide verbal instruction to designated Owner's Representative as to proper methods of system operation. Video record the instruction class and provide the recording in a usable digital format to the Owner's Representative.

G. Provide operational assistance for the first major use of the completed system as directed by the Owner's Representative, including being present for: one prior rehearsal associated with the event (if applicable); a technical-check immediately prior to the event; and the event itself.

3.09 OPERATION AND MAINTENANCE DATA

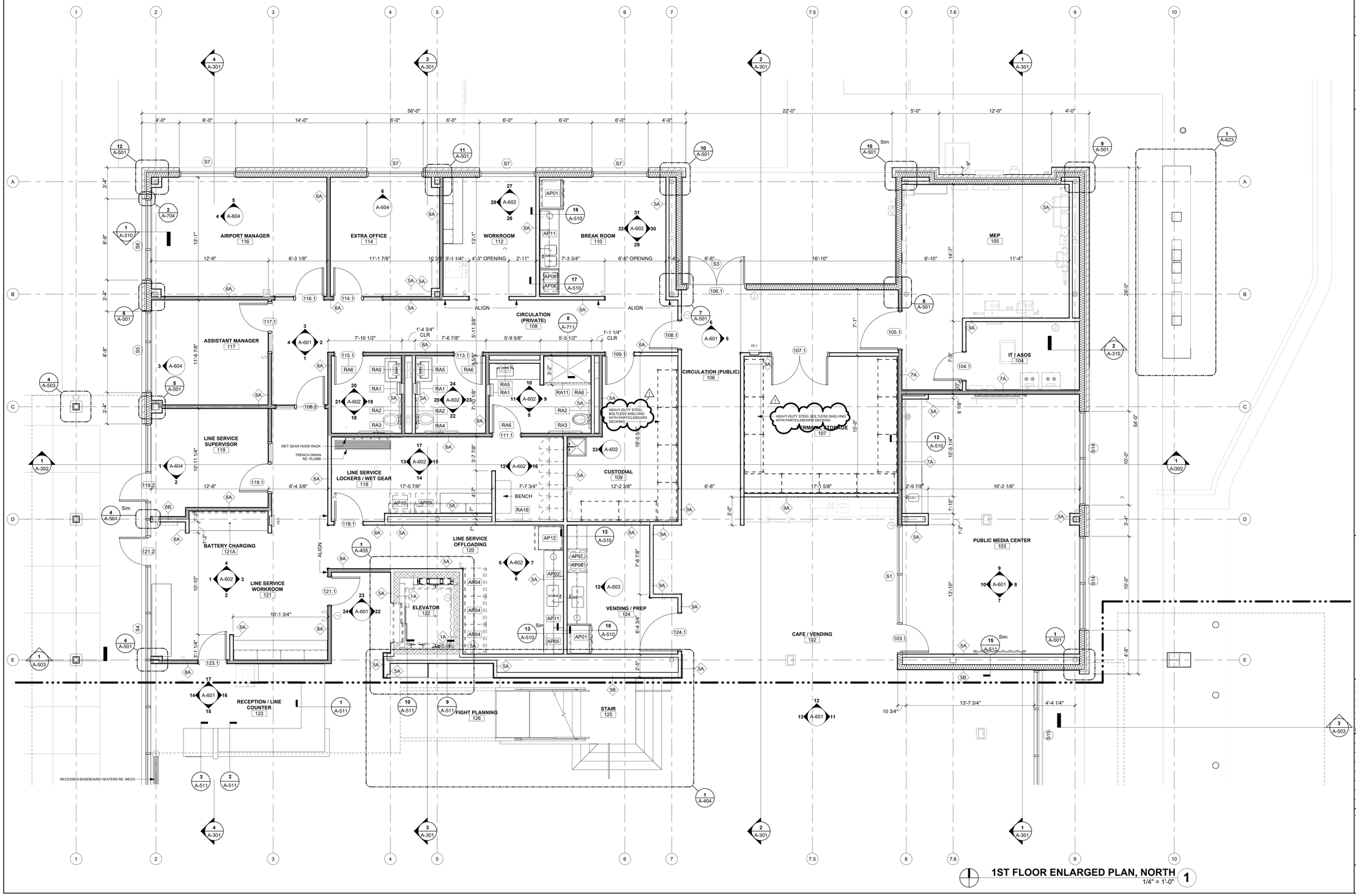
A. At the completion of the project, compile thorough copies of the Operation and Maintenance (O&M) Data per Division 27 Section "General Communications Requirements".

B. O&M data shall be assembled according to rooms or areas as it relates to the project site. The intent is to allow the Owner's Representative to easily locate information relating to a specific system/room without having to spend an inordinate amount of time searching. Include complete information for each system/room – this may involve duplication of information.

C. Include ANSI E1.47-2017 (Entertainment Technology – Recommended Guidelines for Entertainment Rigging System Inspections) within the O&M data.

D. As applicable, save full digital version to the system computer.

END OF SECTION 27 41 16



CMT
1627 MAIN STREET, SUITE 600
KANSAS CITY, MO 64108

WELLNER ARCHITECTS + engineers
1627 MAIN STREET, SUITE 100
KANSAS CITY, MO 64108

PEC
1100 MAIN ST, STE 1800
KANSAS CITY, MO 64105

olsson
1301 BURLINGTON
NORTH KANSAS CITY, MO 64116

KC - LEE'S SUMMIT REGIONAL AIRPORT
LEE'S SUMMIT, MISSOURI

GENERAL AVIATION TERMINAL
CITY PORJECT NO. - 17932172

Julie Black Wellner - Architect - MO #A-5006 - MO Certificate of Authority #000767 - STATE OF MISSOURI - JULIE BLACK WELLNER NUMBER A-5006 - REGISTERED ARCHITECT

April 24, 2025

MARK	DATE	DESCRIPTION
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ISSUED FOR:	ISSUED FOR BID
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DESIGNED BY:	JSB
DRAWN BY:	HJM
CHECKED BY:	LMD
APPROVED BY:	JBW
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SHEET TITLE	

ENLARGED 1ST FLOOR PLAN, NORTH

A-401

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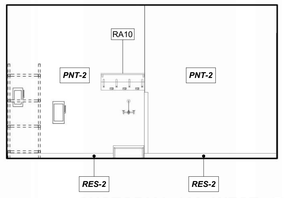

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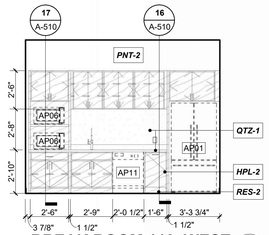

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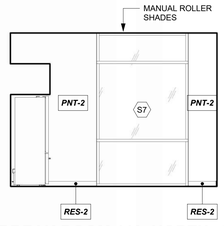

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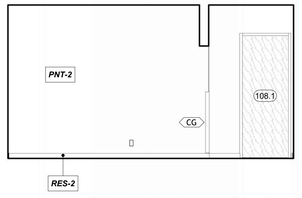

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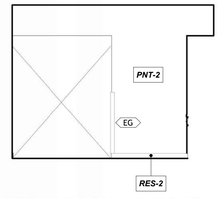

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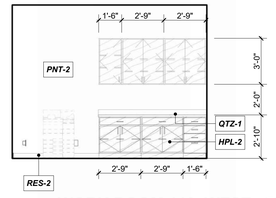

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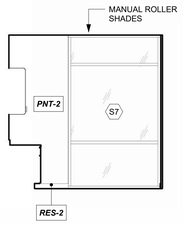

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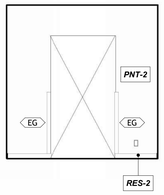

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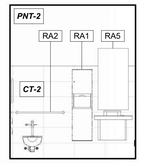

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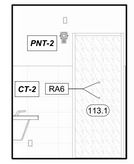

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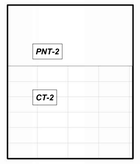

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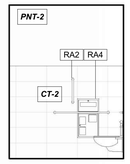

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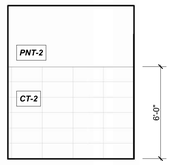

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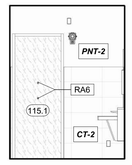

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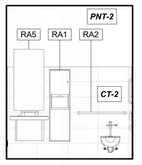

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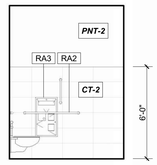

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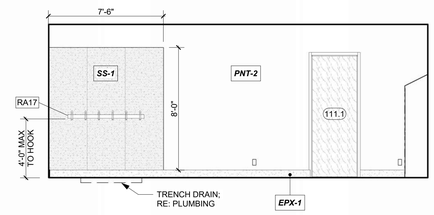

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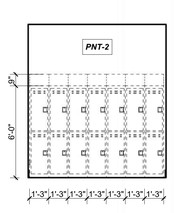

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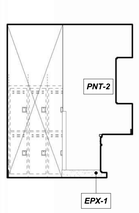

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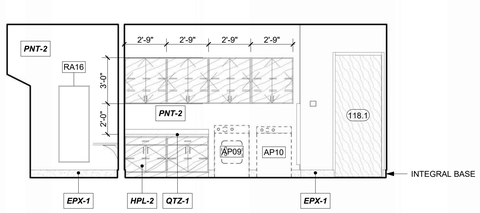

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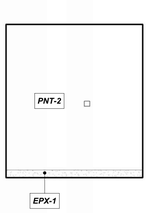

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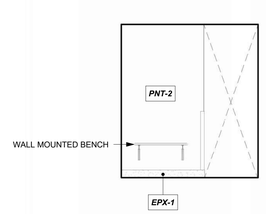

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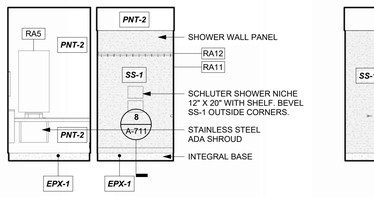
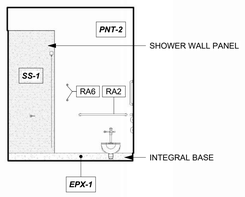
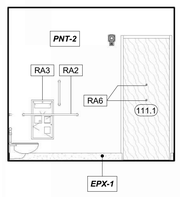
LINE SERVICE RESTROOM, WEST 11
REFERENCED FROM 1 / A-401 1/4" = 1'-0"



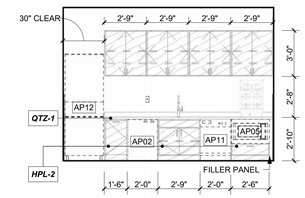
LINE SERVICE RESTROOM, NORTH 10
REFERENCED FROM 1 / A-401 1/4" = 1'-0"



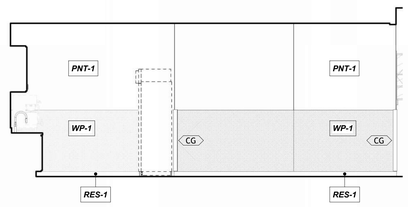
LINE SERVICE RESTROOM, EAST 9
REFERENCED FROM 1 / A-401 1/4" = 1'-0"



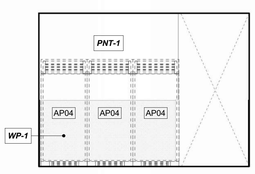
LINE SERVICE RESTROOM, SOUTH 8
REFERENCED FROM 1 / A-401 1/4" = 1'-0"



LINE SERVICE OFFLOADING 120, EAST 7
REFERENCED FROM 1 / A-401 1/4" = 1'-0"

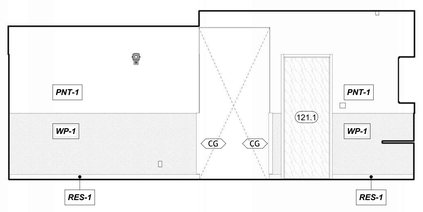


LINE SERVICE OFFLOADING 120, SOUTH 6
REFERENCED FROM 1 / A-401 1/4" = 1'-0"

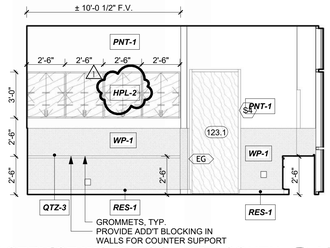


LINE SERVICE OFFLOADING 120, WEST 5
REFERENCED FROM 1 / A-401 1/4" = 1'-0"

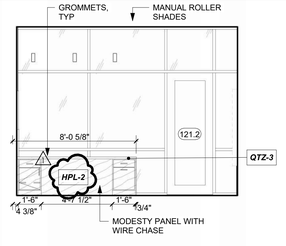
LINE SERVICE WORKROOM 121, NORTH 4
REFERENCED FROM 1 / A-401 1/4" = 1'-0"



LINE SERVICE WORKROOM 121, EAST 3
REFERENCED FROM 1 / A-401 1/4" = 1'-0"



LINE SERVICE WORKROOM 121, SOUTH 2
REFERENCED FROM 1 / A-401 1/4" = 1'-0"



LINE SERVICE WORKROOM 121, WEST 1
REFERENCED FROM 1 / A-401 1/4" = 1'-0"

5/21/2025 2:36:14 PM

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olsson
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KC - LEE'S SUMMIT REGIONAL
LEE'S SUMMIT, MISSOURI

GENERAL AVIATION TERMINAL
CITY PORJECT NO. - 17932172

Julie Black Wellner - Architect - MO #A-5006 - MO Certificate of Authority #000767 - STATE OF MISSOURI - JULIE BLACK WELLNER - NUMBER A-5006 - REGISTERED ARCHITECT

April 24, 2025

MARK	DATE	DESCRIPTION
1	05/23/25	ADDENDUM 1

ISSUED FOR:	ISSUED FOR BID
PROJECT NO:	17932172
REVIT FILE:	2403 Lee's Summit Terminal-R24.rvt
DESIGNED BY:	JSB
DRAWN BY:	HJM
CHECKED BY:	LMD
APPROVED BY:	JBW
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INTERIOR ELEVATIONS

A-602

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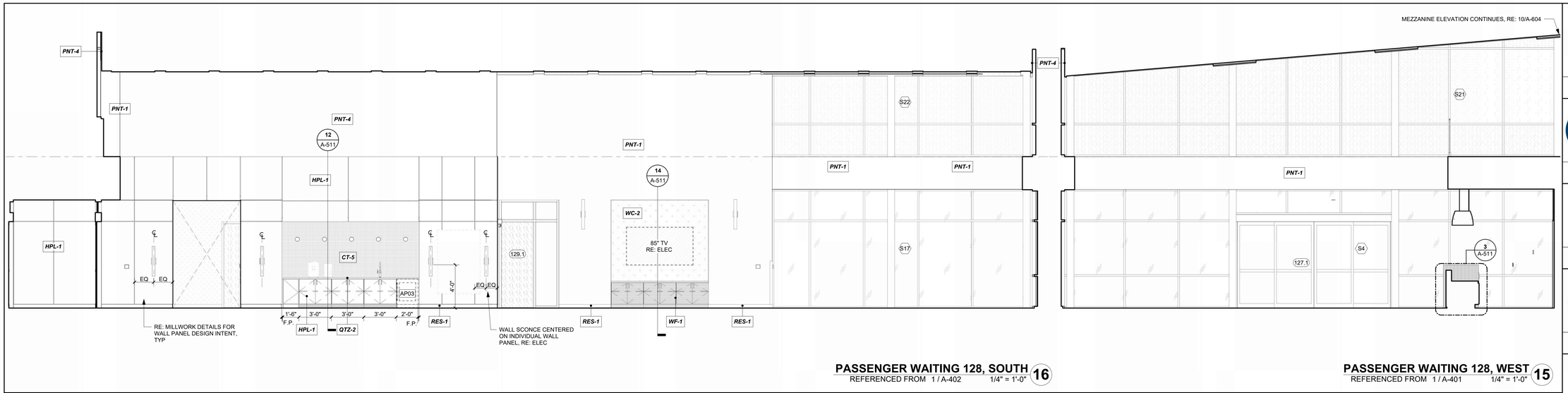
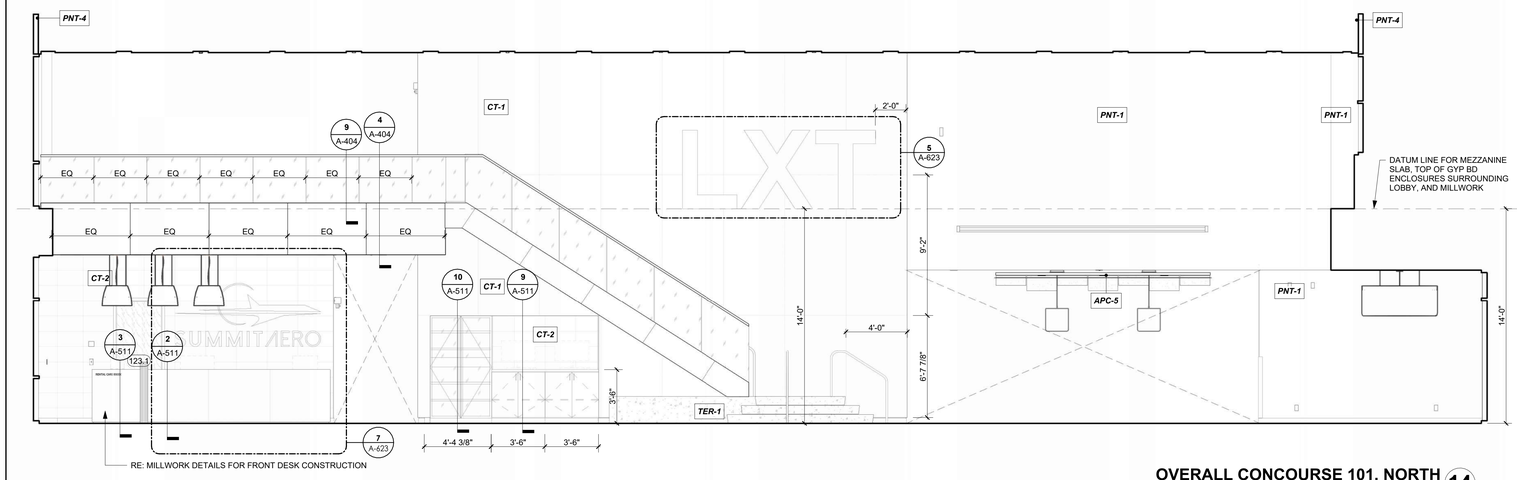
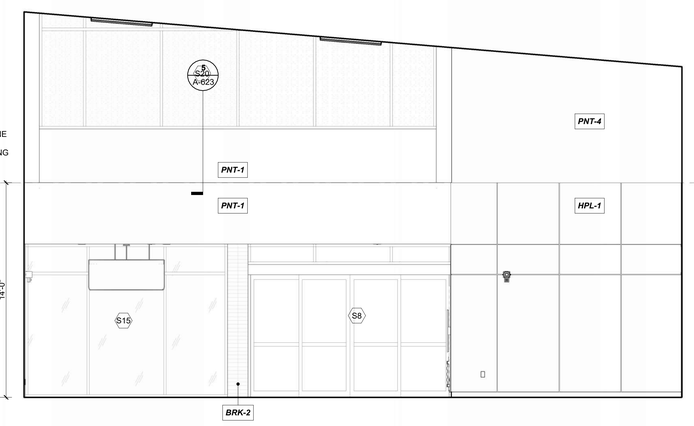


PASSENGER WAITING 128, SOUTH 16
REFERENCED FROM 1 / A-402 1/4" = 1'-0"

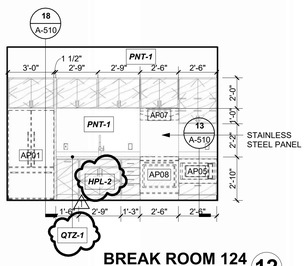
PASSENGER WAITING 128, WEST 15
REFERENCED FROM 1 / A-401 1/4" = 1'-0"



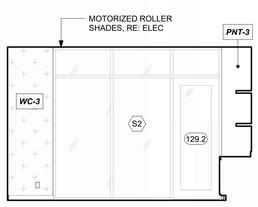
OVERALL CONCOURSE 101, NORTH 14
REFERENCED FROM 1 / A-401 1/4" = 1'-0"



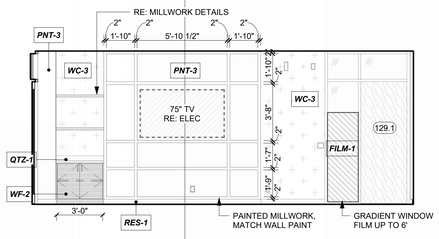
PASSENGER WAITING 128, EAST 13
REFERENCED FROM 1 / A-401 1/4" = 1'-0"



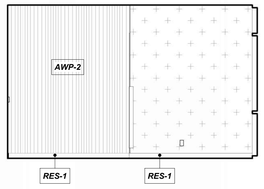
BREAK ROOM 124 12
REFERENCED FROM 1 / A-401 1/4" = 1'-0"



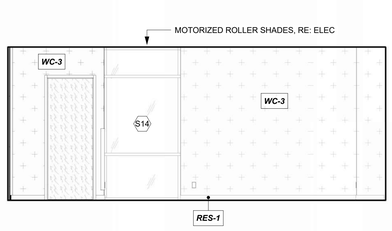
QUIET/SENSORY WAITING 129, WEST 11
REFERENCED FROM 1 / A-402 1/4" = 1'-0"



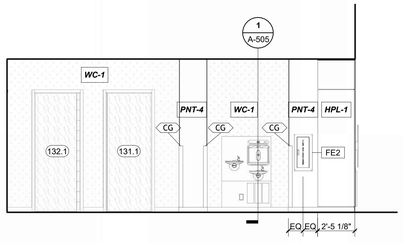
QUIET/SENSORY WAITING 129, NORTH 10
REFERENCED FROM 1 / A-402 1/4" = 1'-0"



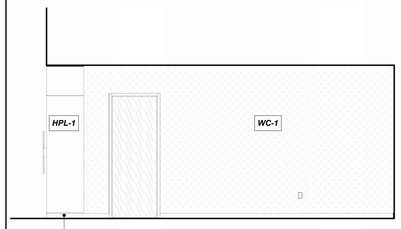
QUIET/SENSORY WAITING 129, EAST 9
REFERENCED FROM 1 / A-402 1/4" = 1'-0"



QUIET/SENSORY WAITING 129, SOUTH 8
REFERENCED FROM 1 / A-402 1/4" = 1'-0"

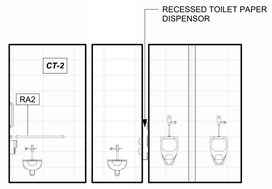


CIRCULATION (PUBLIC) 130, WEST 7
REFERENCED FROM 1 / A-402 1/4" = 1'-0"

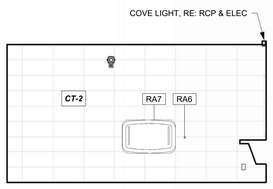


CIRCULATION (PUBLIC) 130, EAST 6
REFERENCED FROM 1 / A-402 1/4" = 1'-0"

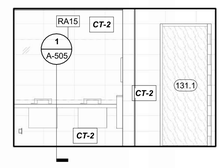
CIRCULATION (PUBLIC) 130, SOUTH 5
REFERENCED FROM 1 / A-402 1/4" = 1'-0"



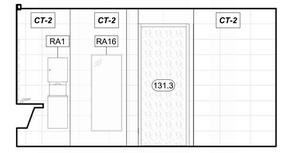
MEN'S PUBLIC RESTROOM 131, WEST 4
REFERENCED FROM 1 / A-402 1/4" = 1'-0"



MEN'S PUBLIC RESTROOM 131, NORTH 3
REFERENCED FROM 1 / A-402 1/4" = 1'-0"



MEN'S PUBLIC RESTROOM 131, EAST 2
REFERENCED FROM 1 / A-402 1/4" = 1'-0"



MEN'S PUBLIC RESTROOM 131, SOUTH 1
REFERENCED FROM 1 / A-402 1/4" = 1'-0"

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LEE'S SUMMIT, MISSOURI

GENERAL AVIATION TERMINAL
CITY PORJECT NO. - 17932172

Julie Black Wellner - Architect - MO #A-5006 - MO Certificate of Authority #000767 - STATE OF MISSOURI - JULIE BLACK WELLNER NUMBER A-5006 - REGISTERED ARCHITECT

April 24, 2025

MARK	DATE	DESCRIPTION
1	05/23/25	ADDENDUM 1

ISSUED FOR:	ISSUED FOR BID
PROJECT NO:	17932172
REVIT FILE:	2403 Lee's Summit Terminal-R24.rvt
DESIGNED BY:	JSB
DRAWN BY:	HJM
CHECKED BY:	LMD
APPROVED BY:	JBW
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INTERIOR ELEVATIONS

A-603

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DOOR HARDWARE SCHEDULE ON THESE DRAWINGS ARE A CONVENIENCE REFER TO 08 71 00 DOOR HARDWARE SCHEDULE

HARDWARE SET: 01
DOOR NUMBER: 119.2 121.2
EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
4 EA	HINGE	5BB1HW NRP	630	IVE
1 EA	POWER TRANSFER	EPT10 CON	689	VON
1 EA	ELEC PANIC HARDWARE	RX-LC-QEL-98-NL-CON 24 VDC	626	VON
1 EA	RIM HOUSING	20-079	626	SCH
1 EA	FSIC PERM. CORE	23-030 EV29 T	626	SCH
1 EA	FSIC CONSTR. CORE	23-030 ICX	ORG	SCH
1 EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1 EA	DOOR SWEEP	8198AA	AA	ZER
1 EA	THRESHOLD	103A-223	A	ZER
2 EA	WIRE HARNESS	CON X LENGTH REQ'D		SCH
1 EA	DOOR CONTACT	7764	628	SCE
1 EA	POWER SUPPLY	BY SECURITY SYSTEM INTEGRATOR		B/O
1 EA	DOOR CALL STATION	BY SECURITY SYSTEM INTEGRATOR		
1 EA	CARD READER	BY SECURITY SYSTEM INTEGRATOR		
1 EA	WEATHERSTRIP	BY DOOR/FRAME MANUFACTURER		B/O
1 EA	WIRING DIAGRAM	BY SECURITY SYSTEM INTEGRATOR		

OPERATION: DOOR NORMALLY CLOSED AND LOCKED. ACCESS VIA VALID CARD READ. PANIC MAY BE DOGGED (MADE PUSH/PULL) ELECTRONICALLY. OUTSIDE ADA ACTUATOR ONLY OPERABLE WHEN DOOR IS DOGGED OR AFTER VALID CARD READ, INSIDE ACTUATOR ALWAYS OPERABLE. ALWAYS FREE EGRESS.

HARDWARE SET: 02
DOOR NUMBER: 106.1
EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2 EA	CONT. HINGE	112XY EPT	628	IVE
2 EA	POWER TRANSFER	EPT10 CON	689	VON
1 EA	REMOVABLE MULLION	KR4954	689	VON
1 EA	ELEC PANIC HARDWARE	RX-LC-QEL-98-EO-CON 24 VDC	626	VON
1 EA	ELEC PANIC HARDWARE	RX-LC-QEL-98-NL-CON 24 VDC	626	VON
1 EA	RIM HOUSING	20-079	626	SCH
1 EA	MORTICE HOUSING	26-064	626	SCH
2 EA	FSIC PERM. CORE	23-030 EV29 T	626	SCH
1 EA	FSIC CONSTR. CORE	23-030 ICX	ORG	SCH
2 EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
2 EA	CUSH SHOE SUPPORT	4040XP-30 SRT	689	LCN
2 EA	BLADE STOP SPACER	4040XP-81 SRT	689	LCN
1 EA	MULLION SEAL	8780NBK PSA	BK	ZER
2 EA	DOOR SWEEP	8198AA	AA	ZER
1 EA	THRESHOLD	103A-223	A	ZER
4 EA	WIRE HARNESS	CON X LENGTH REQ'D		SCH
2 EA	DOOR CONTACT	7764	628	SCE
1 EA	POWER SUPPLY	BY SECURITY SYSTEM INTEGRATOR		B/O
1 EA	DOOR CALL STATION	BY SECURITY SYSTEM INTEGRATOR		
1 EA	CARD READER	BY SECURITY SYSTEM INTEGRATOR		
1 EA	WEATHERSTRIP	BY DOOR/FRAME MANUFACTURER		B/O
1 EA	WIRING DIAGRAM	BY SECURITY SYSTEM INTEGRATOR		

OPERATION: DOOR NORMALLY CLOSED AND LOCKED. ACCESS VIA VALID CARD READ. PANIC MAY BE DOGGED (MADE PUSH/PULL) ELECTRONICALLY. ALWAYS FREE EGRESS.

HARDWARE SET: 03
DOOR NUMBER: 129.2
EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
4 EA	HINGE	5BB1HW NRP	630	IVE
1 EA	PANIC HARDWARE	98-EO	626	VON
1 EA	ACCESSORY	LESS DOGGING PLATE	626	VON
1 EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1 EA	RAIN DRIP	142AA	AA	ZER
1 SET	GASKETING	429AA-S	AA	ZER
1 EA	DOOR SWEEP	8197AA	AA	ZER
1 EA	THRESHOLD	103A-223	A	ZER
1 EA	DOOR CONTACT	679-05 HM/WD AS REQ'D	BLK	SCE
1 EA	MOTION SENSOR	SCANII 12/24 VDC	WHT	SCE
1 EA	WIRING DIAGRAM	BY SECURITY SYSTEM INTEGRATOR		

OPERATION: DOOR CONTACT MONITORS DOOR POSITION.
NOTE: INSTALL WEATHERSTRIP AT FRAME HEAD FIRST, THEN INSTALL CLOSER PA BRACKET ON WEATHERSTRIP.

HARDWARE SET: 04
DOOR NUMBER: 201.1
EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
4 EA	HINGE	5BB1HW	652	IVE
1 EA	POWER TRANSFER	EPT10 CON	689	VON
1 EA	EU STOREROOM LOCK	ND80P6DEU RHO RX CON 12V/24V DC	626	SCH
1 EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1 EA	WALL STOP	WS406/407CCV	630	IVE
1 EA	GASKETING	488SBK PSA	BK	ZER
1 EA	DOOR SWEEP	39A	A	ZER
1 EA	THRESHOLD	655A-223	A	ZER
1 EA	DOOR CONTACT	679-05 HM/WD AS REQ'D	BLK	SCE
1 EA	POWER SUPPLY	BY SECURITY SYSTEM INTEGRATOR		B/O
1 EA	CARD READER	BY SECURITY SYSTEM INTEGRATOR		

HARDWARE SET: 05
DOOR NUMBER: 104.1 108.1 121.1 123.1
EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3 EA	HINGE	5BB1HW 4.5 X 4.5 NRP	652	IVE
1 EA	POWER TRANSFER	EPT10 CON	689	VON
1 EA	EU STOREROOM LOCK	ND80P6DEU RHO RX CON 12V/24V DC	626	SCH
1 EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1 EA	FLOOR STOP	FS410 (AT 123.1 ONLY)	626	IVE
1 EA	WALL STOP	WS406/407CCV	630	IVE
1 EA	GASKETING	488SBK PSA	BK	ZER
1 EA	DOOR CONTACT	679-05 HM/WD AS REQ'D	BLK	SCE
1 EA	POWER SUPPLY	BY SECURITY SYSTEM INTEGRATOR		B/O
1 EA	CARD READER	BY SECURITY SYSTEM INTEGRATOR		

HARDWARE SET: 06
DOOR NUMBER: 107.1
EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6 EA	HINGE	5BB1HW	652	IVE
1 EA	POWER TRANSFER	EPT10 CON	689	VON
1 EA	CONST LATCHING BOLT	FB51T	630	IVE
1 EA	EU STOREROOM LOCK	ND80P6DEU RHO RX CON 12V/24V DC	626	SCH
2 EA	OH STOP	90S	630	GLY
2 EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1 EA	KICK PLATE	8400 10" X 1" LDW B-CS	630	IVE
1 EA	GASKETING	488SBK PSA (AT RATED DOORS)	BK	ZER
1 EA	MEETING STILE	383AA	AA	ZER
2 EA	DOOR CONTACT	679-05 HM/WD AS REQ'D	BLK	SCE
1 EA	POWER SUPPLY	BY SECURITY SYSTEM INTEGRATOR		B/O
1 EA	CARD READER	BY SECURITY SYSTEM INTEGRATOR		

OPERATION: DOOR NORMALLY CLOSED AND LOCKED. ACCESS VIA VALID CARD READ. ALWAYS FREE EGRESS.

HARDWARE SET: 07
DOOR NUMBER: 109.1
EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
4 EA	HINGE	5BB1HW	652	IVE
1 EA	STOREROOM LOCK	ND80P6D RHO	626	SCH
1 EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1 EA	WALL STOP	WS406/407CCV	630	IVE
1 EA	GASKETING	488SBK PSA (AT RATED DOORS)	BK	ZER
3 EA	SILENCER	SR64	GRY	IVE

HARDWARE SET: 08
DOOR NUMBER: 124.1 129.1 136.1
EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
4 EA	HINGE	5BB1HW	652	IVE
1 EA	CLASSROOM LOCK	ND70P6D RHO	626	SCH
1 EA	SURFACE CLOSER	4040XP	689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1 EA	WALL STOP	WS406/407CCV	630	IVE
1 EA	GASKETING	488SBK PSA	BK	ZER

HARDWARE SET: 09
DOOR NUMBER: 103.1 114.1 116.1 117.1 119.1
EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
4 EA	HINGE	5BB1HW	652	IVE
1 EA	ENTRANCE LOCK	ND53P6D RHO	626	SCH
1 EA	WALL STOP	WS406/407CCV	630	IVE
3 EA	SILENCER	SR64	GRY	IVE

NOTE: PROVIDE FLOOR STOP IN LIEU OF WALL STOP WHERE REQUIRED.

HARDWARE SET: 10
DOOR NUMBER: 111.1 113.1 115.1 133.1
EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
4 EA	HINGE	5BB1HW	652	IVE
1 EA	OFFICE W/SIM RETRACT W/ OUTSIDE INDICATOR	L9056J 06A L583-363 OS-OCC	626	SCH
1 EA	FSIC PERM. CORE	23-030 EV29 T	626	SCH
1 EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1 EA	WALL STOP	WS406/407CCV	630	IVE
1 EA	GASKETING	488SBK PSA	BK	ZER

HARDWARE SET: 11
DOOR NUMBER: 131.1 132.1 135.1
EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1 EA	CONT. HINGE	224XY	628	IVE
1 EA	CLASSROOM SEC W/DB	L9457J 06A	626	SCH
2 EA	FSIC PERM. CORE	23-030 EV29 T	626	SCH
1 EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1 EA	WALL STOP	WS406/407CCV	630	IVE
3 EA	SILENCER	SR64	GRY	IVE

HARDWARE SET: 12
DOOR NUMBER: 134.1
EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
4 EA	HINGE	5BB1HW	652	IVE
1 EA	PASSAGE SET	ND10S RHO	626	SCH
1 EA	WALL STOP	WS406/407CCV	630	IVE
3 EA	SILENCER	SR64	GRY	IVE

HARDWARE SET: 13
DOOR NUMBER: 100.1 100.2 127.1 127.2
EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1 EA	MORTISE HOUSING	26-064	626	SCH
1 EA	FSIC PERM. CORE	23-030 EV29 T	626	SCH
1 EA	LOCAL CONTROL SWITCH	BY DOOR MANUFACTURER		

NOTE: BALANCE OF HARDWARE BY DOOR SYSTEM MANUFACTURER. VERIFY CYLINDER TYPE/QUANTITY REQUIRED WITH DOOR MANUFACTURER.

HARDWARE SET: 14
DOOR NUMBER: 118.1
EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
4 EA	HINGE	5BB1HW	652	IVE
1 EA	CLASSROOM DEADBOLT	B663P6	626	SCH
1 EA	PUSH PLATE	8200 6" X 16"	630	IVE
1 EA	PULL PLATE	8303 8" 6" X 16"	630	IVE
1 EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1 EA	WALL STOP	WS406/407CCV	630	IVE
1 EA	GASKETING	488SBK PSA	BK	ZER

HARDWARE SET: 15
DOOR NUMBER: 105.1 200.1
EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3 EA	HINGE	5BB1HW 4.5 X 4.5 NRP	652	IVE
1 EA	POWER TRANSFER	EPT10 CON689		VON
1 EA	ELEC PANIC HARDWARE	RX-LC-QEL-98-NL-CON 24 VDC	626	VON
1 EA	RIM HOUSING	20-079	626	SCH
1 EA	FSIC PERM. CORE	23-030 EV29 T	626	SCH
1 EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1 EA	WALL STOP	WS406/407CCV	630	IVE
1 EA	GASKETING	488SBK PSA	BK	ZER
2 EA	WIRE HARNESS	CON X LENGTH REQ'D		SCH
1 EA	DOOR CONTACT	679-05 HM/WD AS REQ'D	BLK	SCE
1 EA	POWER SUPPLY	BY SECURITY SYSTEM INTEGRATOR		B/O
1 EA	CARD READER	BY SECURITY SYSTEM INTEGRATOR		
1 EA	WIRING DIAGRAM	BY SECURITY SYSTEM INTEGRATOR		

HARDWARE SET: 16
DOOR NUMBER: 131.2 131.3 115.1 132.2 132.3
EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1 EA	HINGE	5BB1HW	652	IVE
2 EA	SPRING HINGE	3SP1	652	IVE
1 EA	PRIVACY W/ OUTSIDE IND.	ND40 RHO OS-OCC	626	SCH
1 EA	FSIC PERM. CORE	23-030 EV29 T	626	SCH
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1 EA	WALL STOP	WS406/407CCV	630	IVE
3 EA	SILENCER	SR64	GRY	IVE

NOTE: DOOR IN 8'-0" FRAME UNDER AND OVER CUT DOOR BY 4".

HARDWARE SET: 17
DOOR NUMBER: 108.2
EACH TO HAVE:

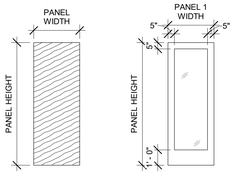
QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
4 EA	HINGE	5BB1HW	652	IVE
1 EA	PASSAGE LOCK	ND10 RHO	626	SCH
1 EA	SURFACE CLOSER	4040XP	689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1 EA	WALL STOP	WS406/407CCV	630	IVE
1 EA	GASKETING	488SBK PSA	BK	ZER

DOOR SCHEDULE

MARK	PANEL WIDTH LEAF 1	PANEL WIDTH LEAF 2	PANEL HEIGHT	PANEL TYPE	FRAME TYPE	FRAME HEAD HEIGHT	FIRE RATING	HARDWARE SET	DETAIL HEAD	DETAIL JAMB	COMMENTS
100.1	3' - 4"		8' - 0"	-		0' - 8"		13	7/A-506	8/A-506	
100.2	3' - 4"		8' - 0"	-		0' - 8"		13	7/A-506	8/A-506	
103.1	3' - 0"		8' - 0"	P00WD	FCW00AL	0' - 0"		09	13/A-506	14/A-506	
104.1	3' - 0"		8' - 0"	P00HM	F00HM	0' - 2"		05	9/A-506	10/A-506	
105.1	4' - 0"		8' - 0"	P00HM	F00HM	0' - 2"		15	9/A-506	10/A-506	
106.1	3' - 0"	3' - 0"	8' - 0"	P30AL	FCW00AL	0' - 0"		02	5/A-506 SIM.	16/A-506	
107.1	3' - 0"	3' - 0"	8' - 0"	P00HM	F00HM	0' - 2"		06	9/A-506	10/A-506	
108.1	3' - 0"		8' - 0"	P00WD	F00HM	0' - 2"		05	9/A-506	10/A-506	
108.2	3' - 0"		8' - 0"	P00WD	F25HM	0' - 2"		17	9/A-506	10/A-506	PASSAGE DOOR, NO LOCK
109.1	3' - 0"		8' - 0"	P00WD	F00HM	0' - 2"		07	9/A-506	10/A-506	
111.1	3' - 0"		8' - 0"	P00WD	F00HM	0' - 2"		10	9/A-506	10/A-506	
113.1	3' - 0"		8' - 0"	P00WD	F00HM	0' - 2"		10	9/A-506	10/A-506	
114.1	3' - 0"		8' - 0"	P00WD	F25HM	0' - 2"		09	9/A-506	10/A-506	
115.1	3' - 0"		8' - 0"	P00WD	F00HM	0' - 2"		10	9/A-506	10/A-506	
116.1	3' - 0"		8' - 0"	P00WD	F25HM	0' - 2"		09	9/A-506	10/A-506	
117.1	3' - 0"		8' - 0"	P00WD	F25HM	0' - 2"		09	9/A-506	10/A-506	
118.1	3' - 0"		8' - 0"	P00WD	F00HM	0' - 2"		14	9/A-506	10/A-506	
119.1	3' - 0"		8' - 0"	P00WD	F25HM	0' - 2"		09	9/A-506	10/A-506	
119.2	3' - 0"		8' - 0"	P30AL	FCW00AL	0' - 0"		01	5/A-506	6/A506	
121.1	3' - 0"		8' - 0"	P00WD	F00HM	0' - 2"		05	9/A-506	10/A-506	
121.2	3' - 0"		8' - 0"	P30AL	FCW00AL	0' - 0"		01	5/A-506	6/A506	
123.1	3' - 0"		8' - 0"	P00WD	F00HM	0' - 2"		05	9/A-506	10/A-506	CARD READER
124.1	4' - 0"		8' - 0"	P00WD	F00HM	0' - 2"		08	9/A-506	10/A-506	
127.1	3' - 8"		8' - 0"	-		0' - 8"		13	7/A-506	8/A-506	
127.2	3' - 8"		8' - 0"	-		0' - 8"		13	7/A-506	8/A-506	
129.1	3' - 0"		8' - 0"	P00WD	F38HM	0' - 2"		08	9/A-506	10/A-506	
129.2	3' - 0"		8' - 0"	P30AL	FCW00AL	0' - 0"		03	5/A-506	3/A-502	
129.3	3' - 0"		8' - 0"	P00WD	F00HM	0' - 2"		10	9/A-506	10/A-506	
131.1	3' - 0"		7' - 10"	P00WD	F00HM	0' - 2"		11	11/A-506	12/A-506	
131.2	2' - 10"		7' - 10"	P00WD	F00HM	0' - 2"		16	9/A-506	10/A-506	UNDER CUT 4"
131.3	3' - 0"		7' - 10"	P00WD	F00HM	0' - 2"		16	9/A-506	10/A-506	UNDER CUT 4"
132.1	3' - 0"		7' - 10"	P00WD	F00HM	0' - 2"		11	11/A-506	12/A-506	
132.2	3' - 0"		7' - 10"	P00WD	F00HM	0' - 2"		16	9/A-506	10/A-506	UNDER CUT 4"
132.3	2' - 10"		7' - 10"	P00WD	F00HM	0' - 2"		16	9/A-506	10/A-506	UNDER CUT 4"
132.4	2' - 10"		7' - 10"	P00WD	F00HM	0' - 2"		16	9/A-506	10/A-506	UNDER CUT 4"
133.1	3' - 0"		7' - 10"	P00WD	F00HM	0' - 2"		10	9/A-506	10/A-506	
134.1	3' - 0"		8' - 0"	P00WD	F00HM	0' - 2"		12	9/A-506	10/A-506	
135.1	3' - 0"		8' - 0"	P00WD	F00HM	0' - 2"		8	9/A-506	10/A-506	
136.1	3' - 0"		8' - 0"	P00WD	F00HM	0' - 2"		08	9/A-506	10/A-506	
200.1	3' - 0"		7' - 0"	P00HM	F00HM	0' - 2"		15	15/A-506	16/A-506	
201.1	3' - 0"		7' - 0"	P00HM	F00HM	0' - 2"		04			

GENERAL NOTES:
1. ALL HM FRAMES ARE TO BE PAINTED, PNT-4

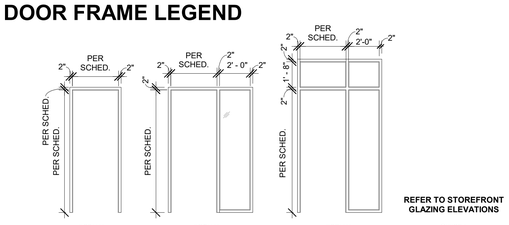
DOOR PANEL LEGEND



P00--
FLUSH DOOR
WD = WOOD
HM = HOLLOW METAL

P30--
DOOR WITH FULL LITE
AL = ALUMINUM
WD = WOOD

DOOR FRAME LEGEND



F00HM
HOLLOW METAL

F25HM
HOLLOW METAL W/ SIDELITE

F38HM
HOLLOW METAL W/ TRANSOM & SIDELITE

REFER TO STOREFRONT GLAZING ELEVATIONS

FCW00AL
ALUMINUM STOREFRONT

CMT
1627 MAIN STREET, SUITE 600
KANSAS CITY, MO 64108

WELLNER ARCHITECTS + engineers
1627 MAIN STREET, SUITE 100
KANSAS CITY, MO 64108

PEC
1100 MAIN ST, STE 1800
KANSAS CITY, MO 64105

olsson
1301 BURLINGTON
NORTH KANSAS CITY, MO 64116

KC - LEE'S SUMMIT REGIONAL
LEE'S SUMMIT, MISSOURI

GENERAL AVIATION TERMINAL
CITY PORJECT NO. - 17932172

Julie Black Wellner - Architect - MO #A-5006 - MO Certificate of Authority #000767 - STATE OF MISSOURI JULIE BLACK WELLNER REGISTERED ARCHITECT A-5006

April 24, 2025

MARK	DATE	DESCRIPTION
1	05/23/25	ADDENDUM 1

ISSUED FOR:	ISSUED FOR BID
PROJECT NO:	17932172
REVIT FILE:	2403 Lee's Summit Terminal-R24.rvt
DESIGNED BY:	JSB
DRAWN BY:	HJM
CHECKED BY:	LMD
APPROVED BY:	JBW
COPYRIGHT 2025	
SHEET TITLE	

DOOR SCHEDULE & LEGENDS

A-701

SHEET OF

5/23/2025 8:42:52 AM

Appliance Schedule

MARK	Type	Manufactuer	Model #/SKU	RM #	QTY	Furnished By	Comments
AP01	23.3 Cu. Ft. Counter-Depth French Door Refrigerator	Frigidaire Professional	PRFG2383AF	110, 124	2	CP-CI	
AP02	24" W Undercounter Refrigerator	Summit	162-AL54 • MPN: AL54	120	1	CP-CI	
AP03	23 1/2"W Undercounter Refrigerator w/ Glass Door	Summit	162-ALBV2466CSS • MPN: ALBV2466CSS	101A	1	CP-CI	
AP04	Glass Front Refrigerator Reach-in One-section	True	MFG #TS-23G-HC-FGD01	120	3	CP-CI	
AP05	2.2 Cu. Ft. Built-In Microwave	Frigidaire Professional	PMBS3080BF	120, 124	2	CP-CI	Install with Trim Kit
AP06	1.6 Cu. Ft. 1250Watt Countertop Microwave	Panasonic	NN-SN77HSATH SKU:6580627	110	2	CP-CI	
AP07	30" Electric Range ADA	Frigidaire Professional	PCFE3080AF	124	1	CP-CI	
AP08	Undercabinet Range Hood	Broan	BUEZ130SS	124	1	CP-CI	
AP09	Washer	Speed Queen	TR7003WN	118	1	CP-CI	
AP10	Dryer	Speed Queen	DR7004WE	118	1	CP-CI	
AP11	Dishwasher 24" Stainless Steel ADA	Bosch	SGE78C55UC	110, 124	2	CP-CI	
AP12	30" W Ice Maker	Koolaire	700-KYT0500A161 • MPN: KYT0500A 161	120	1	CP-CI	

Restroom Accessories Schedule

MARK	DESCRIPTION
RA1	Bobrick B-43944 Semi-Recessed Towel Dispenser & Waste Receptacle
RA2	ADA Grab Bar Set (18", 36", & 42")
RA3	Bobrick B-3574 Recessed Toilet Tissue / Seat Cover Dispenser / Waste Disposal, Left Side While Seated
RA4	Bobrick B-35745 Recessed Toilet Tissue / Seat Cover Dispenser / Waste Disposal, Right Side While Seated
RA5	Channel-Frame Mirror, Anti-fog
RA6	Bobrick B-9542 Fino Collection Surface Mounted Coat Hook
RA7	KB310-SSWM Baby Changing Station Closed Position
RA8	KB311-SSRE Baby Changing Station Closed Position
RA9	Bobrick B-370634 25 TrimLine Series Semi-Recessed 50 Cent Napkin-Tampon Vendor
RA10	Bobrick B-239 Utility Shelf with Rag Hooks and Broom Holders
RA11	Bobrick B-204-3 Vinyl Shower Curtain with Shower Curtain Hooks, Bright Polished
RA12	Bobrick B-6047x60 Classic Series Shower Curtain Rod
RA13	Bobrick B-4288 Contura Series Surface Mounted Multi-roll Toilet Tissue Dispenser
RA14	Bobrick B-4221 Contura Series Surface Mounted Seat Cover Dispenser
RA15	RE:Interior Elevations Custom Mirror Anti-fog
RA16	Glass Mirror with Stainless Steel Angle Frame, Full Height
RA17	Bobrick B-232 x 24 Hat & Coat Rack w/3 Hooks

Wall Guard Schedule

MARK	DESCRIPTION
CG	Corner Guard
EG	End Wall Guard

Room Finish Schedule

ROOM #	ROOM NAME	Floor Finish	Base Finish	Wall Finishes				Ceiling Finish	Notes
				North	East	South	West		
100	VESTIBULE	WOG-1	RES-1	PNT-1	-	HPL-1	-	APC-2	
101	CONCOURSE	TER-1/TER-2	RES-1	PNT-1				APC-2 + APC-4	
101A	COFFEE	-	CWT-3	-	HPL-1	CT-5	HPL-1	HPL-1	
102	CAFE / VENDING	TER-1	RES-1	PNT-1	PNT-1	-	PNT-1	GYP/APC-5 + APC-2	
103	PUBLIC MEDIA CENTER	CPT-2	RES-1	VWC-2	PNT-1	PNT-1	PNT-1	GYP/APC-2	
104	IT / ASOS	SC-1	RES-2	PNT-1	PNT-1	PNT-1	PNT-1	-	
105	MEP	SC-1	RES-2	PNT-1	PNT-1	PNT-1	PNT-1	-	
106	CIRCULATION (PUBLIC)	TER-1	RES-1	-	PNT-1	PNT-1	PNT-3	GYP	
107	TERMINAL STORAGE	SC-1	RES-2	PNT-1	PNT-1	PNT-1	PNT-1	APC-1	
108	CIRCULATION (PRIVATE)	TER-1	RES-1	PNT-2	PNT-2	PNT-2	PNT-2	GYP	
109	CUSTODIAL	SC-1	RES-2	PNT-2	PNT-2	PNT-2	PNT-2	APC-1	1
110	BREAK ROOM	TER-1	RES-2	PNT-2	PNT-2	PNT-2	PNT-2	APC-1	
111	LINE RESTROOM	EPX-1	EPX-1	PNT-2	PNT-2	PNT-2	PNT-2	GYP	1
112	WORKROOM	TER-1	RES-2	PNT-2	PNT-2	PNT-2	PNT-2	APC-1	
113	RESTROOM	CT-3	-	CT-2/PNT-1	CT-2/PNT-1	CT-2/PNT-1	CT-2/PNT-1	GYP	1
114	EXTRA OFFICE	CPT-1	RES-2	PNT-2	PNT-2	PNT-2	PNT-2	APC-1	
115	RESTROOM	CT-3	-	CT-2/PNT-1	CT-2/PNT-1	CT-2/PNT-1	CT-2/PNT-1	GYP	
116	AIRPORT MANAGER	CPT-1	RES-2	PNT-2	PNT-2	PNT-2	PNT-2	APC-1	
117	ASSISTANT MANAGER	CPT-1	RES-2	PNT-2	PNT-2	PNT-2	PNT-2	APC-1	
118	LINE SERVICE LOCKERS / WET GEAR	EPX-1	EPX-1	PNT-2	PNT-2	PNT-2	PNT-2	GYP	1
119	LINE SERVICE SUPERVISOR	TER-1	RES-1	PNT-2	PNT-2	PNT-2	PNT-2	APC-1	
120	LINE SERVICE OFFLOADING	TER-1	RES-1	WP-1/PNT-2	WP-1/PNT-2	WP-1/PNT-2	WP-1/PNT-2	APC-1	
121	LINE SERVICE WORKROOM	TER-1	CWT-3	WP-1/PNT-2	WP-1/PNT-2	WP-1/PNT-2	WP-1/PNT-2	APC-1	
121A	BATTERY CHARGING	-	-	WP-1/PNT-2	WP-1/PNT-2	WP-1/PNT-2	WP-1/PNT-2	-	
122	ELEVATOR	CT-3	-	-	-	-	-	-	
123	RECEPTION / LINE COUNTER	CT-1/2	CWT-3	CT-2	-	-	-	APC-2	
124	VENDING / PREP	TER-1	RES-1	PNT-1	PNT-1	PNT-1	PNT-1	APC-1	
125	STAIR	TER-1	-	CT-1	-	-	-	-	
126	FIGHT PLANNING	TER-1	-	CT-1	-	-	-	-	
127	VESTIBULE	WOG-1	RES-1	-	-	-	-	APC-2	
128	PASSENGER WAITING	TER-1/CPT-3	RES-1	-	-	PNT-1	-	APC-2 + APC-4	
129	QUIET / SENSORY WAITING	CPT-1	RES-1	VWC-3/PNT-3	AWP-2	VWC-3	VWC-3	GYP	
130	CIRCULATION (PUBLIC)	TER-1	RES-1	-	VWC-1/PNT-4	VWC-1	VWC-1	GYP	
131	MEN'S	CT-3	-	CT-2	CT-2	CT-2	CT-2	GYP	1
132	WOMEN'S	CT-3	-	CT-2	CT-2	CT-2	CT-2	GYP	1
133	FAMILY RR	CT-3	-	CT-2/PNT-1	CT-2/PNT-1	CT-2/PNT-1	CT-2/PNT-1	GYP	1
134	QUIET ROOM	CPT-1	RES-1	PNT-3	PNT-3	PNT-3	PNT-3	APC-1	
135	QUIET ROOM	CPT-1	RES-1	PNT-3	PNT-3	PNT-3	PNT-3	APC-1	
136	PILOT LOUNGE	CPT-1	RES-1	PNT-3	PNT-3	PNT-3	PNT-3	APC-1	
200	PASSENGER WAITING	TER-1/CPT-3	RES-1	PNT-1	PNT-3/CT-4	PNT-1	-	APC-2 + APC-4	

FINISH SCHEDULE NOTES:
1. EPOXY-BASED PAINT IN WET AREAS, TYP.

GENERAL FINISH NOTES:
A. PAINT ALL EXPOSED INTERIOR STRUCTURAL STEEL PNT-1.
B. PAINT ALL LOOSE LINTELS/PLATES PNT-5/6 TO MATCH ADJACENT BRICK.

Finish Legend

Symbol	Manufacturer	Series/Pattern	Number	Color	Remarks
Acoustical Panel Ceiling					
APC-1	Armstrong	Optima		White	24" x 24" 9/16" Grid
APC-2	Armstrong	Metalworks Linear		Cherry	6" Wide Planks, Perforated - Interior
APC-3	Armstrong	Metalworks Linear		Cherry	6" Wide Planks, Non-Perforated - Exterior and some Lower Interior Locations
APC-4	Armstrong	Metalworks Linear		Black	12" Wide Planks, Non Perforated - In Conjunction with APC-2
APC-5	TURF	Slice	04	Light Gray	Classic C, D, & E Profiles
Acoustical Wall Panel					
AWP-1	TURF	Reed	26	Faded Denim	
AWP-2	TURF	Reed	28	Indigo	
Brick Veneer					
BRK-1	Glen Gery	Metallix Series		Titanium Metallix	Running Bond Installation. RE:Elevations
BRK-2	Glen Gery	Burlesque Glazed Series		Oyster White with Speck Glazed	Stack Bond Installation, RE:Elevations
Carpet Tile					
CPT-1	Shaw Contract	Cross Weave Tile	5T526-25100	Cobblestone	18" x 36" Ashlar Installation
CPT-2	Shaw Contract	Local Time	5T523-21486	Vibrant Tejate	18" x 36" Ashlar Installation, Conference Room
CPT-3	Shaw Contract	Dye Lab	5T041-41496	Indigo	24" x 24" Monolitic Install, Inset Rugs
Ceramic Tile					
CT-1	Milestone	Farmhouse Living		Slate	Wall Panels
CT-2	Milestone	Area 51		Black	RR & Behind Main Counter
CT-3	Anatolia	La Marca		Nero Ventio Honed	RR Floors (Match Hangar 2)
CT-4	INAX	Japanese Tile World - Yohen Boarder		Dark Mix Blue	Mezz. Fireplace
CT-5	Tilebar	Splash		Lagoon	Exterior Mosaic + Above Coffee Bar
Ceramic Tile Trim					
TRIM-1	Schluter	Schluter®-QUADEC		Clear Anodized	Outside Corners on all Tile, Top Trim on Tile to Waiscott Level, Use Connectors
Corner Guards					
CG-1				Stainless Steel	Corner Guard, 2" Wings X 4' Tall, Installed above Wall Base
EG				Stainless Steel	End Guard. F.V. Wall Thickness
Epoxy					
EPX-1	Desco	Cremona Series	FB-513	Custom Color Match Torginol Coyote	Line Service Wet Gear Locker Room + Adjoining RR, Incorporated Wall Base
High Pressure Laminate					
HPL-1	Formica	Fenix	J0754	Blu Fes	Public Facing Terminal Wall Paneling + Coffee Bar + Casework
HPL-2	Formica		6995-26	Cherry Walnut	Office Side Casework
HPL-3				White	Cabinet Interiors
HPL-4	Wilsonart	Traceless	15505	Black Velvet	Under Front Desk
Metal Panel					
MP-1	Citadel	Envelope	2000 RR	Regal Blue	Building Fascias including Eyebrows
MP-2	Citadel	Envelope	2000 RR	Slate Gray	Freestanding Canopy Fascia, All Column Surrounds
MP-3	Centria	Concept Series Concealed Fastener Panels	CS-660	Slate Gray	Wall Panels, Vertical Ribs
Millwork Trim					
MWT-1	Fry Reglet			Millwork Insert W/ Return Keys	Wall Paneling
MWT-2	Fry Reglet			Millwork Channel L Angle w/ Return Key	Wall Paneling
MWT-3	Fry Reglet			Millwork U Channel	Front Desk
MWT-4	Fry Reglet			4" Millwork Reveal Base	Front Desk
Paint					
PNT-1	Benjamin Moore		OC-65	Chantilly Lace	Terminal Public Side Field Color
PNT-2	Sherwin Williams		0055	Light French Gray	Office Side Field Color
PNT-3	Sherwin Williams		6517	Regatta	Accent
PNT-4	Sherwin Williams		7069	Iron Ore	Accent, Hollow Metal Doors, Stairs
PNT-5	Sherwin Williams			Match Brick BRK-1	Loose Lintels/Steel Plates
PNT-6	Sherwin Williams			Match Brick BRK-2	Loose Lintels/Steel Plates
Parapet Cap					
CF-1	PacClad	Pac Continuious Cleat Coping		Regal Blue	Building Canopies, Continuous Cleat Coping
CF-2	PacClad	Pac Continuious Cleat Coping		Slate Gray	Brick Parapet Walls and Screen Walls, Continuous Cleat Coping
CF-3	PacClad	PAC-3000 CS		Slate Gray	Freestanding Canopy, ACM Parapet Piece
Precast Concrete Terrazzo					
PC-1	Wausau Tile		TZ51	Sleepy Hallow	Precast Stairs
PC-2	Wausau Tile		TZ32	Oyster Shell	For Background Color Reference Only, Match Aggregates of PC-1
Quartz					
QTZ-1	Cambria	Luxury Series		Harlow Matte	Front Desk + RR Counters
QTZ-2	Cambria	Signature Series		Hadley	Concourse Flight Planning Counter + Coffee Bar Counter
QTZ-3	Cambria	Coordinates Series		Black Rock Matte	Line Service Office Counters
Resilient Base					
RES-1	Johnsonite	Millwork - Stance	4.5"		Public Areas
RES-2	Johnsonite	Millwork - Mandalay	4.25"		Offices
Roofing					
ROOF	PacClad	Title-Loc	16"	Regal Blue	Standing Seam Roof with Snow Guards
TPO				White	
Solid Surface					
SS-1	Wilsonart		D354SL	Designer White	Shower Partitions
Terrazzo					
TER-1	Desco			Custom Blend - Dark Color	MATCH PC-1, Concourse, Cafe/Vending Area, Plubic and Private Corridors + Line Service
TER-2	Desco			Custom Blend - Light Color	MATCH PC-2, Concourse Accent
Vinyl Wallcovering					
VWC-1	MDC Interior Solutions	Len-Tex Contract	7427AL	Silva	
VWC-2	MDC Interior Solutions	Thom Filicia Affinity	TFC1873	Midnight	
VWC-3	MDC Interior Solutions	Thom Filicia Affinity	TFC1866	Pebble	
Walk Off Grille					
WOG-1	Matter	Nuway	7/16" Closed	Charcoal	Install Wall to Wall.
Wall Protection					
WP-1				Aluminum Diamond Plate	Near Mechanical Room and in All of Back Line Service + Stainless Trim Strips on Exposed Edges
Window Film					
FILM-1	Decorative Films		SXJ-0547	Feather Gradient	71" Roll Height
Wood Finish					
WF-1	VT Industries			Cherry Clear	All Wood Doors
WF-2				Walnut	Custom Casework / Wall Partitions - Flat Cut Veneer, Clear Finish

1

CMT
1627 MAIN STREET, SUITE 600
KANSAS CITY, MO 64108

WELLNER ARCHITECTS + engineers
1627 MAIN STREET, SUITE 100
KANSAS CITY, MO 64108

PEC
1100 MAIN ST, STE 1800
KANSAS CITY, MO 64105

olsson
1301 BURLINGTON
NORTH KANSAS CITY, MO 64116

KC - LEE'S SUMMIT REGIONAL AVIATION TERMINAL
LEE'S SUMMIT, MISSOURI
GENERAL AVIATION TERMINAL
CITY PORJECT NO. - 17932172

Julie Black Wellner - Architect - MO #A-5006 - MO Certificate of Authority #000767 - STATE OF MISSOURI - JULIE BLACK WELLNER - NUMBER A-5006 - REGISTERED ARCHITECT

April 24, 2025

MARK	DATE	DESCRIPTION
1	05/23/25	ADDENDUM 1

ISSUED FOR:	ISSUED FOR BID
PROJECT NO:	17932172
REVIT FILE:	2403 Lee's Summit Terminal-R24.rvt
DESIGNED BY:	JSB
DRAWN BY:	HJM
CHECKED BY:	LMD
APPROVED BY:	JBW
COPYRIGHT 2025	
SHEET TITLE	

FINISH SCHEDULES

A-712

SHEET OF

5/21/2025 2:35:17 PM

CITY OF LEE'S SUMMIT

PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION

Pre-Bid Meeting Minutes
LXT General Aviation Terminal
Project No. 17932172
May 15, 2025, at 10:00 A.M.
Howard A Conference Room at City Hall
220 SE Green Street; Lee's Summit, MO 64063

1. **Introductory Remarks**

   A. Introductions and announcement of recording of meeting
      i. Attendance log is attached at the end of the minutes.

2. **Bids**

   A. Due **Thursday 5/29/25** via the QuestCDN.com (Project No. 17932172) – **2:00 PM CDT**. Bids will be opened publicly and read via Microsoft Teams video conferencing at: Meeting ID 212 475 292 863 9, Passcode: BX3dP2vp.

   B. Prevailing Wage will be in effect for this project. Current Prevailing Wage Order is #31.
      a. Prevailing Wage 32 is submitted for approval, but has not yet received approval.

   C. Tax Exemption under Section 144.062 RSMo.

   D. Submit as part of the bid the following:
      a. Bid Bond
      b. Bid Worksheet

   E. Within five days of owners request following bid, Bidder shall submit:
      a. Bidder Qualification Statement
      b. Current Missouri Secretary of State Business Filing
      c. City of Lee's Summit Business License
      d. Bidder's state or other contractor license number, SAMS and/or DUNS, if applicable
      e. List of Proposed Subcontractors
      f. List of Proposed Manufacturers and Suppliers
      g. Affidavit of Non-Collusion
      h. Work Authorization/Eligibility Affidavit and E-Verify Memorandum of Understanding
      i. Documentation affirming enrollment and participation in a federal work authorization program. Documentation can be the electronic signature page from the E-Verify program's Memorandum of Understanding. Letters from contractors reciting compliance is not sufficient.

   F. Addendum 1 will be issued at least 4 days prior to the bid opening.

3. Section 80 – General Provisions

A. Contract Times: Substantial Completion within 425 calendar days; Liquidated Damages: $3,000/day.

4. Review of Project and Technical Specifications

A. Proposed Improvements:
   a. Earthwork
   b. New pavement (PCC pavement on base course on stabilized subgrade)
      i. Parking lot pavement
      ii. Airfield pavement
      iii. Sidewalks
   c. Curb and gutters
   d. Light poles
   e. Utilities (Sanitary, Water, Electric, Fiber Optic, Gas)
   f. Markings and Signage
   g. Landscaping and irrigation
   h. Building
      i. New general aviation terminal building: new facility that provides new office spaces for airport staff and services for the public
      ii. The terminal includes outdoor seating, a mezzanine, and other amenities/features
      iii. The building does include an elevator.

B. Specifications
   a. General Provisions are Federal Aviation Administration (FAA) Specifications
   b. Technical Specifications are City of Lee's Summit Standard Specifications for landside and FAA for the airside
      i. Where Lee's Summit Standard Specifications are not specific, the Kansas City Chapter of APWA specifications shall govern.
   c. Project QC/QA requirements can be found in Section C-100
   d. Quality Control Plan has to be submitted and reviewed prior to start of work

C. Geotechnical Report
   a. A Geotechnical Exploration Report is not part of the contract documents but may be available upon request

D. Allowances:

   a. Addendum 1 will include a schedule of allowances for the Evergy and Spire utility lines.

   b. Two allowances are embedded into the contract, summarized below. Detailed descriptions of what each Allowance shall cover can be found in Paragraph 3.3 of Section 01120a of the Specifications.
      i. Allowance 1: Evergy Allowance
      ii. Allowance 2: Spire Allowance

5. Construction Notice

A. Contractors bidding should be aware that other nearby construction projects are planned and may be performed concurrently during this work. The contractor is required to coordinate with other contractors with relation to planned improvements and access routes.
    a. City Hangar 2 is under construction immediately north of the GA Terminal, and that project includes the access roads to the GA Terminal. That work is expected to be substantially complete by August.
    b. A private hangar adjacent to the south end of the GA Terminal parking lot will be starting construction likely around the same time as the terminal. The contractor will need to coordinate operations.

6. Contractor's Operational Requirements

A. FAA AC150/5370-2F – Operational Safety on Airports During Construction
B. Contractor shall submit a Safety Plan Compliance Document (SPCD) in accordance with FAA AC 150/5370-2F.
C. All Vehicles and Equipment Shall Have Airport Orange and White Flags.
D. All work shall stay clear of the taxiways and runways
E. Airport perimeter gate must remain closed and locked any time it is not in use
F. Any equipment greater than 100-ft will require a special airspace study/permit prior to use. If any such equipment shall be required over the course of this project please coordinate this with CMT as early as possible. The airspace permit process can take several months.
G. Contractor Apron-Taxilane closures require a set low-profile lighted barricades and placed per construction activity plan sheet or as directed by the engineer.

7. Questions and Answers:

Questions must be received by 2:00 P.M. on Tuesday, May 20, 2025. Questions are to be addressed to Jason Barker at Jason@wellner.com.

Questions and answers from the meeting are listed below:

Q: Are there any special access requirements to go view the site?
A: No, Hangar 2 is under construction and the site is open.

Q: On the fire protection plans, on the 2nd floor, what's outside the 2nd door?
A: Door 201.1 is an exterior access door to the low roof.

Q: Is there a specific contractor for controlled access or any approved models?
A: No specific contractor, but Johnson Controls equipment is what the City uses.

CITY OF LEE'S SUMMIT

PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION

PRE-BID MEETING ATTENDANCE LOG

DATE: May 15, 2025
TIME: **10**:00AM
BID/RFP NO: LXT General Aviation Terminal

Please list your name, your firm and email address. Clarification information resulting from this meeting will be provided to you.

REPRESENTATIVE	COMPANY NAME	EMAIL
1. RICK BROWN	JA Lillig Excavating	RICK@JALillig.com
2. Jeremy Hoffman	Fogel-Anderson	Jhoffman@fogel-anderson.com
3. NATE LITTON	CENTRIC	nate.litton@centric.build
4. JOHN BOYKIN	F+G MECH	johnb@fgmechanical.com
5. Tate Holmes	Civic Elite Contracting	Tate.Holmes@Civicelite.com
6. Cole Tagtmeyer	Civic Elite Contracting	Cole.Tagtmeyer@civicelite.com
7. Chris Chatman	BlueChip Roofing + Waterproofing	Chris@bluechiproofingkc.com
8. JASON BARKER	WELLNER ARCHITECTS+ENG	jason@wellner.com
9. LINDSEY DAHL	WELLNER ARCH & ENG	ldahl@wellner.com
10. Jerry Bollinger	CMT	gbollinger@cmtengr.com
11. KRISTEN SPARKS	HARTLINE CONSTRUCTION	Ksparks@hartlineKC.com
12. Katie Walker	Hartline Construction	kwalker@hartlineks.com
13. JOHN MILLER	JOHNSON CONTROLS FIRE PROTECTION (FS)	JOHN.CHARLES.MILLER@JCI.COM
14. DESIRAE LORENZ	JOHN CONTROLS FIRE PROTECTION (FA)	DESIRAE.LORENZ@JCI.COM
15.		