CINCINNATI / NORTHERN KENTUCKY INTERNATIONAL AIRPORT

DESIGN CRITERIA MANUAL (DCM)

CVG
CINCINNATI/NORTHERN KENTUCKY
INTERNATIONAL AIRPORT

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DESIGN & CONSTRUCTION

Division 01 – General Requirements

Section 01 10 00 – Summary

Part 1– General / Project Submission Requirements

1.1 30% Design Documents

Documents prepared by the A/E consisting of drawings and other documents illustrating the scale and relationship of Project components.

Deliverables and actions include, but are not limited to:

A. Prepare basic 30% Design documents to include:
   1. Site plan with diagrammatic indications showing horizontal relationships.
   2. Sections through the site showing vertical relationships.
   3. Principal floor plans.
   4. Functional space plans.
   5. Incorporation of prior PDD review comments.
   6. General descriptive views or elevations.
   7. Illustrative sketches, models, or renderings, if required.

B. Analyze comparative systems with engineers and consultants, select systems to be used in the project and determine system space and location requirements.

C. Create or obtain lists of special building equipment and fixtures required by the Project that affect the design work and distribute the lists to appropriate consultants.

D. Confirm that the selected engineering and construction systems are compatible with one another.

E. Calculate areas and volumes and analyze plan efficiency of the design by usable area, area per person or other method.

F. Prepare a general description of the project, including materials and equipment outlines.

G. Start project outline specifications, including Division 1.

H. Prepare an estimate of probable construction cost based on all available data. Include appropriate contingency to cover future development of the project. If requested by Owner, provide a detailed estimate and/or life cycle costing.

I. Confirm with the Owner contracting strategy and scope for early procurement packages.

J. Submit 30% Design documents to the Owner. (These documents may include, but may not be limited to, drawings, descriptions, calculations, outline specifications, colors, materials, and statements of probable construction cost.)

K. Obtain Owner's written approval of Schematic Design documents.

L. Obtain Owner's written authority to proceed to the Design Development phase.

1.2 60% Design Documents

Documents prepared by the A/E consisting of drawings and other documents to fix and describe the size and character of the Project as to architectural, structural, mechanical, and electrical systems, materials and such other elements as may be appropriate.

Deliverables and actions include, but are not limited to:

A. Incorporate outstanding 30% Design review comments.
B. Confer with and obtain preliminary review from all regulatory agencies.
C. Review the building design program and verify compliance.
D. Define actual occupancy for each area and check against program.
E. Contact utility companies and public authorities for all services and initiate approval process, confirm all applicable local, public, and utility regulations and space/location requirements for all systems and equipment.
F. Finalize structural, mechanical, electrical, and other building systems selection.
G. Confirm that the selected engineering and construction systems are compatible.
H. Submit 60% Design documents including:
    1. Site plans indicating building location(s) and site improvements.
    2. Other necessary documents to include detailed plans, elevations, sections, schedules, and notes.
    3. Area calculations (net and gross).
    4. Building volume calculations.
    5. Prepare a preliminary Project Manual including BOD updates, General and Special Requirements, Division 1 specifications and outline technical specifications for all scopes of work.
    6. Updated materials, equipment, fixtures and building systems file.
    7. Updated probable construction cost estimate.
I. Confirm with the Owner contracting strategy and scope for early packages.
J. Obtain Owner's written approval of 60% Design documents.
K. Obtain Owner's written authorization to proceed to Construction Documents phase.

1.3 90% Design Documents

Documents prepared by the AQ/E consisting of drawings and specifications which set forth in detail the requirements for the construction of the Project and which are fully sufficient for Design/Builder to perform its construction obligations under the D/B Agreement.

Deliverables and actions include, but are not limited to:

A. Incorporate or resolve all outstanding 60% Design review comments.
B. As documents develop, confer with, and obtain further review from all regulatory agencies and establish schedule for submission and/or review.
C. Check with the applicable regulatory agencies and establish schedule for submission and/or review.
D. Coordinate drawings with Project Manual terminology and definitions.
E. Re-check Design documents for code compliance.

F. Develop an index of required drawings; check requirements of the Owner and governing bodies and prepare a one-fourth size mock-up of all project drawings, their sequence, and the information to appear on each sheet.
G. Finalize the project manual to include all final detailed technical specifications, general and special conditions, and Division 1 specifications.
H. If applicable, determine alternates, cash allowances and unit prices.
I. Finalize instructions on insurance, bonds, construction agreements and bidding procedures.
J. Finalize what items, if any, are to be furnished by the Owner, and those items not to be included in the contract.
K. Obtain schedule for delivery and installation of Owner-furnished materials.
L. Prepare final calculations of net and gross areas and volumes.
M. Prepare final pre-bid construction cost estimate.
N. Submit drawings, Project Manual, construction cost estimate and area calculations to the Owner.
O. Obtain Owner's written authorization to proceed to the Bidding or Negotiation phase.

Part 2 – Product Requirements

None.

Part 3 – Execution Requirements

None.

End of Section

Section 01 33 50 – Building Information Modeling (BIM), Virtual Design & Construction Coordination

Part 1 – General

1.1 Scope

A. This section identifies and outlines the process for modeling and construction coordination of existing and new facilities using 3D Virtual Construction Models. 3D Models will be used for the coordination process to identify and eliminate installation conflicts between trades and disciplines. Completed coordination will fit MEPFP, and any other trades included in the coordination process, within the design parameters provided by the Architect and Engineers.

B. Specific administrative and procedural minimum actions are specified in this section, as extensions of provisions in General Conditions and other contract documents. These requirements have been included for special purposes as indicated.

C. All MEPFP Equipment, Sheet Metal Ductwork, Mechanical Piping, BAS Controls, Plumbing, Process Piping, Electrical, Low Voltage, Fire Protection, Kitchen Equipment, Pneumatic Tube, Conveyance Equipment, Drywall Framing, Miscellaneous Metal, above ceiling Equipment Supports, and Steel Fabrication Subcontractors will be required to provide at minimum: 3D solid models for the coordination process.

D. Each Subcontractor shall provide the necessary qualified staff to generate their 3D coordination models and subsequent drawings extracted from those models. All personnel shall have previous experience and will be assigned to the job dedicated solely for the coordination modeling process. Field Personnel assigned to the job, such as Superintendents or Foreman actively running this project will not be acceptable for this position. Subcontractors at the Post Bid Review Meeting shall submit the name(s) or personnel who will be assigned to perform this work along with a brief description of their 3D modeling experience and the specific modeling software that will be used for the project.

E. If the Subcontractor does not have the qualified in-house staff to generate their 3D coordination models and are using a third-party consultant, that consultant must be approved by the Contractor prior to the Subcontractor awarding their modeling scope of work. The Subcontractor will provide a competent person from their company capable of making decisions on their scope of work, along with their consultant modeler, at each coordination meeting. The consultant will be considered an employee of the Subcontractor and be held to the same standards as the rest of the project teams in-house modeling staff outlined in this specification.

F. Each Subcontractor shall be fully responsible for keeping their 3D models, and drawings extracted from those models, updated throughout the duration of the contract such that the 3D model and 2D drawings are maintained as a “record drawing” of the facility. In conformity with the requirements of the contract, the updated drawings shall be available for review by the Contractor at any reasonable time during working hours. The Subcontractor shall be responsible for producing any additional schematic or 2D drawings required to construct the facility and/or to document the “record drawing” for the project. The Subcontractor shall submit to the Contractor any such drawings or schematics as required.

G. All work on the coordination drawings (including BIM’s) shall be performed by competent draftsmen in a clear legible manner utilizing standard industry conventions. All Subcontractors shall be responsible for providing their coordination drawing files according to the established

coordination schedule. It is the responsibility of each Subcontractor to supply a sufficient number of draftsmen to avoid delaying the coordination process and shop drawing submittals.

H. Each Subcontractor is required to collaborate with each other through email, telephone, or in person to resolve basic clashes outside of the regularly scheduled coordination meeting times and arrive at the meeting prepared to address the unresolved clashes in a constructive manner.

I. Subcontractor shall participate in BIM coordination meetings and follow up review meetings as requested by the Contractor. Subcontractor agrees that because of the information exchanged at such meetings, both the digital submission and the Work depicted in the Subcontractors' digital submissions, may require changes or modifications by the Subcontractor to achieve compliant coordination with other elements of the Project, including when provided by others. Such changes/modifications shall be accomplished at no additional cost or time impact to the project.

J. Subcontractor agrees that; neither participation in the BIM process, nor the use of BIM, relieves the Subcontractor of the responsibilities described in this document, including to coordinate their work with the work of other trades, and strictly comply with other requirements of the Subcontract Agreement, the Contract Documents, and Specifications. It is expressly understood and agreed that, notwithstanding the requirement for submittals, traditional shop drawings and other submissions shall be provided by Subcontractor as described in the Contract Documents. No party will be entitled to any claim for extra time or money, dispute, controversy, cost or expense increase, arising out of the direct or indirect use of BIM.

K. Subcontractor acknowledges and agrees, that the Contractor shall incur no responsibility or liability with respect to the BIM or use thereof, including that resulting from errors, omissions or deficiencies in the BIM process. In the event that Subcontractors provide deficient information or data that does not represent the work, or is corrupted, or contains a virus, and/or otherwise damages or delays the BIM process, the Subcontractor shall bear all costs associated with reconstructing their BIM's, and to remediate such deficiencies and their negative impact and effects at no additional costs to the Contractor, the Owner or other Subcontractors.

L. This specification section works in conjunction with any Owner, Architect or Contractor incorporated BIM Execution Plan(s), if applicable to the project.

1.2 Description

A. Extent of Model(s)

- The 3D model, in Plan View, shall extend (at a minimum) five feet beyond the exterior walls of all new construction on site or as directed by the Contractor.
- Vertically, the model shall extend from the lowest extent of the foundations, or lowest underground piping, and up through and including the roof and penthouse.
- To the extent that the building systems are designed, they will be included in the full vertical and horizontal extents of the model including underground utilities and roof- mounted items.
- A 3D architectural and structural base model will be provided with a scope representing at a minimum the information typically drawn in two dimensions and as required for proper coordination. The following identifies the Level of Development (LOD) for items that will be provided by the Contractor or the Architect.
  a. Architectural: All exterior slabs, walls, doors, windows, steps, railings, and roofs will be modeled. All interior floor slabs, walls, ceilings, doors, windows, toilet partitions, shower

stalls, large furniture that would make access from a ladder difficult, and casework (as needed for coordination) will be modeled.

b. Structural: Structural concrete and steel elements will be modeled including columns, beams, stair risers and landings. Handrails will not be modeled unless integral to coordination process.
c. Owner provided equipment will be modeled where there are large items (such as sterilizers, cart washers, Operating Room lights, Operating Room booms, etc.) where these items, or features of these items, will have an impact on coordination.
d. Elevator shaft clear space will be modeled. Nominal elevator cab size and overrun shall be modeled including hoist beam. Elevator cabs will not be modeled.
e. Furnishings will be modeled if deemed necessary for coordination purposes.
f. Architectural and Structural Bulletin changes will be modeled if deemed necessary for coordination purposes.

- Level of Development (LOD) required for other coordination team members (the Contractor reserves the right to require additional information to be included in the coordination model):
  a. Large MEPFP Equipment: Model a "travel-path" into the building to the point-of-installation for all items that are larger than a personnel-door / double-door/ corridor width / freight elevator door opening so that coordination of means & methods + sequence of construction can be coordinated between trades to ensure a travel path will be available for major equipment when it arrives (including equipment that ships in pieces or "splits" that have to be assembled in place and other large items that have a long lead time) so that dedicated construction openings or late- installation of certain walls can be determined in advance of equipment arriving.
  b. HVAC: At a minimum, all ducts and air handling equipment shall be modeled to the outside face dimension including flanges, joints, fittings, connections, insulation, offset requirements, dampers, controls, access zones, control panels, diffusers and grills, associated piping (to outside diameter of pipe or insulation, whichever is greater), any electrical work, and hangers and supports associated with the HVAC system. Control cables outside the cable tray and wire management hooks are not required to be modeled unless the area is significantly congested as determined by the Contractor. Equipment (with pads) will be modeled to overall height, width, and depth with clearance and maintenance access zones (see 'o.' below) per equipment specs, building code, or Owner requirement.
  c. Plumbing and Mechanical Piping: At a minimum all plumbing, piping, equipment (with pads), hangers, supports, and piping connections will be modeled to its overall height, width, and depth; including access zones for valves and cleanouts. Pipes will be modeled to the outside diameter of the pipe adding insulation as its own entity where applicable or the pipe insulation, whichever is greater. Fittings, connections, valves, and cleanouts will not be modeled unless the area is significantly congested as determined by the Contractor. Plumbing-feeding fixtures such as sinks, toilets, drinking fountains, floor and roof drains shall be modeled for rough in location.
  d. Fire Protection: At a minimum, all components of the fire protection system shall be modeled including all piping, valves, valve cabinets, fire pumps (with pads), sprinkler

heads, hangers, supports, access zones (see 'o.' below), and control panels.

e. Pneumatic Tube Systems: At a minimum all piping, hangers, supports, transfer stations, diverters and pumps shall be modeled including required clearance and access zones (see 'o.' below).
f. Electrical: At a minimum, all panels, and devices (including access zones as required by the local AHJ), light fixtures (with installation clearances), cable trays (with clearance above and to at least 1 side per Owner requirements), conduit larger than ¾", hangers, busways, power feeds to the equipment, generators, and switchgear will be modeled. Large groups of ¾" (or less) conduit will be modeled to reflect the overall space requirements.
g. Fire Alarm: At a minimum, all components of the fire alarm system shall be modeled including all panels and devices with access zones and conduit larger than ¾". Large groups of ¾" (or less) conduit in a particular location will be modeled to reflect the overall space requirements.
h. Telecommunications: At a minimum, all cable tray, wire managements hooks, conduit larger than ¾", and communication racks and cabinets will be modeled. Large groups of ¾" (or less) conduit in a particular location will be modeled to reflect the overall space requirements.
i. Structural Fabrication: At a minimum, all columns, beams, girts, purlins, bracing, girders, trusses, joists, kickers, steel shapes, slabs, pre-cast concrete elements, laminated wood framing, metal floors and roof decks, pre-engineered building components, miscellaneous framing, trestles, and catwalks shall be modeled.
j. Conveyance (elevators, escalators, etc.): At a minimum, all equipment including service access, support connections, and mechanical spaces shall be modeled.
k. Kitchen Equipment: At a minimum, all manufactured equipment and supporting elements requiring field installation either by this trade or by others shall be modeled. Include rough in locations for equipment services. Refer to HVAC requirements for ductwork associated with hoods or exhaust.
l. Framing: Although standard wall and ceiling framing is not modeled; any atypical framing features required for tiered ceilings, soffits, curved walls, arched ceilings, etc. should be modeled to ensure there is enough available space for the additional framing / bracing for these components.
m. All trades: Seismic bracing shall be shown where required.
n. All trades: All required access panel locations and sizes shall be shown as required.
o. When modeling Access and/or Clearance Zones:
    1) Above ceiling equipment zones must be modeled per equipment spec, building code, or Owner standard – whichever is greater; and must extend down to the level below to insure there is adequate space to land a ladder for access.
    2) Zones for equipment installed below ceiling must be modeled per equipment spec, building code, or Owner standard – whichever is greater; and must extend down to the level below.
    3) Unresolvable clashes with Zones must be approved by the Contractor.

B. Software Requirements

- Each Subcontractor must provide and be able to read 3D solid model files in at least one of the following standard formats: DWG, NWC, IFC, DWF, or DGN. Other file types will work for submission if they are readable by Navisworks. All files must be created as ACIS solids (including insulation) so accurate clash detection can be performed. 2D drawings will be extracted from the 3D model to maintain a true representation of the model into the drawings. To ensure the measurements on the 2D drawings match the model, the model features in the 2D drawings may not be edited in any way after the extraction from the 3D model.
- Subcontractors shall inform the Contractor of any object enablers, software plug-ins, 3D viewers, etc., required for the Contractor to view their 3D models with the latest version of AutoCAD and Navisworks. The Subcontractor is responsible for uploading these specific object enablers to the project File Sharing site.
- The Contractor requires all Subcontractors to send a test file of their model prior to award of contract in order to ensure that the model format is usable for the coordination process. It is understood that all Subcontractors participating in the coordination process shall provide model files compatible with Autodesk Navisworks – which is the primary tool that will be used for model integration, design collaboration and clash detection.

1.3 Procedure

A. Coordination Process and Procedures
   1. A File Sharing site will be set up which will contain all necessary file information and procedures. Each Subcontractor and design team member will have access. This will be the main path for distributing files and information.
   2. The Architect and Engineer will supply, at a minimum, 'DWG' files for Subcontractors to use in developing their 3D coordination models. It is possible that each Subcontractor may need to pay a fee for the electronic files and sign appropriate release forms from the A/E.
   3. The Contractor will prepare a Coordination Model comprised of Architectural, Structural, and Civil (if applicable) models prior to starting the coordination process. This model shall be posted to the project File Sharing site for Subcontractors for reference use only. Models will also reference items furnished by the Owner as they relate to coordination.
   4. If the building structure is steel the initial coordination model containing the structural engineer's model will be updated with a steel fabrication model (when available). This will require all trades to review the model and may require some re-coordination.
   5. Before starting the Coordination Process, the Contractor and Subcontractors will review the pre-coordination model, 2D files, and drawings at a scheduled pre-coordination meeting. Information gathered at this meeting will be used to determine priority areas, identify potential problem areas, and note any details on the drawings that are not currently modeled that may need to be added to the model.
   6. BIM Coordination meeting times, posting frequencies and schedule will be agreed upon at the coordination kickoff meeting. There are 3 types of coordination meeting styles to choose from:
      a. LOCK DOWN – coordination will be conducted in consecutive all-day meetings until coordination has been completed. This process should be used if it's determined that

coordination can be completed within 2 weeks (10 working sessions) or less. Specific times, durations, and frequency per week to be established in detail between the Contractor and Subcontractors.

b. WEEKLY – coordination will be conducted on a weekly basis until coordination is complete. No single meeting should last more than 2 hours. For this method to succeed mechanical Subcontractors and the Contractor Lead must communicate multiple times per week outside the weekly scheduled meeting.
c. COMBINATION – A formula of Options a. and b. combined, as agreed upon between Contractor and Subcontractors.

The Contractor will lead the coordination team and drive Navisworks during the coordination meetings. Subcontractors shall post prepared 3D coordination models to the project File Sharing site. The Contractor will combine each 3D model into a single 3d model and facilitate determination of conflicts. Once conflicts are determined, all coordination team members are responsible for coordinating their work, including re-work of the 3D model until conflicts are minimized and resolved in a satisfactory manner.

7. Accurate and timely coordination is the responsibility of all trades. The Contractor will schedule meetings as required, which Subcontractors must attend. Failure to attend is a serious violation of this agreement, the Contractor will supplement under written notice modeling work of absent Subcontractor, all cost associated with supplementation will be borne by the Subcontractor on notice. Modeling work declared improperly coordinated is non-compliant and may require the Subcontractor to relocate work as directed by the Contractor. There will be no compensation to any Subcontractor for relocating any part of the work that has been installed without proper coordination between all the Subcontractors and released by the signoff process through the Contractor for installation. Any work installed not in accordance with the approved coordination composites, that creates additional work to other Subcontractors is non-compliant and shall be removed. The cost of such additional work shall be assessed to the responsible Subcontractor as determined by the Contractor. Errors in coordination will be resolved by the Subcontractor at its own expense. Where agreements cannot be reached, the Contractor will furnish a final resolution. The non-compliant Subcontractor will be responsible for the expense of said resolution.
8. All Subcontractors must follow the standard file naming convention. The file name will consist of an agreed upon project designation, an approved abbreviation of their discipline, followed by the Level, Building, Area, or other descriptor. Below are some typical sample file names (there may be projects that do not fit this envelope; those will be dealt with as they come up):
   a. CGHQ-HVAC-L1 (typical naming structure – project, discipline, level)
   b. WP79-ELEC (no level callout required if project has only one level)
   c. NRDT-E-L1-HVAC (Project, Building, Level, Discipline)
9. Typical outline to be used to prioritize clash resolution between systems (every project should customize this list to best suit their specific needs):
   a. Architecture (walls, ceilings, soffits, framing (typical and any required for additional support) and Structure (columns, beams, joists, kickers, and any additional structure required) will take precedence over other disciplines.
   b. All code required elements and their integrity are to be maintained.

c. Maintenance and service aisles shall be maintained.
d. Underground routing and stub-up locations (where applicable).
e. Shafts along with core and sleeve locations (where applicable).
f. Large HVAC duct and equipment, and gravity pipe will typically have priority among the MEPFP trades.
g. FPRO sprinkler heads that are required to be centered in ceiling tiles will only take precedence if conflict occurs at drop location.
h. Conflicts will be resolved by the coordination team to take into consideration the best interest of the overall project schedule and budget.

10. All Subcontractor participants shall agree and understand that the 3D coordination model is only a means for coordination and that each Subcontractor is responsible for cross-referencing all contract documents with model information.
11. If coordination meetings occur onsite, each Subcontractor will have a competent person, with a laptop, who is capable of running their design software and making competent decisions that do not negatively affect their system at all coordination meetings so changes can be worked out and verified during the meeting.
12. Subcontractors not internally modeling their own work must still have a representative at each meeting to make system decisions along with the external modeler also available either on site or via WebEx. Any cost associated with a web meeting that would not otherwise be required due to external modeling will be the responsibility of that Subcontractor.
13. Any Subcontractor responsible for more than 1 trade must have clashes between those trades worked out prior to coordination meetings. If clashes cannot be corrected before a meeting the issue(s) must be communicated to the coordination team for their input in potential resolutions.
14. Major changes made during the coordination process shall be clearly documented and submitted through the proper approval process to the Architect/Engineer. Minor changes during this process shall be noted in the “record drawing” documentation.
15. Each Subcontractor shall be responsible for updating their BIM’s and “field installation” drawings as required to maintain record coordination and construction information. The Contractor may require proof record BIM’s and drawings as a condition for payment. Updates shall include but are not limited to:
    a. Correction of issues found during coordination
    b. Incorporation of Bulletin’s and RFI’s
    c. Submittal modifications and revisions on A/E approved documents
    d. “Record drawing” field modifications
    e. “Record drawing” documentation items such as valve tags, access doors, etc.
16. The Contractor will post the results of each coordination meeting that will include, at a minimum, the following items:
    a. NWD file of the model used at that meeting for coordination
    b. Updated Coordination Schedule (PDF) - if applicable
    c. Signoff Sheet (PDF) - if applicable
17. Signoff shall occur when all coordination team members are satisfied that coordination conflicts have been adequately resolved. All Subcontractors involved in the coordination process shall sign Contractor’s standard signoff sheet for each completed coordination area.

If the Subcontractor pre-fabricates, the 'Ready for Fab' box must also be checked to indicate that material is being released into their fab shop. Authorized representatives are to be designated by each Subcontractor and approved by the Contractor. At the following meeting, each Subcontractor may be required to bring physical drawings to be signed by all other coordination team members. Each Subcontractor is responsible for reproduction costs associated with production of hard copy drawings for signoff.

18. Signoff of the 2D drawings extracted from the coordinated model shall signify the Subcontractor's intention to complete installation as indicated on the coordination drawing. Each Subcontractor shall be responsible for locating their respective components as shown on the 3D model and field installation drawings. Field installation conflicts will be resolved by the affected party at the direction of the Contractor with no additional cost to the Contractor or the Owner. The signed documents will remain in the Contractor's possession.
19. Field QA/QC checks will be performed by the Contractor to ensure the installation of MEP/FP systems are compliant with the tolerances identified within the BIM Coordination effort.
20. Conflicts that result in re-work due to an item not being included in the modeling process, a lack of modeling detail, or improper field installation will be subject to re-work at no additional cost to other Subcontractors, the Contractor, or the Owner. The Subcontractor in error will be responsible for all costs associated with re-working their system, and/or the cost of having another system(s) move.
21. Each Subcontractor will provide all other parties involved in the coordination process a copy of their completed documents. This can either be a hard or digital copy, depending on which type is preferred by each Subcontractor.
22. Each Subcontractor is required; in addition to the development of coordinated models, to submit hard copies of their respective coordinated systems in a 2D format as required by the project documents and specifications for approval through the regular submittal process. Subcontractors are responsible for producing 2D coordinated drawings after resolving all clashes for a designated area. This file shall include all coordinated drawing information, full dimensions (especially elevation dimensions), text, tags, etc. needed to successfully install the systems in the field.

B. Modeling Process
   1. All Subcontractors' drawings and model files shall be based on the origin point provided by the Contractor. The cost of any changes required by the Subcontractor to their drawings or models, due to the use of an unauthorized origin shall be borne by the Subcontractor.
   2. All base models shall be modeled to a Level of Development (LOD) equal to or greater than typical shown on a 2D plan, section or elevation drawn at 1/8" = 1'-0". Detailed models for specific areas of the project may require greater Level of Development. Refer to the Project BIM Execution Plan for specific LOD per modeled element, per discipline.
   3. The Model working units shall be feet/inches. The level of tolerance (allowable interference) shall be determined at the coordination kickoff meeting.
   4. If a Subcontractor discovers an error, inconsistency, or omission in its own information or submissions, or the information/submissions provided by others, or any BIM deficiency, it shall promptly report the same to the Contractor via written notice and shall contain all relevant specifics.

5. Each Subcontractors Model will show only their disciplines equipment with no entities allowed outside the areas defined in 1.2.A. Any text, balloons, or leaders that reference changes made must be on a single separate layer (or workset) so it can be easily hidden before being inserted into the coordination model. Model entities used for reference outside the defined modeling area must be hidden.
6. Subcontractors may create their model in any software that meets the export to Navisworks requirements listed in 1.2.B.1, however, the Owner may require a Revit model upon completion of the project to include any changes made after coordination was completed and/or as-built field conditions. If not originally created in Revit, a Revit model must be created using native Revit objects directly from the coordination model. Any inconsistency between the coordination model and record model will be corrected by the model author.
7. The Subcontractor is responsible for creating and maintaining any necessary Facility Management data required by the Owner or Contractor throughout the process.
8. The Subcontractor will group and name their equipment geometry in accordance to the equipment schedules outlined in the contract design documents for import into the Contractor's QA/QC software.
9. For all other model definition see 1.2.A.

1.4 Schedule

A. The coordination team shall agree on a coordination schedule based on the Reverse Phase Schedule (RPS). This schedule should consider delivery and long lead items of all Subcontractors involved in the coordination process. The coordination schedule is a guide, and the overall project schedule will determine completion date for coordination. If for any reason schedule is not maintained, Subcontractor(s) will be held responsible per Messer's Subcontractor Agreement included in Section 00 52 00 – Agreement Forms.

B. list of drawings and the coordination drawing schedule will be agreed upon by all Subcontractors and updates to the same, shall be binding on the Subcontractors. Manpower, equipment and material adjustments as necessary to meet the Coordination Drawing Schedule as created by the project team members is the responsibility of each Subcontractor.

End of Section

Section 01 50 00 – Temporary Facilities and Controls

Part 1 – General / Design Requirements

None.

Part 2 – Product Requirements

None.

Part 3 – Execution Requirements

None.

End of Section

Section 01 73 00 – Execution

Part 1 – General / Design Requirements

1.1 Civil / Site Layout

A. Coordinate System: Grid
B. Horizontal Datum: NAD 83 (2011)
C. Vertical Datum: NAVD 88
D. Zone: Kentucky Single Zone
E. Geoid Model: GEILD 12B
F. Units: US Survey Feet

1.2 Horizontal and Vertical Control Plan

A. See Appendix item 017300-A KYSNGZ Horz & Vert Control Plan for survey control monumentation.

Part 2 – Product Requirements

None.

Part 3 – Execution Requirements

3.1 Cutting and Patching

A. Floors
    1. Tenants are not allowed to penetrate the terrazzo flooring.
B. Exterior Building Enclosure
    1. Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.
        a. Exposed items must be authorized and vetted by CVG project manager.

End of Section

Public Restrooms

Part 1 – General / Design Requirements

When and where possible, stainless-steel fixtures and finishes should be minimized. This will include doors, paneling, and trim.

1.1 Structural

A. To the extent possible, metal stud partitions will be constructed on a 6" high concrete curb.
B. Plumbing chase and Custodial Rooms will have 6" high concrete curb at all perimeter walls.

1.2 Mechanical

Restrooms will have a minimum of 15 air changes per hour.

1.3 Plumbing

A. To the extent possible, water shut-off valves, temperature control valves, electrical transformers, etc. will be located within 30 horizontal inches of a ceiling access panel.
B. Alternative location of access panel will be located under the lavatory countertop concealed behind the stainless-steel skirt.
C. Plumbing service chase access will be through a door no less than 30" wide. Access to plumbing chase from inside restrooms rooms will be avoided.
D. Access to plumbing chase from inside the Custodial Room will be avoided.
E. Restroom Layouts in new construction and restroom renovations where space permits will incorporate a plumbing service chase with a minimum clearance of 18" from point of access to and behind all plumbing fixtures. Where plumbing fixtures require cleanouts, a 30" free and clear path will be provided for service equipment and personnel.
F. If a plumbing service chase with the above-mentioned clearances cannot be met, cleanouts shall be turned into the public space.
G. Plumbing service chase will have a minimum of one (1) drain, centrally located, free and clear of any obstruction and in close proximity to back of fixtures.

1.4 Electrical

A. At least one (1) convenience GFCI electrical outlet will be provided in at least one (1) ADA stall and one (1) above each diaper changing station.
B. Provide one (1) convenience GFCI electrical outlet in plumbing service chase at each end of fixture banks to power maintenance equipment.
C. One (1) distress button with data connection to the CVG Airport Response Coordination Center will be provided in each single use All Gender/Family Restroom, Nursing Room, and Service Animal Relief Area where isolated passengers can call for help in the event of an emergency. Distress button device faceplate shall be waterproof and have continuous caulking. Mounting

height will be 15” from finished floor to center of distress call button. It shall be located adjacent to a water closet for fallen passengers to call for help.

D. Electrical equipment will not be located in any Custodial Room, Restroom, or any other wet room.
E. Electrical equipment and capabilities should be extended to the entrance of each restroom for future state technology needs.

1.5 Lighting

Continuous, wall to wall, indirect linear lighting will be installed above all lavatories, water closets, urinals, and feature walls as the primary means of illuminating these areas.

A. All other required lighting will be fully recessed in the ceiling.
B. Self-illuminating mirrors, mirror edge lighting, wall sconces, or candelabra fixtures will not be used.

1.6 Doors

A. Doors will not be stainless steel.
B. Unless otherwise required by Building Code or if unique space constraints exist, doors will not be used to enter restrooms.
C. Restroom entry vestibules will have 48” wide minimum clear openings that are arranged to allow free-flow traffic without sightlines into the restrooms.
D. Where doors are required, doors, frames and hardware will be in compliance with the door and lock specifications provided in design criteria manual.

1.7 Ceilings

A. Ceiling heights will be 9’-0” minimum above finished floor.
B. Porous ceiling materials are not acceptable.
C. Ceiling will be cement plaster or water resistant gypsum board.
D. All ceilings will be painted.
E. All access panels, registers and grills will be painted to match ceiling.

1.8 Toilet Partitions

A. Toilet partitions should not be stainless steel.
B. Typical toilet stalls in new construction and in new restroom layouts will be 3’-6” x 6’-0”
C. Ambulatory and accessible stall widths will be sized to meet the applicable code requirements. In existing structures where spatial constraints do not permit the above, code requirements will govern.
D. Toilet partitions will be ceiling-hung and rigidly fastened to structural steel supports concealed in ceiling plenum. Partition heights will be floor to ceiling.
E. To limit partition racking, additional floor pedestal supports will be provided every 2-3 stalls.

1.9 Finishes

A. Design Color Palette
   1. Restrooms colors will be limited to three (3) distinguishable values of white to grey color scale (preferably warm grey), a single accent color in specific locations and natural finished stainless-steel accessories.
   2. Floors and bases are to be the middle value (i.e. Medium Grey). Ceilings, wall field tile and lavatory/counters will be the lightest value (i.e. White).
   3. Accent colors are to be a single hue or color of glass tile and are limited to above the water closets and on feature walls defined as single plane walls without openings, fixtures, or accessories.
   4. Each restroom is limited to (1) one color.

1.10 Walls

A. Wall field tile will be ceramic tile laid up in a horizontally balanced and consistent pattern from corner to corner and bottom to top. Rectangular tiles will be laid horizontally. Horizontal stack bond pattern is preferred. Wall field tile will start with a full tile above the wall base tile.
B. Wall field tile will be square or rectangular with no dimension less than 8”.
C. Behind water closets, the wall field tile will be from top of wall base tile to approximately 60” above finish floor (AFF) and end with a full tile.
D. If used glass tile will be square or rectangular and with no dimension less than 4”. Size and bond pattern of glass tile will match the field tile pattern where possible and course out with field tile in all cases.
E. If accent tile is used, it will be above 60” and run to the ceiling. If accent tile is not used, wall field tile will run to ceiling. No exposed wall finishes will be painted gypsum board.
F. Tile grout will be epoxy and white for all wall tile applications.
G. Colored accent tile will only be used above urinals where urinals and water closets are on a common wall. In such cases, the ledges and accent color tile will be consistent from inside corner to inside corner.
H. Restroom layouts in new construction will have a solid surface ledge at approximately 60” AFF behind water closets and urinals and in existing structures where space permits. Ledge solid surface material will match the lavatory countertops.
I. Transitions from one material to another or one color to another, will only occur at inside corners and at stainless steel cased openings between two adjacent spaces.
J. Stainless Steel corner guards will be used at all outside corner of all tile walls from top of wall base to ceiling. At the end of tiled partitions, single stainless steel end cap installed flush to the surface of the tile can be used in lieu of two flush corner guards.
K. Custodial Room wall finish will have tile or fiberglass reinforced panels installed above the mop sink to a height of 60 inches. The remainder of the wall finish will be painted impact resistant, water-resistant gypsum board.

1.11 Floors

A. Restroom floor tile finish assembly will be per the guidelines in TCNA.
B. Floor finish will have positive slope to floor drain(s).
C. All exposed concrete floors will be smooth and have a high performance, waterproof polyurethane sealant that is chemical resistant, and abrasion resistant.
D. Waterproof membrane at finished floors shall extend up the wall structure for at least 3 feet high behind all wall hung plumbing fixtures and 12 inches high for walls without plumbing fixtures.
E. Floor and Tile grout will be similar in color and epoxy grout for all floor tile applications. Align base and wall tile grout lines with floor tile when possible.
F. Restroom tile cove base will be provided and match floor tile and extend up the wall.
G. Non-tile cove bases and cove strips are not acceptable.
H. Terrazzo is not an acceptable flooring for Restrooms and should not be considered.

1.12 Under Countertop Lavatories/Trash Drop Layouts

A. Restroom countertops will be solid surface acrylic polymer product.
B. Engineered stone is not acceptable.
C. Countertops will all have positive slope to lavatories.
D. Undermount sinks should be larger than the hole in the counter surface. Sealant must be complementary to the intended function of the sink (alleviate grime build up with good design)
E. A continuous integral splash will be provided at all walls adjacent to lavatories and trash drops.
F. Integrally mixed automatic faucet and soap dispenser will be installed at 45 degree angle from centerline of lavatory.
G. A circular finished thru counter trash drops will be provided at the end of each pair of lavatory /wash stations.
H. A standard removable trash receptacle will be provided under each trash drop.
I. Trash receptacles shall be at least 29 inches tall, no more than 15 inches deep and no more than 14 inches wide.
J. No enclosure will be provided in front of trash receptacles.
K. A removable skirting (matching the S.S. toilet partition pattern and finish) will meet ADA code requirements and will be provided under each lavatory to allow access to plumbing for maintenance purposes.
L. Clear dimension of 30-1/2” will be maintained from finish floor to bottom of counter for the full length of counter.
M. Floor finish will be sloped to and from this line of demarcation to achieve positive slope to floor drain(s).
N. Battery powered fixtures (soap dispensers, etc.) are not an acceptable alternative. When possible, soap dispensers should be hard wired.
O. All dispensers should have keyless, top-fill access, including lady boxes, toilet paper dispensers and
P. Locking toilet seat covers is not required.

1.13 Accessories

A. All Public Restrooms will be equipped with a diaper changing station. Diaper changing table should not impede circulation paths. Location of diaper changing station preferential order:
   1. Along main circulation path: solid surface fixed-type ledge/countertop with no depressions, or stainless steel with a front lip.
   2. Along main circulation path: Recessed, stainless steel, "flip down" model.
   3. In ADA stall: Recessed, stainless steel, "flip down" model.

B. Coat hooks will bear 150# weight, installed on latch side of the toilet stall where partition door opens out. At end conditions where adjacent wall is demising, coat hook to be on adjacent demising wall and clear of partition door impact. Coat hooks will be anchored to integral structural members inside the toilet partitions sized to carry the load. Coat hooks installed on toilet partitions doors are not acceptable.

C. Paper Towel Dispensers will be located adjacent to lavatory stations on the side wall to minimize hand water drip accumulation along the passenger circulation paths. Provide a Paper Towel Dispenser in compliance with ADA requirements. Paper Towel Dispensers are the primary drying source. A Warm Air Dryer is a secondary drying source. There will only be one paper towel type with associated paper towels and one warm air dryer.

D. Wall mounted foam/liquid soap dispensers are not allowed.

E. Restroom Layouts in new construction and restroom renovations where space permits will have through counter trash drops located adjacent to each lavatory/counters and typically one for each two lavatory stations.

F. In restroom renovations where spatial limitations prohibit item above, a minimum two (2) trash drops for every three (3) wash stations will be provided.

G. Under exceptional circumstances and only when approved by CVG, one (1) trash drop will be provided for every three (3) wash stations. Individual stainless steel framed mirrors (24"x48") will be provided in new construction or sized and mounted from top of splash in restroom renovations.

H. All mirrors are to have anti-graffiti film.

I. One (1) Emergency call button speaker phone will be installed in each individual isolated Public Restrooms, Nursing Room, Service Animal Relief Areas, Family Restrooms and All Gender Restrooms. Mounting height shall be 15" above finished floor.

Part 2 – Single use Facility/ All gender/ Family Restrooms

This room shall serve to accommodate passengers traveling with companions, passengers traveling with the opposite sex and passengers traveling with children.

Signage for these restrooms shall be identified as "All Gender Restrooms" per signage standards.

2.1 Floors

A. To Match restroom finish and requirements

2.2 Walls

A. To Match restroom finish and requirements

2.3 Ceilings

A. To Match restroom finish and requirements

2.4 Doors

A. Door shall not open directly onto the main public circulation path where possible.
B. The door hardware will have a thumb-turn lock with occupancy indicator display.

End of Section

Ablution and Multi-Faith Spaces

Part 1 – General / Design Requirements

1.1 Floor

A. Color to coordinate with restroom finishes. Non-slip tile will be required in ablution room.

1.2 Walls

A. Color to coordinate with restroom finishes.

1.3 Ceilings

A. Color to coordinate with restroom finishes.

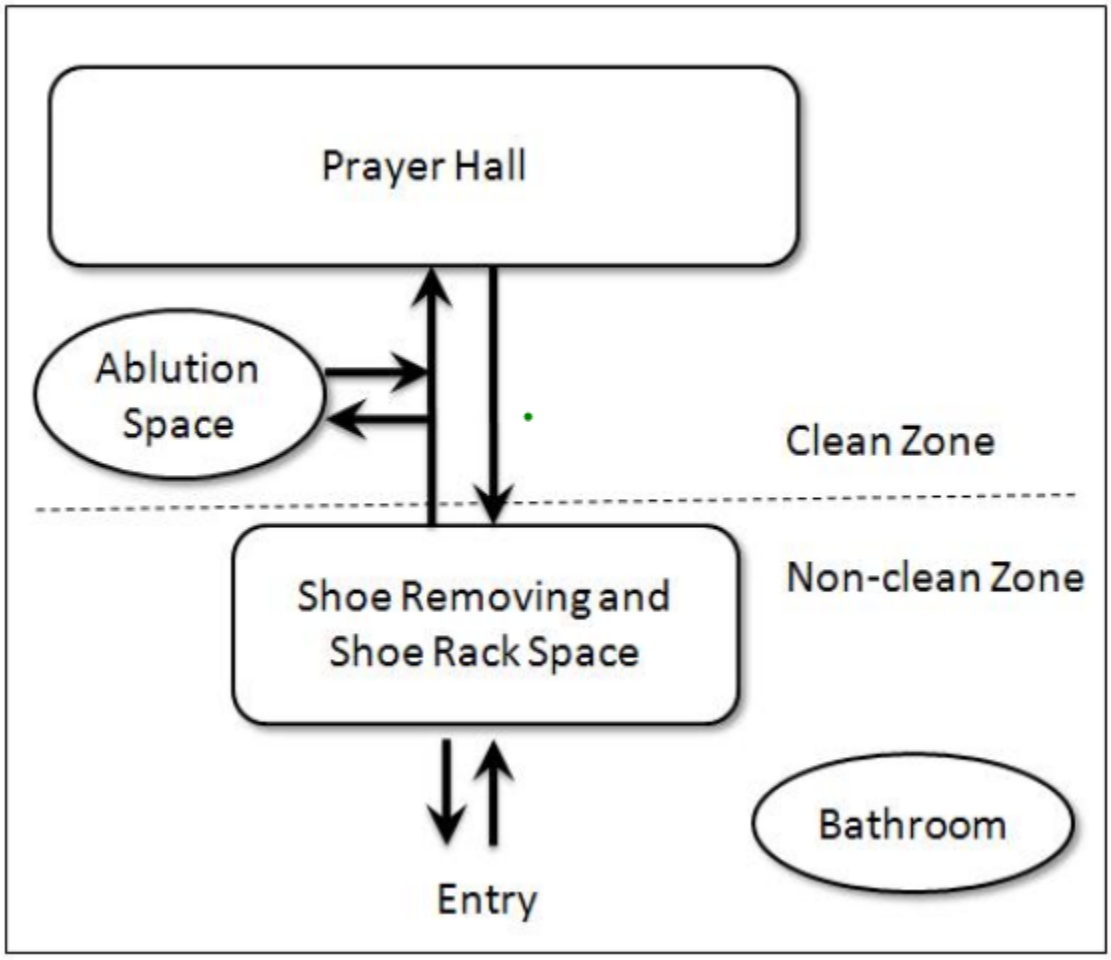
1.4 Doors

A. Door shall not open directly onto the main public circulation path where possible. Access to the room should be opposite Mecca (Quibla).

1.5 Shoe removing and shoe rack space

A. Built-in seating and shoe rack required for taking off and putting on shoes near entry prior to or adjacent to entrance of the ablution area or multi faith space.
B. The space should have negative air pressure (suction), connected directly to an exhaust.

Ideal format below to allow for clean zone that are not within the ablution space.



End of Section

Nursing Rooms

Part 1 – General / Design Requirements

Rooms dedicated to lactation and the care of small children shall be provided within the concourse, terminal and FIS area at CVG International airport.

A. The nursing room will not be accessible from inside the restrooms. It will be accessible from the main public circulation path.
B. A water closet or urinal is not allowed in the nursing room.
C. A diaper changing surface is not allowed in the nursing room.

1.1 Accessories

A. Lavatory with faucet and soap dispenser. Faucet should not be automatic is nature as that will impede the cleaning of nursing parents' items. Faucet should allow for temperature-controlled water.
B. 30" minimum countertop adjacent to lavatory where space is available
C. Paper towel dispenser with integrated trash receptacle
D. Multiple Convenience GFCI electrical duplex outlets with USB/USB-C ports to be located above countertop, opposite the lavatory.
E. Single padded bench or chair for nursing passengers to sit. If a chair is to be used instead there should more than one shall be provided.

1.2 Floors

A. Floor tile finish to match restroom finish.

1.3 Walls

A. Wall tile finish to match the restroom finish.

1.4 Ceilings

A. Ceiling finish to match the restroom finish.

1.5 Doors

A. The nursing room door shall not open directly onto the main public circulation path.
B. The Nursing room door hardware will have a thumb-turn lock with indicator display.

End of Section

SARA Rooms

Part 1 – General / Design Requirements

The Federal Aviation Administration (FAA) regulation known as the Air Carrier Access Act -14 CFR Part 382 requires Service Animal Relief Areas (SARA) for passengers with disabilities either departing, connecting, or arriving at an airport with a service animal. CVG has several SARA rooms throughout both concourses, terminal and FIS.

1.1 Layout

A. Prefer all or partial glass enclosure to easily see in and out of SARA.
B. Specific requirements should be considered in view that most users are likely to be visually impaired.
C. fixtures and fittings should be recessed into the walls so that they do not present a protrusion hazard to users. When not possible, it should be ensured that all sharp edges are removed and that features contrast with the wall coverings. There are many examples of metal bins and white walls which have little visual contrast.
D. A step-free, well-lit access route and entrance way with appropriate, inclusive signage.
E. The entrance(s) should be wide enough and have sufficient turning radius inside the space for mobility aids/wheelchairs maneuvering.
F. The entrance(s) should ideally be a push button operating an electronic sliding door(s). Manually operated doors should be easy to operate for people in wheelchairs. Doors do not require locks. Doors are recommended to avoid the risk of entry by small children and contamination by solid and liquid animal waste.
G. The facility must be well drained to avoid standing water (slip risk).
H. The floor finish must be designed to be highly slip resistant.
I. A drinking bowl that can be emptied easily when water is not entirely consumed should be installed for the service animal. The tap must be easy to operate, preferably automated, with levers preferred to handle dexterity-related disabilities. Service animals typically need to drink before and after their flight.
J. The relief area should be able to be washed down after use, typically with an accessible hose and appropriate drainage.
K. should have a solid waste trap for the wash down area, preferably kept constantly wet to function properly.
L. Does not need to be impregnated with pheromones if it has artificial grass; and does not need a prop for the service animals (as featured in many SARAs). Users advised us that they are specifically trained to toilet on demand.
M. A sink, preferably height adjustable, with a generous shelf for personal items.
N. Recessed/contained plumbing beneath to minimize risk of knee strike by persons in wheelchairs.
O. Paper towel dispenser (electric hand dryers are not recommended as sudden, high-volume noise can be distressing for persons with cognitive disabilities).

P. Clear written use instructions in an accessible format on the outside of the facility and a push button device to provide audible instructions adjacent to the wash down facility.
Q. A call button connected to the Airport Control Centre for the user to summon assistance, if required.
R. Pet area rooms will be accessible from the main public circulation path.
S. Pet area rooms will not have a water closet, urinal or diaper changing surface.

1.2 Mechanical

A. Pet area rooms will have 30 air changes per hour min.
B. Pet Area rooms will have constant negative pressure.

1.3 Plumbing

A. One hose bid is required in this area.
B. One floor drain is located in the center of the room, and one in the pet relief area.

1.4 Accessories

The Pet Area rooms will have the following accessories and shall be in compliance with ADA standards.

A. Lavatory
B. Soap dispenser
C. Mirror
D. Recessed paper towel dispenser with integrated trash receptacle
E. Dog Bag dispenser
F. Dog Bag disposal
G. Hose bibb.
H. Pet-friendly turf, grass or another surface that's gentle on paws in all types of weather.

Floor mounted accessories are not encouraged due to the extent of damage caused by uric acid from animals.

Requirement of note from the FAA guidelines: "Airports must consult with one or more service animal training organizations regarding design, dimensions, materials and maintenance of service animal relief areas." Doing so creates an opportunity to engage with local organizations while also ensuring that the airport is kept well-informed of best practices and the evolving needs of this specific passenger type and their companions.

1.5 Walls

A. Where feasible, metal stud partitions will be installed on 6" high concrete curb.
B. All walls will have waterproofing membrane extend full height from floor to ceiling.
C. Wall field tile will be in full height ceramic tile installed in a balanced and consistent pattern.

D. White or light-colored tile shall be used.

1.6 Floors

A. All floor finishes will have positive slope to floor drains.
B. All floors will have tile finish.
C. Tile cove base will be provided and match floor tile.
D. Pet areas with synthetic grass inserted over tile floor. Removable stainless-steel fasteners and composite perimeter bender board will be used to secure the “synthetic material to a reasonable level of tautness.

1.7 Ceilings

A. Porous ceiling materials are not acceptable.
B. Ceiling will be cement plaster or water resistant gypsum board.
C. All ceilings will be painted white
D. All access panels, registers and grills will be painted to match ceiling.

1.8 Doors

A. Door bottom will have a minimum 12” high stainless steel kick plate.
B. Door hardware to include an ADA thumb turn indicator.

End of Section

CVG Art Program – Exhibition Wall and Display Case Design & Construction

Part 1 – General / Design Requirements

1.1 Exhibit Type and Media

A. The CVG Art Program exhibits paintings, photographs, drawings, site-specific installations, sculptures, mixed-media art/installations, kinetic art, video, digital projection, sound, multi-media, and interactive art - by individual artists, or groups of artists.

1.2 Exhibit Wall and Display Cases

A. All CVG owned/leased Terminal Development Programs shall incorporate the design, fabrication and installation of museum-quality display walls, display cases, and dedicated infrastructure such as lighting, power, and data. Designs require Art Program approval prior to 60% and 90% / 100% architectural design submittal.
B. Displays shall be simple and clean to make the exhibition wall or case a blank canvas for exhibitions. Displays shall be designed to be as versatile as possible. Adding embellishments or making the case an irregular shape will make it difficult to select art to place inside.
C. Materials used for display construction shall be chosen carefully because component materials can easily become a significant source of pollutants or harmful fumes for displayed objects. Outgassing from materials used in the construction of the exhibition case and/or coatings used for lining or finishing the case interiors can be destructive.
    1. Displays must be constructed of safe, durable, and cleanable materials such as metal, glass, Plexiglas, or sealed woods.
    2. Separating certain materials from the display section of an exhibition by lining relevant surfaces with a barrier (drywall) or impermeable film will help protect items from damage. Any fabrics that line or decorate the case (e.g. polyester blend fabric), and any adhesives used in the process, must also be reviewed to determine any risk. If the display is to be painted, acrylic or latex paint in white eggshell/satin finish is preferable.
    3. Storage shall be incorporated into display cases and be placed out of sight, in the base or behind the backboard of a case.
    4. Whenever possible, the exhibition area shall be within view of security cameras.

1.3 Art Display Cases

A. Overall
    1. The overall aesthetics of the display's cases shall be simple, clean, and visually integrated with the Terminal design and interior finishes. The design should not draw attention away from the exhibition with mullion-free glazing systems for an unfettered view of the case contents. The materials selection and quality of fabrication and installation shall be safe, robust, and durable enough to resist frequent exhibition changes as well as normal wear and tear in an airport passenger terminal environment.
    2. Accessibility, Maintenance, and Security

a. Display cases shall allow for attachment of suspended, wall- and floor-mounted, 2- and 3-dimensional work in all media.
b. Minimum uniform clear depth of interior display area shall be 18 inches. Minimum clear height of interior display area shall be 48 inches.
c. Case access shall permit adequate room for loading and safe installation of a single object as close as possible in size to the display area.
d. Floor within case shall be with removable panels for access, maintenance and changeout of floor finish material.
e. Display case glass shall be low iron (ultra-clear), UV protected safety glass. Any adjacent or nearby glass windows/skylights shall be UV protected safety glass.
f. Removable/movable and lockable (keyed) glass system to access and protect art works.

3. Finishes and Interior Filtration/Climate Control
   a. Walls and floors should be reinforced with (wood) sub-panels for mounting artworks and finished to appear seamless. Finished interior surfaces shall be paintable.
   b. Interior finishes and furniture should be made of low-formaldehyde or sealed products.
   c. The base shall be stainless steel satin finish up to 6” above floor and solid surface panels for all other exposed surfaces not requiring glass.
   d. Filtered ventilation (i.e. filtered vents) shall be incorporated, avoiding a completely sealed environment, allowing air exchange with use of HEPA filters, etc.
   e. Provide options for procuring a stable climate-controlled environment, desiccants, or passive and active climate stabilization systems. Humidity shall remain within 50 – 72%.
4. Technical Information and Materials
   a. Art Program shall review and approve single point load capacity and uniformly distributed load capacity for interior display case walls and floors.
   b. Loads acting as a result of art hung on the wall of the case shall be assumed to reach a maximum of 30 pounds per square foot (psf) over the full height of the case.
   c. Loads acting as a result of art fixed to the floor of the case shall be assumed to reach a maximum of 500 pounds point load over a one foot square area.
   d. Loads acting as a result of art hung from the ceiling of the case shall be determined during the design phase wherever it is appropriate to support vertical loads.
   e. Electrical and data service shall be provided by Architect to the location of the case for distributing power/data as required by IMT and POC respectively, to form a complete systematic install.
   f. Task lighting (LED) shall be incorporated for working within the display case.
   g. If freestanding, cases shall contain an internal structural steel frame anchored to the base building in a method that allows for discrete attachment and detachment and engineered as required by applicable codes and regulations.
   h. Free-standing cases shall be able to hold up to 50 pounds per square foot plus 200 pounds point load over 4” x 4”.

1.4 Art Display Walls

A. Designated art walls shall be finished with 5/8" drywall over 5/8" fire rated/retardant plywood sheathing.
B. Art walls are to remain blank, clean and seamless for Art Program. Keep art wall locations clear of ATMs, vending machines, thermostats, SmarteCartes, chairs, BIDS/FIDS/GIDS, mechanical or light switches, fire strobes, fire extinguishers cabinets, AED cabinets, wayfinding or signage, wall-mounted security cameras, and any furniture or fixture as allowed by Code.
C. Art Program shall review and approve single point load capacity and uniformly distributed load capacity for art display walls.
D. Loads acting as a result of art hung on the wall (up to 8 inch depth) shall be assumed to reach a maximum of 30 pounds per square foot (psf) over the full height of the wall.

PART 2 – Lighting

2.1 Goals

The goal of this section is to provide standards for all art lighting at CVG Airport (CVG). Additional discipline-specific guidance related to electrical work can be found throughout the Design Criteria Manual (DCM) including, but not limited to electrical and sustainability guide specifications. These standards provide information for the art lighting component at CVG and provide the project design team the ability to have a unique lighting experience while keeping with CVG guidelines. As CVG is a transitory space, the lighting requirements should be considered as a transition space where long-term viewing of art at close distances is not the predominate experience.

2.2 General

Art lighting fixtures and design shall provide the lighting levels, visual comfort, color rendering and aesthetics to complement the artwork and the area in which it is installed. Lighting of artwork is especially important to CVG and all art lighting design, including photometric calculations, shall be approved by CVG prior to submitting 90% construction documents for plan check. All lighting shall be installed in areas that are accessible by ladder or lift for ease of maintenance. Artwork types anticipated include wall-mounted, floor mounted, suspended, free-standing cases and built-in casework.

2.3 Standards

A. The art lighting design shall follow the following industry standard guideline:
   1. IES Lighting Handbook, 10th Edition.
B. The art lighting design shall reference the following industry standard guideline:
C. ANSI/IES RP-30-17 Recommended Practice for Museum Lighting.

2.4 Luminaire Requirements

All lighting design shall be high efficacy, energy efficient and shall comply with the latest Title 24 requirements. Dimmable LED's shall be required utilizing 3000K - 3500K color; provide consistent color temperature (tight binning), high CRI (85+), and rated life >50,000 hours.

A. General
   1. Luminaire manufacturer shall have a minimum of five (5) years' experience in the manufacture and design of LED products and systems and no less than one hundred (100) North American installations.
   2. Unless otherwise specified, all LED luminaires and power/data supplies shall be provided by a single manufacturer to ensure compatibility and consistency.
   3. All LED sources used in the LED luminaire shall be of proven quality from established and reputable LED manufacturers and shall have been fabricated after two (2) years from current date.
   4. Replacement and Spares a. Manufacturer shall provide written guarantee of the following:
      a. Manufacturer will keep record of original bin for each LED module and have replacement modules from the same bin available for five (5) years after date of installation.
      b. Manufacturer will keep an inventory of replacement parts (source assembly, power and control components).
      c. Manufacturer's LED system will not become obsolete for ten (10) years: Manufacturer will provide exact replacement parts or provide upgraded parts that are designed to fit into the original luminaire and provide equivalent distribution and lumen output to the original, without any negative consequences.
   5. All parts of system shall be replaceable in field. Manufacturer shall provide written guarantee of the following: (1) Manufacturer has in place a written recycling and re-use program and will accept returned product and/or components for recycling or re-use. (2) Manufacturer will properly dispose of non-recyclable components that are deemed harmful to the environment.
   6. System shall carry a full warranty for five (5) years. Additional warranty may be purchased by the project or Owner.
   7. Products and Components – Performance a. LED luminaires and components shall be UL listed or UL classified (or equivalent approved agency such as ETL).
   8. LED luminaires and components shall be CE certified.
   9. LEDs shall comply with ANSI/NEMA/ANSLG C78.377-2008 – Specifications for the Chromaticity of Solid State Lighting Products. Color shall remain stable throughout the life of the lamp. Color shall match approved sample.
   10. LEDs shall comply with IESNA LM-80 – Standards for Lumen Maintenance of LED Lighting Products.
   11. LED sources shall have no measurable (UV) or infrared (IR) emission in the light beam.
   12. Luminaire shall meet a minimum flicker threshold of 120Hz. (IES recommendation)

13. Luminaires shall have at least 50 lumens per Watt out of the aperture (efficiency).
14. All fixtures shall be approved by CVG prior to specification, provide sample for review.

2.5 Luminaire Application

A. Track-mounted lighting shall be utilized for most art lighting to allow for lighting of many different types of artworks and easy adjustment of lighting when artwork changes.
   1. Track shall be continuous for the full length of the art locations or contain breaks no larger than 12 inches. (CVG requirement)
   2. Luminaires shall allow for full adjustment of pan and tilt angles to allow aiming at artwork. Pan and tilt angle indicators are desired "for tilt and rotation precision. This is especially important where multiple accents are used in proximity and where each is to produce an identical lighting effect. Also desired is locking capability to lock tilt and aim once set in the field. This minimizes, if not eliminates, misalignment that can occur during re-lamping or cleaning." (IES Lighting Handbook 10th Edition 15.1.2.1)
   3. Luminaires shall allow for field changing of optics (reflectors) and integration of multiple field-changeable optical accessories (louvers, lenses etc.) and glare reduction accessories (snoots, visors). This is important to allow for shaping of the light on the wall from general wash to specific highlighting of various size artworks, as well as reducing luminaire brightness and glare.
B. Built-in and free-standing cases shall have integral casework lighting of artwork – external lighting may create veiling reflections in the glass. Coordinate with casework designer. Luminaire types may include linear, recessed or surface-mounted adjustable.
   1. Luminaires shall be hidden from view wherever possible.
   2. Linear luminaires shall be lensed to prevent view or reflection of individual LED diodes.
   3. Remote power supplies and dimmer controls shall be located in a secure, concealed, accessible and well-ventilated location away from artwork.
   4. Casework glass shall be non-reflective glass to prevent veiling reflections over views of the artwork.
C. Motorized luminaires may be considered for special applications.

2.6 Locations and Angles

A. Industry standard is a 30-35º aiming angle to the artwork to prevent glare and veiling reflections on glass. The airport environment is largely transitional so there is less concern of glare and veiling reflection and more focus on uniform light levels created by higher aiming angles. Locate track to provide a nominal 45º angle to the artwork. Lower angles than 45º (closer to the wall) will provide less uniform light levels, higher angles than 45º (further from the wall) create more risk for direct and reflected glare and shadowing of art by visitors. ANSI/IES RP-30-17 Museum Lighting
B. A 6' setback from the wall is standard for single-story walls to provide uniform light levels across the wall for any size artwork, and to allow for artwork of varying depth off the wall including

free-standing artwork against the wall. Multiple track locations may be required to provide appropriate lighting angles and uniform light levels for taller walls.

C. Provide wide-optic “wall wash” or “flood” luminaires evenly spaced one to three feet on center to provide uniform light levels across the top of wall. Also allow for medium- or narrow- optic luminaires evenly interspersed to light the bottom of the wall to match light levels from the wall wash luminaires. These can also be used to spotlight/highlight the artwork against the rest of the wall/wall wash. These luminaires shall be equipped with accessory lenses such as linear spread lenses, softening lenses for more even illumination or to fine-tune the distribution.

2.7 Controls

All art lighting shall be dimmable. Provide dual-circuit-dimmable track with separate control every 14-16 feet to allow for separate dimming of wide- and narrow optic luminaires, and/or lighting of different artwork to different light levels. Alternatively provide on-board or wireless (Bluetooth) dimming of individual luminaires. Art lighting shall be switched separately from the rest of the architectural lighting to allow for turning off late at night or if art is not being displayed at that location. All controls and dimmers shall be in a secure, concealed, and accessible location.

2.8 Light Level Criteria

A. Provide light levels on artwork walls for five to ten times the average ambient light levels for “Feature” level emphasis on the artwork (IES Lighting Handbook 10th Edition Table 15.2). Provide light levels of 60-80 foot-candles average, 140 foot-candles maximum (CVG requirement).

B. Light level uniformity across the individual artworks should be 2-to-1 average-to-minimum and 4-to-1 maximum-to-minimum. Uniformity across entire walls should be 10-to-1 maximum-to-minimum (IES Lighting Handbook 10th Edition 15.1.2.3).

C. Light levels should be provided with artwork light sensitivity considered to reduce risk of significant deterioration.

2.9 Lighting Design Submittals

A. Provide photometric calculation, based on actual architectural conditions, including appropriate reflectance values and light loss factors. Submit to CVG for review and compliance.
   1. Calculations shall be done with software such as AGI 32 or Visual.
   2. Calculations shall be done in point-by-point format with elevation views and shall include mounting height, on-center spacing, luminaire type, distance to wall, lumen information, light loss factor information and all appropriate industry standard levels. Elevation views shall show calculation points at 2’ on center spacing in both directions, from floor to ceiling of the art location wall.

B. Design shall indicate initial system luminaire quantities as well as system maximum capacity of luminaire quantity or power.

2.10 Lighting Designer Qualifications

A. The lighting designer shall be a member of International Association of Lighting Designers or a Certified Lighting Designer.

2.11 Extra Stock

A. Furnish to the Owner and store at the site where directed, extra stock of each type of lighting fixture type and installed in the Project in quantities as required by Owner, packaged in manufacturer's unopened cartons, and identified as to contents by fixture type.
B. Furnish items above with appropriate quantity of each optical accessory, reflectors, glare shielding or other components available for the luminaire.

2.12 Installation

A. Provide labor and materials for final aiming of all adjustable fixtures under the Architect's supervision. Aiming shall take place immediately before building is turned over to Owner, after regular working hours where required.
B. Provide setting of dimming levels under the direction of the commissioning agent or Architect/Lighting Designer.
C. Provide training in system operation for Owner.

PART 3 – Power and Data

3.1 Infrastructure

A. Provide infrastructure for electrical power and data for future art exhibitions and cultural performances as follows:
    1. Art Exhibition Locations: a. At least two dedicated power and data outlets at each art wall location. For art exhibition walls larger than 45' long, power/data must be evenly spaced and located at specified intervals, approx. every 15'.
        a. Position power and data outlets at the top of the wall behind soffits recessed outside of the display area or mounted in ceilings directly above display walls.
        b. Power for art exhibition locations shall be provided as dual outlet, 20amp dedicated circuit. Each wall shall have a minimum of one (1) dedicated and distinct 20amp circuit.
        c. Data ports shall be duplex data (CAT6 Ethernet).
B. Cultural Performance Locations:
    1. Two dedicated distinct 30amp power outlets in walls or at base of columns.
    2. Power for cultural performance locations shall be provided as 30amp dedicated circuit.

End of Section

End of Division 01 – General Requirements

Division 02 – Existing Conditions

Section 02 41 19 – Selective Demolition

Part 1 – General / Design Requirements

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and materials so as to not void existing warranties.
B. Route(s) for debris-removal operations must be authorized and vetted by CVG PM.
C. Provide miscellaneous cutting, patching and repairing of finishes, roof , walls ,etc. as required to accommodate the new work, and provide a uniform new look.
D. Cut and patch systems back to a sound substrate to maintain weather tight seal to protect existing conditions.
E. All penetrations through fire rated assemblies must include provisions to restore the required rating.

Part 2 – Product Requirements

None.

Part 3 – Execution Requirements

A. CMU that penetrates through a slab must be removed (1) course below grade and the slab patched back flush.

End of Section

Geospatial Data and Survey

Part 1 – General / Design Requirements

A. Horizontal and Vertical Datums
This survey is based on the North American Datum of 19833 (NAD83 (2011)), with further reference made to the Kentucky Single Zone Coordinate System. The Survey is also based on the North American Vertical Datum of 1988 (NAVD88). GEOID12B was used for the calculation of orthometric heights on survey data.

End of Section

End of Division 02 – Existing Conditions

Division 04 – Masonry

Section 04 22 20 – Concrete Unit Masonry Repointing

Part 1 – General / Design Requirements

1.1 Summary

A. Section Includes: Repointing joints with mortar.

1.2 Unit Prices

A. Work of this Section is affected by unit prices specified in Section 012200 "Unit Prices."
B. Unit prices apply to additions to and deletions from Work as authorized by Change Orders.

1.3 Definitions

A. Low-Pressure Spray: **100 to 400 psi (690 to 2750 kPa)**; **4 to 6 gpm (0.25 to 0.4 L/s)**.

1.4 Preinstallation Meetings

A. Preinstallation Conference: Conduct conference at Project site.
B. If needed, insert list of conference participants not mentioned in Section 013100 "Project Management and Coordination."
C. Review methods and procedures related to repointing CMU masonry including, but not limited to, the following:
D. Verify CMU masonry repointing specialist's personnel, equipment, and facilities needed to make progress and avoid delays.
E. Materials, material application, sequencing, tolerances, and required clearances.
F. Quality-control program.
G. Coordination with building occupants.

1.5 Sequencing and Scheduling

A. Order sand and gray portland cement for pointing mortar immediately after approval of Samples. Take delivery of and store at Project site enough quantity to complete Project.
B. Work Sequence: Perform CMU masonry repointing work in the following sequence, which includes work specified in this and other Sections:
C. Remove plant growth.
D. Inspect masonry for open mortar joints and permanently or temporarily point them before cleaning to prevent the intrusion of water and other cleaning materials into the wall.
E. Remove paint.
F. Clean masonry.
G. Rake out mortar from joints surrounding masonry to be replaced and from joints adjacent to masonry repairs along joints.

H. Repair masonry, including replacing existing masonry with new masonry materials.
I. Rake out mortar from joints to be repointed.
J. Point mortar and sealant joints.
K. After repairs and repointing have been completed and cured, perform a final cleaning to remove residues from this work.
L. Where water repellents are to be used on or near masonry work, delay application of these chemicals until after pointing and cleaning.
M. If windows are to be replaced, insert subparagraph into the above sequence for the timing of window replacement.

1.6 Action Submittals

A. Product Data: For each type of product.
B. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
C. Include recommendations for product application and use. Include test data substantiating that products comply with requirements.
D. Shop Drawings:
    1. Include plans, elevations, sections, and locations of repointing work on the structure.
    2. Show provisions for expansion joints or other sealant joints.
    3. Show locations of scaffolding and points of scaffolding in contact with masonry. Include details of each point of contact or anchorage.
    4. Samples for Initial Selection: For the following:
    5. Pointing Mortar: Submit sets of mortar for pointing in the form of sample mortar strips, 6 inches (150 mm) long by **1/2 inch (13 mm)** wide, set in aluminum or plastic channels.
E. Have each set contain a close color range of at least three Samples of different mixes of colored sands and cements that produce a mortar matching existing, cleaned mortar when cured and dry.
F. Submit with precise measurements on ingredients, proportions, gradations, and source of colored sands from which each Sample was made.
    1. Sand Type Used for Pointing Mortar: Minimum 8 oz. (240 mL) of each in plastic screw-top jars.
    2. Sealant materials.
    3. Include similar Samples of accessories involving color selection.
    4. Samples for Verification: For the following:
G. Each type, color, and texture of pointing mortar in the form of sample mortar strips, 6 inches (150 mm) long by **1/2 inch (13 mm)** wide, set in aluminum or plastic channels.
H. Include with each Sample a list of ingredients with proportions of each. Identify sources, both supplier and quarry, of each type of sand and brand names of cementitious materials and pigments if any.
I. Sealant materials.
J. Accessories: Each type of accessory and miscellaneous support.

1.7 Quality Assurance

A. CMU Masonry Repointing Specialist Qualifications: Engage an experienced CMU masonry repointing firm to perform work of this Section. Firm shall have completed work similar in material, design, and extent to that indicated for this Project with a record of successful in-service performance. Experience in only installing masonry is insufficient experience for masonry repointing work.
B. Field Supervision: CMU masonry repointing specialist firms shall maintain experienced full-time supervisors on Project site during times that CMU masonry repointing work is in progress.
C. Quality-Control Program: Prepare a written quality-control program for this Project to systematically demonstrate the ability of personnel to properly follow methods and use materials and tools without damaging masonry. Include provisions for supervising performance and preventing damage.

1.8 Delivery, Storage, and Handling

A. Deliver packaged materials to Project site in manufacturer's original and unopened containers, labeled with manufacturer's name and type of products.
B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
C. Store hydrated lime in manufacturer's original and unopened containers. Discard lime if containers have been damaged or have been opened for more than two days.
D. Store sand where grading and other required characteristics can be maintained and contamination avoided.

1.9 Field Conditions

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit repointing work to be performed according to product manufacturers' written instructions and specified requirements.
B. Temperature Limits, General: Repoint mortar joints only when air temperature is between 40 and 90 deg F (4 and 32 deg C) and is predicted to remain so for at least seven days after completion of the Work unless otherwise indicated.
C. Cold-Weather Requirements: Comply with the following procedures for mortar-joint pointing unless otherwise indicated:
D. When air temperature is below 40 deg F (4 deg C), heat mortar ingredients and existing masonry walls to produce temperatures between 40 and 120 deg F (4 and 49 deg C).
E. When mean daily air temperature is below 40 deg F (4 deg C), provide enclosure and heat to maintain temperatures above 32 deg F (0 deg C) within the enclosure for seven days after pointing.
F. Hot-Weather Requirements: Protect mortar-joint pointing when temperature and humidity conditions produce excessive evaporation of water from mortar materials. Provide artificial shade and wind breaks, and use cooled materials as required to minimize evaporation. Do not

apply mortar to substrates with temperatures of 90 deg F (32 deg C) and above unless otherwise indicated.

Part 2 – Product Requirements

See Editing Instruction No. 1 in the Evaluations for cautions about named manufacturers and products. For an explanation of options and Contractor's product selection procedures, see Section 016000 "Product Requirements."

2.1 Materials, General

A. Source Limitations: Obtain each type of material for repointing CMU masonry (cement, sand, etc.) from single source with resources to provide materials of consistent quality in appearance and physical properties.

2.2 Mortar Materials

A. In "Portland Cement" Paragraph below, gray portland cement is sometimes used to help obtain correct mortar color.
B. Portland Cement: ASTM C 150/C 150M, Type I or Type II, except Type III may be used for cold-weather construction; white or gray, or both where required for color matching of mortar.
   1. Provide cement containing not more than 0.60 percent total alkali when tested according to ASTM C 114.
   2. Hydrated Lime: ASTM C 207, Type S.
   3. Masonry Cement: ASTM C 91/C 91M.
C. Manufacturers: Subject to compliance with requirements, provide products by one of the following or equivalent :
   1. Cemex S.A.B. de C.V.
   2. Essroc.
   3. Hanson Brick and Tile; Lehigh Hanson.
   4. Holcim (US) Inc.
   5. Lafarge North America Inc.
   6. Mortar Cement: ASTM C 1329/C 1329M.
D. Manufacturers: Subject to compliance with requirements, provide products by the following:
   1. Lafarge North America Inc.
   2. Mortar Sand: ASTM C 144.
   3. Match size, texture, and gradation of existing mortar sand as closely as possible. Blend several sands if necessary to achieve suitable match.
   4. Color: Natural sand or ground marble, granite, or other sound stone of color necessary to produce required mortar color.
   5. Mortar Pigments: ASTM C 979/C 979M, compounded for use in mortar mixes, and having a record of satisfactory performance in masonry mortars.

E. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Davis Colors.
   2. LANXESS Corporation.
   3. Solomon Colors, Inc.
   4. Water: Potable.

2.3 Accessory Materials

A. Sealants
   1. Sealant manufacturer's standard elastomeric sealant(s) of base polymer and characteristics indicated below and according to applicable requirements in Section 079200 "Joint Sealants."
   2. Type: Single-component, nonsag urethane sealant.
   3. Colors: Provide colors of exposed sealants to match colors of mortar adjoining installed sealant unless otherwise indicated.
   4. Ground-Mortar Aggregate: Custom crushed and ground pointing mortar sand or existing mortar retrieved from joints. Grind to a particle size that matches the adjacent mortar aggregate and color.
   5. Masking Tape: Nonstaining, nonabsorbent material; compatible with mortar, joint primers, sealants, and surfaces adjacent to joints; and that easily comes off entirely, including adhesive.
   6. Other Products: Select materials and methods of use based on the following:
   7. Previous effectiveness in performing the work involved.
   8. Minimal possibility of damaging exposed surfaces.
   9. Consistency of each application.
   10. Uniformity of the resulting overall appearance.
   11. Do not use products or tools that could leave residue on surfaces.

B. Mortar Mixes
   1. Measurement and Mixing: Measure cementitious materials and sand in a dry condition by volume or equivalent weight. Do not measure by shovel; use known measure. Mix materials in a clean, mechanical batch mixer.
   2. Mixing Pointing Mortar: Thoroughly mix cementitious materials and sand together before adding any water. Then mix again, adding only enough water to produce a damp, unworkable mix that retains its form when pressed into a ball. Maintain mortar in this dampened condition for 15 to 30 minutes. Add remaining water in small portions until mortar reaches desired consistency. Use mortar within one hour of final mixing; do not retemper or use partially hardened material.
   3. Colored Mortar: Produce mortar of color required by using specified ingredients. Do not alter specified proportions without Architect's approval.
   4. Mortar Pigments: Where mortar pigments are indicated, do not add pigment exceeding 10 percent by weight of the cementitious or binder materials, except for carbon black which is

limited to 2 percent, unless otherwise demonstrated by a satisfactory history of performance.

5. Do not use admixtures in mortar unless otherwise indicated.
6. Mixes: Mix mortar materials in the following proportions:
7. Subparagraph below, or revise to indicate specific requirements for each type of brick unit indicated. Consider revising portland cement to white portland cement if light-colored mortar is required. Retain last option in subparagraphs if using pigments.
8. The volumetric proportion in "Pointing Mortar by Volume" Subparagraph is an example only; revise to suit Project.
9. Pointing Mortar by Type: ASTM C 270, Proportion Specification, Type N unless otherwise indicated; with cementitious material limited to portland cement and lime, or masonry cement or mortar cement. Add mortar pigments to produce mortar colors required.

Part 3 – Execution Requirements

3.1 Protection

A. Prevent mortar from staining face of surrounding masonry and other surfaces.
B. Cover sills, ledges, and other projecting items to protect them from mortar droppings.
C. Keep wall area wet below pointing work to discourage mortar from adhering.
D. Immediately remove mortar splatters in contact with exposed masonry and other surfaces.
E. Remove gutters and downspouts and associated hardware adjacent to masonry and store during masonry repointing. Reinstall when repointing is complete.
F. Provide temporary rain drainage during work to direct water away from building.

3.2 Masonry Repointing, General

A. Appearance Standard: Repointed surfaces are to have a uniform appearance as viewed from **20 feet (6 m)** away by Architect.

3.3 Repointing Mortar

A. Rake out and repoint joints to the following extent:
B. Joints in areas indicated, up to 10%. Anything over shall be as per Unit Prices.
C. Joints indicated as sealant-filled joints.
D. Joints at locations of the following defects:
E. Holes and missing mortar.
F. Cracks that can be penetrated 1/4 inch (6 mm) or more by a knife blade 0.027 inch (0.7 mm) thick.
G. Cracks **1/8 inch (3 mm)** or more in width and of any depth.
H. Hollow-sounding joints when tapped by metal object.
I. Eroded surfaces 1/4 inch (6 mm) or more deep.
J. Deterioration to point that mortar can be easily removed by hand, without tools.
K. Joints filled with substances other than mortar.

L. Do not rake out and repoint joints where not required.
M. Rake out joints as follows, according to procedures demonstrated in approved mockup:
N. Revise first subparagraph below according to depth required to rake out joints for Project.
O. Remove mortar from joints to depth of 2 times joint width, but not less than **1/2 inch (13 mm)** or not less than that required to expose sound, unweathered mortar. Do not remove unsound mortar more than **2 inches (50 mm)** deep; consult Architect for direction.
P. Remove mortar from masonry surfaces within raked-out joints to provide reveals with square backs and to expose masonry for contact with pointing mortar. Brush, vacuum, or flush joints to remove dirt and loose debris.
Q. Do not spall edges of masonry units or widen joints. Replace or patch damaged masonry units as directed by Architect.
R. Notify Architect of unforeseen detrimental conditions including voids in mortar joints, cracks, loose masonry units, rotted wood, rusted metal, and other deteriorated items.

3.4 Pointing Mortar

A. Rinse joint surfaces with water to remove dust and mortar particles. Time rinsing application so, at time of pointing, joint surfaces are damp but free of standing water. If rinse water dries, dampen joint surfaces before pointing.
B. Apply pointing mortar first to areas where existing mortar was removed to depths greater than surrounding areas. Apply in layers not greater than **3/8 inch (9 mm)** until a uniform depth is formed. Fully compact each layer, and allow it to become thumbprint hard before applying next layer.
C. After deep areas have been filled to same depth as remaining joints, point joints by placing mortar in layers not greater than **3/8 inch (9 mm)**. Fully compact each layer and allow to become thumbprint hard before applying next layer. Where existing masonry units have worn or rounded edges, slightly recess finished mortar surface below face of masonry to avoid widened joint faces. Take care not to spread mortar beyond joint edges onto exposed masonry surfaces or to featheredge the mortar.
D. When mortar is thumbprint hard, tool joints to match original appearance of joints as demonstrated in approved mockup. Remove excess mortar from edge of joint by brushing.
E. Cure mortar by maintaining in thoroughly damp condition for at least 72 consecutive hours, including weekends and holidays.
Where repointing work precedes cleaning of existing masonry, allow mortar to harden at least 30 days before beginning cleaning work.

3.5 Final Cleaning

A. After mortar has fully hardened, thoroughly clean exposed masonry surfaces of excess mortar and foreign matter; use wood scrapers, stiff-nylon or -fiber brushes, and clean water applied by low-pressure spray.
B. Do not use metal scrapers or brushes.
C. Do not use acidic or alkaline cleaners.

D. Paragraphs below are examples only; revise to suit Project.
E. Clean adjacent non masonry surfaces. Use detergent and soft brushes or cloths.
F. Clean mortar and debris from roof; remove debris from gutters and downspouts. Rinse off roof and flush gutters and downspouts.
G. Remove masking materials, leaving no residues that could trap dirt.

End of Section

End of Division 04 – Masonry

Division 05 – Metals

Section 05 58 13 – Column Covers

Part 1 – General / Design Requirements

1.1 Summary

A. Section Includes:
   1. Custom manufactured formed metal enclosures for columns and beams.
   2. Supplementary components and accessories necessary for a complete installation, whether or not such items are indicated on the Drawings or included in the Specifications.

1.2 References

A. Abbreviations and Acronyms:
   1. AA: Aluminum Association.
   2. AAMA: American Architectural Manufacturers Association.
   3. ACM: Aluminum-Faced Composite Material.
   4. AHJ: Authority (Authorities) Having Jurisdiction.
   5. AL: Air Leakage.
   6. DFT: Dry Film Thickness.
   7. HDG: Hot Dip Galvanized.
   8. MSG: Manufacturer's Standard Gage for Sheet Metal.
   9. NAAMM: National Association of Architectural Metal Manufacturers.

B. Definitions:
   1. Manufacturer: Means the column cover manufacturer, unless otherwise indicated.
   2. Manufacturers' Standard Gage for Sheet Steel: Means the thickness steel sheet based on a weight of 41.82 pounds per square foot per inch of thickness.

1.3 Administrative Requirements

A. Coordination
   1. General Coordination: Coordinate column cover installation of with the work of related trades for necessary rough-in work, backings, supports, and anchorage. Deliver backing and embedment, templates, and installation instructions to related trades before affected work begins.

1.4 Submittals

A. Action Submittals: Combine all product data specified below together and submit as one coordinated submittal.
   1. Product Data
      a. Submit a comprehensive list of all proposed column cover assembly components and accessories necessary for complete installation, along with their manufacturer's product

data, typical installation details and other data necessary to demonstrate compliance with specified requirements for each item listed.

b. Along with the other required submittals for items furnished under this Section, combine copies of manufacturer's product data for items furnished under other Sections together with the product data required for the work installed under this Section.

c. Submit sample copies of specified warranties with terms, conditions, exclusions, limitations, and time periods for each warranty clearly defined and expressed.

2. Shop Drawings: Submit large-scale dimensioned drawings showing column cover layout, geometry, materials, joints, profiles, edge conditions, attachments to other work, and finishes.

a. Label individual components with the manufacturer's product name. Indicate material thickness design loads, required clearances, and methods of field installation.

1) Indicate method of field assembly, components, and location and size of each field connection.

2) Distinguish between factory- and field-assembled work.

b. Include elevation drawings of each vertical surface in which column covers are installed. All such drawings must show the horizontal and vertical location and sizes of all components, accessories, and trim, including joint locations, openings, penetrations, and items installed in each surface.

c. Include project-specific, at least 1-1/2-inch scale dimensioned detail drawings showing profiles, shapes, joints, seams, and dimensions, including terminations, penetrations, miters, interior corner conditions, and exterior corner conditions either not detailed on the product data, or that are detailed on the product data, but in a manner that is not specific to the Project. Furnish edge details where specified items abut adjacent items.

d. Indicate method of attaching to adjacent supporting construction.

1) Show fasteners, brackets, clips, mounting devices, and similar attachments to other work.

2) Label each attachment type the manufacturer's product name.

3) Indicate base material and finish, fastener material and finish, and material and finish of items being fastened or attached.

e. Include medium-scale 3-D pictorial oblique or axonometric projection drawings for conditions too difficult to illustrate as two-dimensional multi-view orthographic projection drawings. Perspective projections do not meet the requirements for 3-D drawings and are returned without review.

3. Samples:

a. Column covers: Submit a 12-inch long sample of each column cover type in the same material and finish specified for the Work.

b. Trim and Closures: Submit minimum 12-inch long samples of each accessory type in the specified color and finish. Include fasteners and other exposed accessories.

B. Informational Submittals:
   1. Test and Evaluation Reports: Submit evidence showing that proposed column covers have been tested or listed by a qualified national testing organization, conform to the specified reference standards, and either meet or exceed the specified performance requirements, based on comprehensive testing of the manufacturer's current manufactured units.
   2. Installation Instructions:
      a. Submit manufacturer-prepared instructions for the proper installation of each column cover assembly.
      b. If the manufacturer's instructions are either unavailable or do not specifically apply to project conditions, then consult the manufacturer's field representative and obtain manufacturer-prepared installation requirements, recommendations, or instructions in writing and promptly distribute copies to the Architect for feedback before proceeding with the work.

1.5 Quality Assurance

A. Source Limitations: Obtain column covers and accessories through one source from a single manufacturer.
B. Qualifications:
   1. Manufacturer: Must be a legal business entity with at least 10 consecutive years' experience manufacturing column covers similar in material, design, complexity, and extent to this Project, and whose products have resulted in applications with a record of successful in-service performance.
C. Mockups: Along with portions of the building enclosure system specified in other sections, including backup wall construction, exterior cladding, insulation, ties and other penetrations and flashings, construct an integrated Type A mockup (pre-submittal, ex situ integrated/composite mockup).
   1. Required mockups are indicated on the Drawings.
   2. Before starting work, including bulk purchase and delivery of products, submit drawings of the proposed mockup to the Architect for information.
   3. After the Architect's review of the submitted mockup drawings, construct mockup to
      a. Review construction techniques.
      b. Coordinate the work of multiple sections.
      c. Train the trades involved in the work.
      d. Demonstrate aesthetic effects, quality of materials, and fabrication and installation (workmanship); and serve as a platform for preconstruction testing.
   4. At a minimum, comply with the following:
      a. Where directed by the Architect, demonstrate patching techniques, and materials and techniques proposed for repair of surfaces to match adjacent undamaged surfaces.
      b. The Architect reviews the mockup to determine if the work falls within an acceptable range for visual appearance; mottling, sheen, color and texture variation, and evenness of finish; integration of the work of different trades; installation tolerances; quality and fabrication and installation (workmanship); compliance with the specified requirements.

5. The Architect either rejects or approves mockups as the acceptable standard by which subsequent work is evaluated for conformance to the requirements of the Contract Documents.
6. If a mockup is rejected, make corrections requested by the Architect or remove and replace it when the Architect refuses to accept corrective work.
   a. Repeat mockups until the Architect approves them.
   b. Approval of mockups does not constitute approval of deviations from the Contract Documents unless those deviations are approved by the Owner in writing.
7. When the mockup is approved, protect the approved mockup until removal is authorized in writing by the Architect. After removal is authorized by the Architect, dismantle, remove, and dispose of the mockup at a disposal location away from the Project site.

D. Field Samples (post-submittal, in situ visual mockups): Include field samples as part of the work of this Section.
   1. Before starting work, including bulk purchase and delivery of products, prepare a field sample in a manner approved by the Architect to demonstrate the expected final visual effect of the planned installation.
   2. At a minimum, comply with the following:
      a. Size: At least 8 feet high by full column diameter.
      b. Illumination: Illuminate field samples with at least the same type and level of illumination maintained in the room or space after the building is occupied.
   3. The Architect reviews field samples to determine if the work falls within an acceptable range for
      a. Visual appearance.
      b. Mottling, sheen, color, and texture variation.
      c. Evenness of finish.
      d. Integration of the work of different trades.
      e. Installation tolerances.
      f. Overall quality.
      g. Fabrication and installation (workmanship); and
      h. Conformance to specified requirements.
   4. The Architect either rejects or approves field samples as the acceptable standard by which subsequent work is evaluated for conformance to the requirements of the Contract Documents.
      a. If a field sample is rejected, make corrections requested by the Architect or remove and replace it when the Architect refuses to accept corrective work.
         1) Repeat field samples until the Architect approves them.
         2) Approval of field samples does not constitute approval of deviations from the Contract Documents, unless those deviations are approved by Owner in writing.
      b. Upon written authorization from the Architect, field samples may remain part of the Work after being properly identified for future reference.

1.6 Handling

A. Packing, Shipping, Handling and Unloading:
   1. Aluminum: Comply with applicable requirements of ASTM B 660 for packaging and packing of aluminum.
   2. Protection: Provide either strippable film or manufacturer's other standard form of temporary protection for metal finishes during fabrication, delivery, storage, handling and installation.

B. Delivery:
   1. Transport column covers in a manner consistent with their shape and design, and in a position to prevent damage, or excessive stresses that could cause damage.
   2. Provide adequate dunnage and bracing during transport.
   3. Support units on non-staining, shock-absorbing material.

C. Acceptance at the Site:
   1. Inspect column covers, components, and accessories delivered to the site for damage.
   2. With a minimum of handling, unload and store only undamaged items.

D. Storage: Store column cover units outdoors, off the ground on pallets, and protected from weather and precipitation or other forms of moisture with breathing-type covers. Un-vented polyethylene tarpaulins are not permitted.
   1. Incline stored items to provide maximum drainage or accumulated moisture.
   2. Provide spacers in order to separate stored items and to provide for air circulation around all surfaces.
   3. Protect stored items to prevent contact with the ground or soil, to prevent staining, and to prevent cracking, distortion, warping or other physical damage.

E. Handling: Handle column cover units in a manner that will prevent bending, warping, twisting or other physical damage.

F. Damaged Item Replacement Requirements: Promptly remove, dispose of, and replace, or arrange and pay costs for the removal, disposal, and replacement of items that become deteriorated, contaminated, or otherwise damaged.
   1. Remove and dispose of damaged items at a disposal location away from the Project site.
   2. Replace removed items with undamaged new items.

G. Packaging Waste Management:
   1. Remove and dispose of construction waste at a disposal location away from the Project site.
   2. Do not bury any type of wood or wood-based or agrifiber products at the Project site.

1.7 Project Conditions

A. Existing Conditions:
   1. Field-verify measurements before preparing column cover submittals and indicate those field measurements on the shop drawings.
   2. If field measurements cannot be made without delaying the Work, establish working dimensions that accommodate installation tolerances, as well as related tolerances specified

for the Work of other sections, and indicate those working dimensions on the shop drawings.

3. Coordinate the installation of adjacent work to ensure the actual dimensions accommodate the previously established working dimensions.

1.8 Warranty

A. Manufacturer's Warranty:
   1. Column Cover Assembly Warranty: All column cover assemblies must be covered by a warranty that protects the Owner for at least 20 years after Substantial Completion against
      a. Water leakage.
      b. Defective products, materials, manufactured units, components, accessories.
      c. Patent or latent defects; and
      d. Incipient or catastrophic failure.
   2. Column Cover Finish Warranty:
      a. Provide specific protection against deterioration of factory-applied finishes for at least 20 years after Substantial Completion. Deterioration includes the following.
         1) Color fading more than 5 Hunter units when tested in conformance with ASTM D 2244.
         2) Chalking in excess of a No. 8 rating when tested in conformance with ASTM D 4214.
         3) Cracking, checking, peeling, or failure of paint to adhere to bare metal.

B. Installer's Warranty: All column cover assemblies must be covered by a written warranty that protects the Owner for at least 5 years after Substantial Completion against
   1. Defective assemblies and installation.
   2. Patent or latent defects.
   3. Incipient or catastrophic failure.

C. Remedy: At no cost to the Owner, replace or repair defective or deteriorated work that occurs during the specified warranty periods.

Part 2 – Product Requirements

2.1 Column Covers

A. Description: Factory-formed, pre-finished aluminum column covers.

B. Products: Design is based on custom "e-Connect System" manufactured by Gordon Incorporated. Other acceptable sources of comparable products include the following.
   1. "Series 100 UNA-CLAD Column Cover" by Firestone Metal Products.
   2. "Series 1500 Architectural Column Covers" by Pittcon Industries.
   3. Fry Reglet Architectural metals –"Column Covers"

C. Comply with the following:
   1. Material: At least 0.125-inch-thick aluminum plate.
   2. Configuration: As indicated on the Drawings. Fabricate with ends folded back to for a one-inch-wide return leg on the concealed side.

3. Joints: Open joint with either sealant and backer rod or compression fit 0.040-inch channel inserts finished to match column cover, as determined by the Architect.
   a. Ceiling and floor details: As indicated on the Drawings.
4. Finishes:
   a. Exposed Aluminum Finish: Provide manufacturer's standard fluoropolymer finish.
   b. Concealed Aluminum Finish: Provide sound-dampening compound to a height of 8 feet above finish floor at concealed surface of columns covers.

D. Materials:
1. Hot Dip Galvanized Steel Sheet: ASTM A 653, structural steel (SS) Grade 37, minimized spangle G90 galvanized coating designation, tension-leveled to a flatness of 5 I-units or less, and bonderized.
2. Aluminum Sheet and Plate: ASTM B 209, Alloy 30003-H14.

2.2 Accessories

A. Sound-Damping compound: Provide one of the following.
1. "GP-1/Epoxy 10/Epoxy Damp" by The Soundcoat Co.
2. "Model KDC-E-162" semi by Kinetics Noise Control, Inc.
3. Or equal.

B. Metal Trim: Fabricate from same material and finish as column covers.
C. Subgirts and Clips: Fabricate from minimum 0.0598-inch (16-gage USS) base metal thickness hot dip galvanized steel sheet.
D. Fasteners: Concealed fasteners recommended by the column cover manufacturer for specified product and in-service conditions. Exposed fasteners are not permitted.
E. Sealant: Provide low modulus sealant and closed cell backer rod specified in Section 07 92 00.
D. Other Accessories: Provide other accessories and secondary items as supplied, required, recommended, approved, or accepted by the manufacturer.

2.3 Finishes

A. Shop Priming:
1. Prime steel parts of anchors, inserts, mullion reinforcement, and supports in conformance with Section 05 12 00.
2. Coat concealed aluminum surfaces in contact with masonry, concrete or steel with bituminous paint specified in Section 05 50 00.

B. Shop Finishing:
1. Top Side Finish: Provide specialty powder coat "Acroguard" with enhanced durability finish.
2. Bottom Side Finish: Apply manufacturer's standard pretreatment and white or light-colored acrylic or polyester backer finish consisting of both a prime coat and wash coat for a total dry film thickness of at least 0.5-mil.

Part 3 – Execution Requirements

3.1 Examination

A. Verification of Conditions: Examine site conditions and field-verify measurements affecting the work of this Section.
   1. Examine supporting and adjacent construction and other conditions under which column covers are installed.
   2. Verify that
      a. Substrates provide sound anchoring supports.
      b. Openings have been framed or formed within allowable tolerances; are square plumb, level, and true to line.
      c. Weather resistive barriers and flashings that are concealed by the installed column covers are installed.
      d. Spaces behind column covers have been thoroughly cleaned of debris.
      e. Work performed as part of the work of other Sections conforms to the column cover manufacturer's installation tolerance requirements; provides true, flat, and level bearing surfaces; and satisfies all other conditions relating to the quality of column cover installation, durability, appearance, and performance.

B. Evaluation and Assessment
   1. Reject work that does not conform to the column cover manufacturer's installation requirements. The Contractor shall either perform or arrange and pay costs for all remedial work necessary to correct or improve deficient conditions and to conform to the column cover manufacturer's installation requirements.
   2. Proceeding with installation stipulates the installer's acceptance of existing conditions. After starting work, the installer shall perform remedial work necessary to correct or improve deficient conditions and to conform to the column cover manufacturer's installation requirements.

3.2 Preparation

A. Clean substrates of substances harmful to column covers. Removing projections that may interfere with attachment. Shim or otherwise plumb supporting substrates.
B. Install subgirts, base angles, sills, furring, and other miscellaneous wall column cover support members and anchorage in conformance with ASTM C 754 and the metal wall column cover manufacturer's installation instructions.

3.3 Installation

A. General:
   1. Use materials and methods required, recommended, approved, or accepted by the column cover manufacturer, along with manufacturer-recommended accessories and techniques.
   2. Install column covers perpendicular to girts and subgirts unless otherwise indicated. Securely fasten column covers and other components in place with provisions for thermal

and structural movement. Use concealed fasteners and anchorages where possible. Provide washer head fasteners with bonded sealing washers where required to protect metal surfaces and to make a weather tight connection.

3. Set units true to line, to required levels and lines, plumb, level, square, and fitted without warp or rack of frames and column covers; with flush well-fitted joints; and in alignment with adjacent construction
4. Scribe and cope the Work of this Section as necessary for an accurate fit. Perform required cutting, drilling, and fitting for a complete installation.
5. Form closely-fitted joints with exposed connections accurately located and secured.
6. Flash and seal column covers with weather closures at perimeter of openings. Install flashing and trim as metal plate wall column cover work proceeds.
7. Where weather tight column cover joints are required, install concealed gaskets, flashings, joint fillers, and insulation as column cover installation progresses. Comply with the requirements of Section 07 92 00 for installing sealants during column cover installation.
8. Securely attach column cover assemblies in place, and provide measures necessary to accommodate, resist, distribute, or transfer, as applicable, the At least specified in-service loads and thermal, seismic, wind sway, or other types of movement without incipient or catastrophic failure.

B. Special Techniques:
1. Provide resilient gaskets or spacers between metal components, and between column covers, as required to eliminate metal-to-metal contact and movement noises in the completed work resulting from thermal and structural movements without over-stressing the material, breaking connections or producing wrinkles and distortion in finished surfaces. Do not apply sealants to joints unless otherwise indicated on Drawings.
2. Provide means of draining condensation, which may occur behind the column cover construction, to the exterior.
3. Anchor column covers and other components of the work securely in place, providing for necessary thermal and structural movement without overstressing the materials and producing distortions in finished surfaces.

C. Attachment: Securely attach column covers and accessories in place to supporting construction.

3.4 Correction and Repair

A. Correction:
1. Correct deficiencies that do not conform to the Drawings or specified requirements, as determined by the manufacturer's field representative and the Architect.
   a. Correction of defective work is only permitted when both structural performance and visual appearance are not affected, and fire-resistive ratings are not compromised.
   b. Document both defective work and proposed corrections to the defective work, and then submit such documentation to the Architect for review. Defective work submittals must include
      1) Descriptions and locations of defective work;

2) Supporting sketches, diagrams, photographs, and other visual depictions of defective work; and
3) Similar documentation and visual depictions of Contractor-proposed corrections.

c. Do not begin correction of defective work until after the Architect's review of the defective work submittal is complete.
d. Corrected work must also be inspected by the Owner's testing agency and re-tested, as applicable.
e. With respect to the acceptance or rejection of corrected work, the Architect's decision is final. Acceptance by the Architect of corrected work is contingent upon
1) Corrections being performed skillfully,
2) Corrective work resulting in sound, permanent construction that is flush and seamless with adjacent surfaces;
3) Colors and textures matching adjoining and adjacent surfaces, without differentiation; and
4) No visible evidence of correction nor any other apparent distinction or seam between original and corrected work.

2. Arrange and pay costs for either removing and re-installing or replacing items that are damaged or that cannot be satisfactorily corrected, as determined by the manufacturer's field representative and the Architect.

B. Repair:
1. Repair or refinish items that
a. Are damaged, loose, chipped, broken, stained, or corroded;
b. Have damaged, loose, chipped, broken, stained, or corroded parts, components, accessories, and similar items; or
c. Do not match the appearance of adjacent surfaces, materials, or finishes, as determined by the Architect.
2. Arrange and pay costs for replacing items that cannot be satisfactorily repaired or refinished in a manner that both matches adjacent undamaged areas and shows no evidence of repair or refinishing, as determined by the Architect.

C. Conformance: Completed work must match the approved mockup, as determined by the Architect.

3.5 Cleaning

A. Cleaning Installed Work:
1. Remove protective materials after installation.
2. Remove from exposed metal surfaces anything that might interfere with uniform oxidation or weathering.
3. Clean surfaces exposed to view using cleaning agents, equipment, tools, and procedures supplied, required, recommended, approved, or accepted by the manufacturer.
a. Protect other work from staining or damage caused by cleaning operations.
b. Do not use cleaning materials or processes that could change the appearance of exposed finishes or damage adjacent materials.

4. Clean spills, stains, soiling, overspray, and fallout from adjacent surfaces.
5. Replace items that cannot be satisfactorily cleaned, as determined by the Architect.

B. Waste Management: After completing the work of this Section, leave work areas around the project site free from debris, materials, equipment, and related items.

3.6 Protection

A. Protect installed items in place from sources of moisture, corrosion, deterioration, staining, or other damage until Substantial Completion.
B. Do not store anything adjacent to or against installed column covers unless they are adequately protected from damage and staining, as determined by the Architect.
B. Do not use column cover surfaces as work surfaces.
C. Remove protection when it's no longer needed and before Substantial Completion.

End of Section

End of Division 05 – Metals

Division 07 – Thermal and Moisture Protection

Section 07 52 16 – Styrene-Butadiene-Styrene (SBS) Modified Bituminous Membrane Roofing

Part 1 – General / Design Requirements

1.1 Related Documents

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

1.2 Summary

A. Section Includes:
   1. Styrene-butadiene-styrene (SBS)-modified bituminous membrane roofing.
   2. Roof insulation.
B. Related Requirements:
   1. Section 076200 "Sheet Metal Flashing and Trim" for metal roof flashings and counter flashings.
   2. Section 079200 "Joint Sealants" for joint sealants, joint fillers, and joint preparation.

1.3 Definitions

A. Roofing Terminology: Definitions in ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" apply to work of this Section.

1.4 Preinstallation meetings

A. Preinstallation Roofing Conference: Conduct conference at **Project site**.
B. Meet with Owner, Architect, Owner's insurer if applicable, roofing Installer, roofing system manufacturer's representative, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
C. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
D. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
E. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
F. Review structural loading limitations of roof deck during and after roofing.
G. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
H. Review governing regulations and requirements for insurance and certificates if applicable.
I. Review temporary protection requirements for roofing system during and after installation.
J. Review roof observation and repair procedures after roofing installation.

1.5 Action Submittals

A. Product Data: For each type of product.
B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work, including:
   1. Base flashings and membrane terminations.
   2. Tapered insulation, including slopes.
   3. Crickets, saddles, and tapered edge strips, including slopes.
   4. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.
C. Samples for Verification: For the following products:
   1. Cap sheet, of color required.
   2. Flashing sheet, of color required.
   3. Walkway pads or rolls, of color required.

1.6 Informational Submittals

A. Coordinate "Qualification Data" Paragraph below with qualification requirements in Section 014000 "Quality Requirements" and as may be supplemented in "Quality Assurance" Article.
B. Qualification Data: For **Installer and manufacturer**.
C. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
   1. Submit evidence of complying with performance requirements.
D. Product Test Reports: For components of membrane roofing system, for tests performed by manufacturer and witnessed by a qualified testing agency.
E. Research/Evaluation Reports: For components of membrane roofing system, from ICC-ES.
F. Sample Warranties: For manufacturer's special warranties.

1.7 Closeout Submittals

A. Maintenance Data: For roofing system to include in maintenance manuals.

1.8 Quality Assurance

A. Manufacturer Qualifications: A qualified manufacturer that is **UL listed approved** for membrane roofing system identical to that used for this Project.
B. FM Global is launching a certified roofing installer program. Insert certification requirements in "Installer Qualifications" Paragraph below if Project is FM Global insured and if a certified roofing installer is required.
C. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

1.9 Delivery, Storage, and Handling

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.

B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
   1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
D. Handle and store roofing materials, and place equipment in a manner to avoid permanent deflection of deck.

1.10 Field Conditions

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.11 Warranty

A. When warranties are required, verify with Owner's counsel that warranties stated in this article are not less than remedies available to Owner under prevailing local laws.
B. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.
C. Special warranty includes membrane roofing, base flashings, **roof insulation, fasteners, cover boards, roofing accessories,** and other components of roofing system.
D. Verify available roofing system warranties and warranty periods with manufacturers.
E. Warranty Period: **20-years** from date of Substantial Completion.
F. Verify available roofing system warranties and warranty periods with manufacturers.
G. Manufacturers No Dollar Limit (NDL) Total Systems Warranty Form, without monetary limitation, non-prorated.
H. Warranty shall cover wind speeds less than, or equal to **80 mph**.
I. Warranty shall have hourly rates for repairs, not open ended.
J. Usually delete "Special Project Warranty" Paragraph below if retaining "Special Warranty" Paragraph above. Manufacturer's labor-and-materials warranty typically binds Installer for the first two or three years. If retaining below, use or revise sample roofing Installer's warranty form at the end of this Section. Alternatively, insert copy of local roofing contractor association's warranty form, or use another form as advised by Owner's counsel. Revise paragraph to reflect scope of special Project warranty.
K. Special Project Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering the Work of this Section, including all components of roofing system such as membrane roofing, base flashing, roof insulation, fasteners, cover boards, substrate boards, vapor retarders, and walkway products, for the following warranty period:
L. Verify available warranties and warranty periods.
M. Warranty Period: **one-year** from date of Substantial Completion.

Part 2 – Product Requirements

A. See Editing Instruction No. 1 in the Evaluations for cautions about named manufacturers and products. For an explanation of options and Contractor's product selection procedures, see Section 016000 "Product Requirements."

2.1 Manufacturers

A. Manufacturers: Subject to compliance with requirements, provide products by the following:
   1. Siplast, Inc. (Paradiene 20/30 FR)
   2. Soprema, Inc.

B. Source Limitations: Obtain components including **roof insulation, fasteners,** for roofing system from **same manufacturer as membrane roofing or manufacturer approved by membrane roofing manufacturer**.

C. Manufacturers not listed above offering systems and products, wishing to be included in the bidding of this project shall complete and submit the CERTIFICATE OF PRODUCT COMPLIANCE included in the BID DOCUMENTS.

2.2 Performance Requirements

A. General Performance: Installed roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roofing and base flashings shall remain watertight.

B. Accelerated Weathering: Roofing system shall withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.

C. Impact Resistance: Roofing system shall resist impact damage when tested according to ASTM D 3746 or ASTM D 4272.

D. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience.

E. Fire/Windstorm Classification: **Class 1A-120**.

F. Hail-Resistance Rating: **SH**.

G. Exterior Fire-Test Exposure: ASTM E 108 or UL 790, **Class A**; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

H. Fire-Resistance Ratings: Comply with fire-resistance-rated assembly designs indicated. Identify products with appropriate markings of applicable testing agency.

2.3 Roofing Sheet Materials

A. Roofing Membrane Sheet: **ASTM D 6163, Grade S, Type I or II, SBS-modified asphalt sheet (reinforced with glass fibers)**; smooth surfaced; suitable for application method specified.

B. Modified Bitumen Base and Stripping Ply
   1. Thickness (avg): 91 mils (2.3 mm) (ASTM D 5147)
   2. Thickness (min): 87 mils (2.2 mm) (ASTM D 5147)
   3. Weight (min per 100 ft^2 of coverage): 62 lb (3.0 kg/m^2)

4. Peak filler content in elastomeric blend - 35% by weight
5. Low temperature flexibility @ -15°F (-26°C): PASS (ASTM D 5147)
6. Peak Load (avg) @ 73°F (23°C): 30 lbf/inch (5.3 kN/m) (ASTM D 5147)
7. Peak Load (avg) @ 0°F (-18°C): 70 lbf/inch (12.3 kN/m) (ASTM D 5147)
8. Ultimate Elongation (avg.) @ 73°F (23°C): 50% (ASTM D 5147)
9. Compound Stability (max): 0.1% (ASTM D 5147)
10. High Temperature Stability (min): 250°F (121°C) (ASTM D 5147)

C. Approvals: UL Class listed, FM Approved (products shall bear seals of approval)
D. Reinforcement: fiberglass mat or other meeting the performance and Compound stability criteria
E. Granule-Surfaced Roofing Cap Sheet: **ASTM D 6163, Grade G, Type I or II, SBS-modified asphalt sheet (reinforced with glass fibers)**; granule surfaced; suitable for application method specified, and as follows:
   1. Granule Color: **White**.
   2. Modified Bituminous Finish Ply.
   3. Thickness (avg): 130 mils (3.3 mm) (ASTM D 5147)
   4. Thickness at selvage (coating thickness) (avg): 98 mils (2.5 mm) (ASTM D 5147)
   5. Thickness at selvage (coating thickness) (min): 94 mils (2.4 mm) (ASTM D 5147)
   6. Weight (min per 100 ft² of coverage): 90 lb (4.4 kg/m²)
   7. Peak filler content in elastomeric blend: 35% by weight
   8. Low temperature flexibility @ -15° F (-26° C): PASS (ASTM D 5147)
   9. Peak Load (avg) @ 73°F (23°C): 30 lbf/inch (5.3 kN/m) (ASTM D 5147)
   10. Peak Load (avg) @ 0°F (-18°C): 75 lbf/inch (13.2 kN/m) (ASTM D 5147)
   11. Ultimate Elongation (avg.) @ 73°F (23°C): 55% (ASTM D 5147)
   12. Compound Stability (max): 0.1% (ASTM D 5147)
   13. High Temperature Stability (min): 250°F (121° C) (ASTM D 5147)
   14. Granule Embedment (max loss): 2.0 grams per sample (ASTM D 5147)
F. Approvals: UL Class listed, FM Approved (products shall bear seals of approval)
G. Reinforcement: fiberglass mat or other meeting the performance and Compound stability criteria.
H. Surfacing: ceramic granules.

2.4 Base Flashing Sheet Materials

A. Backer Sheet: **ASTM D 6163, Grade S, Type I or II, SBS-modified asphalt sheet (reinforced with glass fibers)**; smooth surfaced; suitable for application method specified.
B. **See 2.3.A.1 above for Physical Properties**
C. Retain "Granule-Surfaced Flashing Sheet" or "Metal-Foil-Surfaced Flashing Sheet" Paragraph below for flashing sheet.
D. Metal-foil-surfaced flashing sheet is produced by several manufacturers for torch and, in some cases, hot-mopped application.
E. Metal-Foil-Surfaced Flashing Sheet: ASTM D 6298, glass-fiber-reinforced SBS-modified asphalt sheet (reinforced with glass fibers); metal-foil surfaced; suitable for application method specified, and as follows:
   1. Foil Surfacing: **Aluminum**.
   2. Metal-Clad Modified Bitumen Flashing Sheet.

3. Thickness (avg): 102 mils (2.6 mm) (ASTM D 5147)
4. Thickness (min): 98 mils (2.5 mm) (ASTM D 5147)
5. Weight (min per 100 ft² of coverage): 72 lb (3.5 kg/m²)
6. Maximum filler content in elastomeric blend: 35% by weight
7. Low temperature flexibility @ -15° F (-26° C) - PASS (ASTM D 5147)
8. Peak Load (avg) @ 73°F (23°C): 30 lbf/inch (5.3 kN/m) (ASTM D 5147)
9. Peak Load (avg) @ 0°F (-18°C): 75 lbf/inch (13.2 kN/m) (ASTM D 5147)
10. Ultimate Elongation (avg.) @ 73°F (23°C): 50% (ASTM D 5147)
11. Dimensional Stability (max): 0.1% (ASTM D 5147)
12. Compound Stability (min - sheet): 250°F (121°C) (ASTM D 5147)
13. Compound Stability (min – adhesive coating): 212°F (100°C) (ASTM D 5147)
14. Approvals: UL Class listed, FM Approved (products shall bear seals of approval)

F. Reinforcement: fiberglass mat or other meeting the performance and dimensional stability criteria.
G. Back Surfacing: polyolefin film.
H. Glass-Fiber Fabric: Woven glass-fiber cloth, treated with asphalt, complying with ASTM D 1668, Type I.

2.5 Auxiliary Roofing Materials

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with roofing.
B. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
C. Retain "Asphalt Primer" Paragraph below if priming concrete roof deck.
D. Asphalt Primer: ASTM D 41/D 41M.
E. Roofing Asphalt: ASTM D 312, **Type III or IV as recommended by roofing system manufacturer for application**.
F. Cold-Applied Adhesive: Roofing system manufacturer's standard asphalt-based, one- or two-part, asbestos-free, cold-applied adhesive specially formulated for compatibility and use with **roofing membrane and base flashings**.
G. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required by roofing system manufacturer for application.
H. Mastic Sealant: Polyisobutylene, plain or modified bitumen; nonhardening, nonmigrating, non-skinning, and nondrying.
I. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Global 4470, designed for fastening roofing components to substrate; tested by manufacturer for required pullout strength, and acceptable to roofing system manufacturer.
J. Roofing Granules: Ceramic-coated roofing granules, No. 11 screen size with 100 percent passing No. 8 (2.36-mm) sieve and 98 percent of mass retained on No. 40 (0.425-mm) sieve, color to match roofing.
K. Miscellaneous Accessories: Provide those recommended by roofing system manufacturer.
L. **Retro Drain**: provide at each existing roof drain to accommodate the new thicker roof insulation and saddles. Verify the diameter size of each roof drain plumbing pipe in the field.
M. Provide one of retro drains as listed below or equal:
   1. Hercules RetroDrain by Johns Manville

2. RedLine AFR by OMG Roofing Products

2.6 Roof Insulation

A. If retaining more than one insulation material in this article, indicate location of each on Drawings, or indicate where each layer is used in roofing system. If allowing Contractor to select more than one insulation material, limit options to insulations that comply with Project requirements and limitations. Coordinate insulation selection and thicknesses indicated on Drawings with adjoining construction as well as HVAC design and energy program.
B. Roofing system manufacturers may require use of their own insulations or limit approvals to specific insulation manufacturers. Retain second option in "General" Paragraph below if FM Global approval is required.
C. General: Preformed roof insulation boards manufactured **or approved** by roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated.
D. Polyisocyanurate Board Insulation: ASTM C 1289, **Type II, Class 1, Grade 2**, felt or glass-fiber mat facer on both major surfaces.
E. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. ACFoam II by Atlas Roofing Corporation; Atlanta, GA.
   2. Paratherm by Siplast; Irving, TX.
   3. H-Shield by Hunter Panels, LLC, Portland, ME.
F. Insulation thickness and layers as follows:
   1. **Flat Roof Decks**: 2-layers of Polyisocyanurate 2.2” x 4’ x 4’ panels and 0.5” coverboard.
   2. **Sloped Roof Decks**: 2-layers of Polyisocyanurate 2.0” x 4’ x 4’ panels, tapered insulation, and 0.5” coverboard.
G. Cellulosic-Fiber Board Insulation: ASTM C 208, Type II, Grade 2, fibrous-felted, rigid insulation boards of wood fiber or other cellulosic-fiber and water-resistant binders, asphalt impregnated, chemically treated for deterioration.
H. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. G-P Roof Fiberboard by Georgia Pacific Corp.; Atlanta, GA.
   2. Paratherm Fiberboard by Siplast, Irving, TX.
I. Cellular-glass board insulation dimensions are 24 by 48 inches (600 by 1220 mm).
J. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of **1/8 inch per 12 inches (1:96)** unless otherwise indicated.
K. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

2.7 Insulation Accessories

A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with roofing.
B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Global 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer.

C. Insulation Adhesive: Insulation manufacturer's recommended adhesive formulated to attach roof insulation to substrate or to another insulation layer as follows:
D. Roofing Asphalt: ASTM D 312, **Type III or IV**.
E. Insulation Cant Strips: ASTM C 208, Type II, Grade 1, cellulosic-fiber insulation board.
F. Tapered Edge Strips: ASTM C 208, Type II, Grade 1, cellulosic-fiber insulation board.
G. Cover Board: ASTM C 208, Type II, Grade 2, cellulosic-fiber insulation board, 1/2 inch (13 mm) thick.
H. Substrate Joint Tape: 6- or 8-inch- (150- or 200-mm-) wide, coated, glass fiber.

2.8 Walkways

A. First option in "Walkway Pads" Paragraph below includes composition walkway pads produced by some roofing system manufacturers and independently manufactured products." Verify requirements with roofing system manufacturers, and revise description if required.
B. Walkway Pads: **Reinforced asphaltic composition pads with slip-resisting mineral-granule surface**, manufactured as a traffic pad for foot traffic and acceptable to roofing system manufacturer, **3/8 inch (10 mm)** thick, or manufacturer’s standard thickness.
C. Pad Size: 30-inches.

Part 3 – Execution Requirements

3.1 Examination

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work:
B. Verify that roof openings and penetrations are in place, curbs are set and braced, and roof-drain bodies are securely clamped in place.
C. Wood cants, blocking, curbs, and nailers are required at edges of roof penetrations, area dividers, and terminations. Wood nailers are not required on lightweight insulating concrete decks or on non-insulated, nailable decks.
D. Verify that wood blocking, and curbs, are securely anchored to roof deck at penetrations and terminations.
E. Verify that concrete substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
F. Delete first subparagraph below if no hot roofing asphalt is required.
G. Test for moisture by pouring 1 pint (0.5 L) of hot roofing asphalt on deck at start of each day's work and at start of each roof area or plane. Do not proceed with Work of this Section if test sample foams or can be easily and cleanly stripped after cooling.
H. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 Preparation

A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.

B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.
C. Prime surface of concrete deck with asphalt primer at a rate of 3/4 gal./100 sq. ft. (0.3 L/sq. m), and allow primer to dry.

3.3 Installation, General

A. Comply with roofing system manufacturer's written instructions.
B. **Airport Police Department** roofing membrane assembly on Metal Deck – Roof A, C, E:
C. **High Voltage Building** roofing membrane assembly on Metal Deck:
D. **Facilities Department** roofing membrane assembly on Metal Deck – Roof A:
   1. Remove existing roof system in its entirety down to roof deck. Clean deck of all debris and dirt. If repairs are necessary, detailed scope and cost must be provided to Owner. Owner must approve scope and cost prior to making any necessary repairs to deck, as per Unit Prices. Dispose of debris in an approved landfill.
   2. Mechanically fasten 1-layer of insulation and install balance of layers of insulation, tapered insulation (where required, see drawings) and coverboard, in hot asphalt. Stagger all thermal joints.
   3. Install new cant strip at all vertical interfaces.
   4. Install the base-ply, a smooth surface modified bitumen sheet, in hot asphalt as recommended by the manufacturer.
   5. Install all metal components on roof surface, prime flanges.
   6. Install 1st. ply of the 2-ply flashing system.
   i. Install the cap sheet, a mineral surface modified bitumen membrane, in *cold adhesive as recommended by the manufacturer. Hold cold adhesive back 3” on side laps and back 6” on end laps.
   7. Use a hot air gun on the 3” side lap and 6” end lap. All laps must be rolled with a 3” rounded edge roller. On 6” end lap, remove loose granules and heat and embed all remaining granules with a hot air gun. A 1/8” to 3/8” bleed out of SBS compound shall be visible at the edge of all seams.
   8. Install foil faced flashing with cold adhesive or MBR flashing cement, as recommended by the manufacturer. Anchor to top edge with termination bar and screws @ 8” o.c. max.
   9. **Contractor shall test all roof drains, to verify water flow. Notify Owner of all drain lines that are clogged and/or if the water flow is very slow.**
   10. All required mechanical, plumbing and/or electrical work, such as but not limited to; disconnect and reconnect of equipment, relocation of conduit, etc., shall be the responsible of the Owner and coordinated by the Roofing Contractor.
E. **North Pump #1** roofing membrane assembly on Concrete Deck:
F. **South Pump #2** roofing membrane assembly on Concrete Deck:
   1. Remove existing roof system in its entirety down to roof deck. Clean deck of all debris and dirt. Make necessary repairs to deck, as per Unit Prices. Dispose of debris in an approved landfill.
   2. Prime concrete deck as per manufacturer’s latest requirements.
   3. Install all layers of insulation, tapered insulation (where required, see drawings) and coverboard, in hot asphalt. Stagger all thermal joints.

4. Install new cant strip at all vertical interfaces.
5. Install the base-ply, a smooth surface modified bitumen sheet, in hot asphalt as recommended by the manufacturer.
6. Install all metal components on roof surface; prime flanges.
7. Install 1st. ply of the 2-ply flashing system.
8. Install the cap sheet, a mineral surface modified bitumen membrane, in *cold adhesive as recommended by the manufacturer. Hold cold adhesive back 3" on side laps and back 6" on end laps.
9. Use a hot air gun on the 3" side lap and 6" end lap. All laps must be rolled with a 3" rounded edge roller. On 6" end lap, remove loose granules and heat and embed all remaining granules with a hot air gun. A 1/8" to 3/8" bleed out of SBS compound shall be visible at the edge of all seams.
10. Install foil faced flashing with cold adhesive or MBR flashing cement, as recommended by the manufacturer. Anchor to top edge with termination bar and screws @ 8" o.c. max.
11. **Contractor shall test all roof drains, to verify water flow. Notify Owner of all drain lines that are clogged and/or if the water flow is very slow.**
    a) All required mechanical, plumbing and/or electrical work, such as but not limited to; disconnect and reconnect of equipment, relocation of conduit, etc., shall be the responsible of the Owner and coordinated by the Roofing Contractor.

G. Asphalt Heating: Heat asphalt to its equiviscous temperature, measured at the mop cart or mechanical spreader immediately before application. Circulate asphalt during heating. Do not raise asphalt temperature above equiviscous temperature range more than one hour before time of application. Do not exceed asphalt manufacturer's recommended temperature limits during asphalt heating. Do not heat asphalt within 25 deg F (14 deg C) of flash point. Discard asphalt maintained at a temperature exceeding finished blowing temperature for more than four hours.
   1. Apply hot roofing asphalt within plus or minus 25 deg F (14 deg C) of equiviscous temperature.

H. Substrate-Joint Penetrations: Prevent roofing asphalt and adhesives from penetrating substrate joints, entering building, or damaging roofing system components or adjacent building construction.

3.4 Insulation Installation

A. Install one lapped base-sheet course and mechanically fasten to substrate according to roofing system manufacturer's written instructions.

B. Roofing system manufacturers require nailer strips for insulation-covered roof decks with slopes greater than 1 inch per 12 inches (1:12). Verify roofing system manufacturer's backnailing requirements for reducing nailer-strip spacing as roof slope increases. Unless manufacturer's written instructions contain more stringent requirements, NRCA recommends spacing nailers approximately 16 feet (4.88 m) apart for slopes up to 3 inches per 12 inches (3:12) and 48 inches (1220 mm) apart for steeper slopes. Delete nailer strips on lightweight insulating concrete decks or other non-insulated nailable decks.

C. Insulation cant strips may be mechanically fastened or set in hot asphalt, depending on substrate and roofing system manufacturer's written instructions.

D. Insulation Cant Strips: Install and secure preformed 45-degree insulation cant strips at junctures of roofing system with vertical surfaces or angle changes greater than 45 degrees.
E. Install tapered insulation under area of roofing to conform to slopes indicated.
F. Install insulation with long joints of insulation in a continuous straight line, with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
    1. Cut and fit insulation within 1/4 inch (6 mm) of projections, and penetrations.
G. Install insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2.7 inches (68 mm) or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches (150 mm) in each direction.
    1. Where installing composite and non-composite insulation in two or more layers, install non-composite board insulation for bottom layer and intermediate layers, if applicable, and install composite board insulation for top layer.
H. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.
I. Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.
J. Adhered Insulation: Install each layer of insulation and adhere to substrate as follows:
    1. Prime surface of concrete deck with asphalt primer at rate of 3/4 gal./100 sq. ft. (0.3 L/sq. m), and allow primer to dry.
    2. Set each layer of insulation in a solid mopping of hot roofing asphalt.
K. Mechanically Fastened Insulation: Install each layer of insulation and secure to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.
    1. Fasten insulation according to requirements in "RoofNav" for specified Windstorm Resistance Classification.
    2. Fasten insulation to resist uplift pressure at corners, perimeter, and field of roof.
L. Mechanically Fastened and Adhered Insulation: Install first layer of insulation to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.
    1. Fasten first layer of insulation according to requirements in "RoofNav" for specified Windstorm Resistance Classification.
    2. Fasten first layer of insulation to resist uplift pressure at corners, perimeter, and field of roof.
    3. Set each subsequent layer of insulation in a solid mopping of hot roofing asphalt.
    4. Set each subsequent layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
    5. Set each subsequent layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.
M. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches (150 mm) in each direction. Loosely butt cover boards together. Tape joints if required by roofing system manufacturer.
    1. Fasten cover boards according to requirements in "RoofNav" for specified Windstorm Resistance Classification.

2. Fasten cover boards to resist uplift pressure at corners, perimeter, and field of roof.
3. Apply hot roofing asphalt to underside, and immediately bond cover board to substrate.

3.5 Roofing Installation, General

A. Install roofing system according to roofing system manufacturer's written instructions and applicable recommendations in ARMA/NRCA's "Quality Control Guidelines for the Application of Polymer Modified Bitumen Roofing."
   1. Install roofing system and roof assembly layout illustrations in NRCA's "The NRCA Roofing and Waterproofing Manual" and to Section requirements.
B. Install roofing system according to roofing system manufacturer's written instructions and applicable recommendations in ARMA/NRCA's "Quality Control Guidelines for the Application of Polymer Modified Bitumen Roofing" and as follows:
   1. Deck Type: **I (insulated) or C (concrete or non-nailable)**.
   2. Adhering Method: **M (mopped) or L (cold-applied adhesive)**.
   3. Number of SBS-Modified Asphalt Sheets: **Two**.
   4. Surfacing Type: **M (mineral-granule-surfaced cap sheet)**.
C. Start installation of roofing in presence of manufacturer's technical personnel.
D. Coordinate installation of roofing system so insulation and other components of the roofing system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.
   1. Provide tie-offs at end of each day's work to cover exposed roofing sheets and insulation with a course of coated felt set in roofing cement or hot roofing asphalt, with joints and edges sealed.
   2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system.
   3. Remove and discard temporary seals before beginning work on adjoining roofing.

3.6 Base-ply Sheet Installation

A. Install glass-fiber base-ply sheets according to roofing system manufacturer's written instructions starting at low point of roofing system. Align glass-fiber base-ply sheets without stretching. Extend sheets over and terminate beyond cants.
   1. Embed each glass-fiber base-ply sheet in a continuous void-free mopping of hot roofing asphalt to form a uniform membrane without glass-fiber base-ply sheets touching.

3.7 SBS-Modified Bituminous Membrane Installation

A. Install modified bituminous roofing **sheet and** cap sheet according to roofing manufacturer's written instructions, starting at low point of roofing system. Extend roofing membrane sheets over and terminate beyond cants, installing as follows:
   1. Adhere to substrate in a solid mopping of hot roofing asphalt applied at not less than 425 deg F (218 deg C).
   2. Adhere to substrate in cold-applied adhesive.
   3. Unroll roofing sheets and allow them to relax for minimum time period required by manufacturer.

B. Laps: Accurately align roofing sheets, without stretching, and maintain uniform side and end laps. Stagger end laps. Completely bond and seal laps, leaving no voids.
   1. Repair tears and voids in laps and lapped seams not completely sealed.
   2. Apply roofing granules to cover exuded bead at laps while bead is hot.
C. Install roofing sheets so side and end laps shed water.

3.8 Flashing and Stripping Installation

A. Install base flashing over cant strips and other sloped and vertical surfaces, at roof edges, and at penetrations through roof, and secure to substrates according to roofing system manufacturer's written instructions and as follows:
   1. Prime substrates with asphalt primer if required by roofing system manufacturer.
   2. Backer-Sheet Application: Mechanically fasten backer sheet to walls or parapets. Adhere backer sheet over roofing membrane at cants in **a solid mopping of hot roofing asphalt or cold-applied adhesive**.
   3. Backer-Sheet Application: Adhere backer sheet to substrate in **a solid mopping of hot roofing asphalt or cold-applied adhesive**.
   4. Flashing-Sheet Application: Adhere flashing sheet to substrate in a solid mopping of hot roofing asphalt applied at not less than 425 deg F (218 deg C). Apply hot roofing asphalt to back of flashing sheet if recommended by roofing system manufacturer.
   5. Flashing-Sheet Application: Adhere flashing sheet to substrate in cold-applied adhesive at rate required by roofing system manufacturer.
   6. Flashing-Sheet Application: Adhere flashing sheet to substrate in asphalt roofing cement at rate required by roofing system manufacturer.
   7. Flashing-Sheet Application: Torch apply flashing sheet to substrate.
B. Extend base flashing up walls or parapets a minimum of 8 inches (200 mm) above roofing membrane and 4 inches (100 mm) onto field of roofing membrane.
C. Mechanically fasten top of base flashing securely at terminations and perimeter of roofing.
   1. Seal top termination of base flashing **with a strip of glass-fiber fabric set in asphalt roofing cement**.
D. Install roofing cap-sheet stripping where metal flanges and edgings are set on roofing according to roofing system manufacturer's written instructions.
E. Retro Drains: Set **30-by-30-inch- (760-by-760-mm-)** metal flashing in bed of asphaltic adhesive on completed roofing membrane. Cover metal flashing with roofing cap-sheet stripping, and extend a minimum of **4 inches (100 mm)** beyond edge of metal flashing onto field of roofing membrane. Clamp roofing membrane, metal flashing, and stripping into roof-drain clamping ring.
   1. Install stripping according to roofing system manufacturer's written instructions.

3.9 Walkway Installation

A. Walkway Pads: Install walkway pads using units of size indicated or, if not indicated, of manufacturer's standard size, according to walkway pad manufacturer's written instructions.
   1. Set walkway pads in cold-applied adhesive.
   2. Set walkway pads in additional pour coat of hot roofing asphalt after aggregate surfacing of modified bituminous roofing membrane.

3.10 Field Quality Control

A. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.
   1. Notify Architect and Owner 48 hours in advance of date and time of inspection.
B. Roofing system will be considered defective if it does not pass inspections.

3.11 Protecting and Cleaning

A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

End of Section

Section 07 54 00 – Membrane Roofing

Part 1 – General / Design Requirements

None.

Part 2 – Product Requirements

TBD.

Part 3 – Execution Requirements

TBD.

End of Section

Section 07 84 43 – Joint Firestopping

Part 1 – General / Design Requirements

TBD.

Part 2 – Product Requirements

TBD.

Part 3 – Execution Requirements

TBD.

End of Section

Section 07 92 00 – Joint Sealants

Part 1 – General / Design Requirements

1.1 Summary

A. Section Includes:
B. Silicone joint sealants.
C. Urethane joint sealants.
D. Butyl joint sealants.

1.2 Action Submittals

A. Product Data: For each joint-sealant product.
B. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- (13-mm-) wide joints formed between two 6-inch- (150-mm-) long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

1.3 Informational Submittals

A. Sample Warranties: For special warranties.

1.4 Quality Assurance

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

1.5 Field Conditions

A. Do not proceed with installation of joint sealants under the following conditions:
B. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer **or are below 40 deg F (5 deg C)**.
C. When joint substrates are wet.
D. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
E. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.6 Warranty

A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
B. Verify available warranties and warranty periods for joint-sealant installation.
C. Warranty Period: **Two** years from date of Substantial Completion.
D. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
E. Verify available warranties and warranty periods for joint sealants.

F. Warranty Period: **Five** years from date of Substantial Completion.
G. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
H. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
I. Disintegration of joint substrates from causes exceeding design specifications.
J. Mechanical damage caused by individuals, tools, or other outside agents.
K. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

Part 2 – Product Requirements

2.1 Joint Sealants, General

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
B. Colors of Exposed Joint Sealants: **As selected by Architect or Owner from manufacturer's full range**.

2.2 Silicone Joint Sealants

A. Silicone, S, NS, 35, NT: Single-component, nonsag, plus 35 percent and minus 35 percent movement capability. nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 35, Use NT.
B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Dow Corning Corporation.
   2. GE Construction Sealants; Momentive Performance Materials Inc.

2.3 Urethane Joint Sealants

A. Coordinate paragraphs in this article with "Joint-Sealant Schedule" Article.
B. Urethane, S, P, 35, T, NT: Single-component, pourable, plus 35 percent and minus 35 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type S, Grade P, Class 35, Uses T and NT.
C. Manufacturers: Subject to compliance with requirements, provide products by the following:
D. Bostik, Inc., or equal.

2.4 BUTYL JOINT SEALANTS

A. Butyl-Rubber-Based Joint Sealants: ASTM C 1311.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
C. Bostik, Inc.
D. Pecora Corporation.

2.5 Joint-Sealant Backing

A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
B. Cylindrical Sealant Backings: ASTM C 1330, **Type C (closed-cell material with a surface skin) Type B (bicellular material with a surface skin) or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated**, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.6 Miscellaneous Materials

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

Part 3 – Execution Requirements

3.1 Examination

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.
B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 Preparation

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

B. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
C. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
    1. Concrete.
    2. Masonry.
    3. CMU.
D. Remove laitance and form-release agents from concrete.
E. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
    1. Metal.
F. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
G. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 Installation of Joint Sealants

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
D. Do not leave gaps between ends of sealant backings.
E. Do not stretch, twist, puncture, or tear sealant backings.
F. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.
G. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

H. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
I. Place sealants so they directly contact and fully wet joint substrates.
J. Completely fill recesses in each joint configuration.
K. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
L. Tooling of Non-sag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
M. Remove excess sealant from surfaces adjacent to joints.
N. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
O. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.
P. Provide flush joint profile at according to Figure 8B in ASTM C 1193.
Q. Provide recessed joint configuration of recess depth and at according to Figure 8C in ASTM C 1193.
R. Use masking tape to protect surfaces adjacent to recessed tooled joints.

3.4 Cleaning

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 Protection

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work

End of Section

End of Division 07 – Thermal and Moisture Protection

Division 08 – Openings

Section 08 11 13 – Hollow Metal Doors and Frames

Part 1 – General / Design Requirements

A. Use double 16-gauge (54 mil) studs at all door jambs in cold form metal framed walls.

Part 2 – Product Requirements

A. Manufacturers: Steelcraft, Pioneer, or CVG approved equal
B. Interior doors and frames (except fire-rated doors and frames), heavy-duty; SDI A250.8, Level 2:
   1. Doors:
      a. Size: 3’-0” x 7’-0” minimum
      b. Thickness: 1-3/4 inches.
      c. Face: Uncoated, cold-rolled steel sheet, minimum thickness of 0.042 inch (18 gauge).
   2. Frames:
      a. Materials: Uncoated steel sheet, minimum thickness of 0.053 inch (16 gauge).
      b. Construction: Provide full profile welded at new construction.
C. Interior fire-rated doors and frames, extra-heavy-duty; SDI A250.8, Level 3:
   1. Doors:
      a. Size: 3’-0” x 7’-0” minimum
      b. Thickness: 1-3/4 inches.
      c. Face: Uncoated, cold-rolled steel sheet, minimum thickness of 0.053 inch (16 gauge).
   2. Frames:
      a. Materials: Uncoated steel sheet, minimum thickness of 0.067 inch (14 gauge).
      b. Construction: Knock down frames are not accepted in new construction or replacement/ renovation projects.
D. Exterior doors and frames, extra-heavy duty; SDI A250.8, Level 3:
   1. Doors:
      a. Size: 3’-0” x 7’-0” minimum
      b. Thickness: 1-3/4 inches.
      c. Face: Metallic-coated steel sheet, minimum thickness of 0.053 inch (16 gauge), with minimum A40 coating.
      d. Core: Polystyrene or Polyurethane.
      e. Fabrication: Provide top edge closures, sealed against water penetration.
   2. Frames:
      a. Materials: Metallic-coated steel sheet, minimum thickness of 0.067 inch (14 gauge), with a minimum A40 coating.
      b. Construction: Provide full profile welded at new construction.

Part 3 – Execution Requirements

3.1 Fabrication

A. Provide top edge closures, sealed against water penetration, at all exterior doors.
B. Factory prepare hollow-metal work to receive mortised hardware.
C. Reinforce doors and frames to receive mortised and surface-mounted hardware.
D. Weld grout guards to frame at back of hardware mortises at all frames.

3.2 Installation

A. At fire rated openings, install doors and frames according to NFPA 80.

End of Section

Section 08 31 13 – Access Doors and Frames

Part 1 – General / Design Requirements

A. Provided by the contractor at all locations where access is required to utilities, valves, etc., whether indicated on drawings or not.

Part 2 – Product Requirements

A. Flush Interior Access Doors with Exposed Flanges:
   1. Basis-of-Design: JL Industries Model TM (standard panel) or TMS (stainless).
   2. Description: Face of door flush with frame, with exposed flange and concealed hinge.
   3. Location: Wall and ceiling.
   4. Size: Minimum 12” x 12” for plumbing valve or other connections and access.
      a) Sized to allow maintenance function.
      b) CVG to confirm size during design review.
   5. Uncoated Steel Sheet Door: Minimum 16-gauge steel (0.060 inch) with 1” (25.40mm) flange.
   6. Finish: Factory primed for paint.
   7. Hinge: 90 degrees continuous, concealed, piano hinge.
   8. Latch and Lock: Prepare for and install CR25LM/DM cam lock to receive Corbin Russwin Interchangeable Core.
      a. Cam lock specified is as listed in Olympus Lock, Inc., Data Sheet.
      b. Finish: 26D
      c. Trim Collar: TR201 1/8-inch deep.

B. Fire-Rated, Flush Interior Access Doors with Exposed Flanges:
   1. Basis-of-Design: JL Industries Model FD (standard panel) or FDS (stainless).
   2. Description: Face of door flush with frame, with a core of mineral-fiber insulation enclosed in sheet metal; with exposed flange, self-closing door, and concealed hinge.
   3. Location: Wall and ceiling.
   4. Size: Minimum 12” x 12” for plumbing valve or other connections and access.
      a) Sized to allow maintenance function.
      b) CVG to confirm size during design review.
   5. Fire-Resistance Rating: Not less than that of adjacent construction.
   6. Uncoated Steel Sheet Door: Minimum 20-gauge steel (0.036 inch).
   7. Frame Material: Same material finish as door, nominal 16-gauge (0.060 inch).
   8. Finish: Factory primed for paint.
   9. Hinge: 90 degrees continuous, concealed, piano hinge.
   10. Latch and Lock: Prepare for and install CR25LM/DM cam lock to receive Corbin Russwin Interchangeable Core.
      a. Cam lock specified is as listed in Olympus Lock, Inc., Data Sheet.
      b. Finish: 26D
      c. Trim Collar: TR201 1/8-inch deep.

Part 3 – Execution Requirements

A. Coordinate handling of all panels.
B. General Contractor to install access door, frame, and CR25LM/DM latch and lock with temporary construction core.
    1. Owner will provide and install final Corbin Russwin interchangeable core at all locations at conclusion of project.
C. At locations where access panels are to be painted, they shall be painted in such a manner as to prevent doors from bonding to the frame.

End of Section

Section 08 33 23 – Overhead Coiling Doors

Part 1 – General / Design Requirements

A. Door Alarm: Abnormal door condition alarm dry contacts, with ½" conduit installation, for future monitoring by the BAS.
B. Automatic Operators: Shal comply with UL 325 Standard for Safety.

Part 2 – Product Requirements

A. Doors less than 20'-0" wide:
    1. Basis-of-Design Door: Cornell Iron Works model Thermiser insulated door.
        a. Stainless Steel endlocks.
        b. 4" heavy duty guides, rollers, and hinges.
        c. High cycle springs rated for a minimum of 50,000 cycles.
    2. Basis-of-Design Operator: LIFTMASTER BH50
        a. Chain hoist.
        b. Pneumatic safety edge.
B. Doors over 20-0" wide:
    1. Basis-of-Design Door: Cornell Iron Works model Thermiser insulated door.
        a. Galvanized cast iron endlocks.
        b. 4" heavy duty guides, rollers, and hinges.
        c. High cycle springs rated for a minimum of 50,000 cycles.
    2. Basis-of-Design Operator: LIFTMASTER GH75**.**
        a. Chain hoist.
        b. Pneumatic safety edge.

Part 3 – Execution Requirements

A. All doors to be installed plumb and level and completed with trim. Installer to use an electronic level or water level to verify.

Part 4 – Close Out Requirements

A. Manuals: Maintenance manuals, sequence of operation, warranty, parts list, installation manuals, shall be provided to the owner.

End of Section

Section 08 36 13 – Sectional Doors

Part 1 – General / Design Requirements

A. Automatic Operators shall comply with UL 325 Standard for Safety.

Part 2 – Product Requirements

A. Doors less than 20'-0" wide:
   1. Basis-of-Design Door: General Door model WB-200.
      a. 3" heavy duty track, rollers, and hinges.
      b. Wind struts on every section.
      c. High cycle springs rated for a minimum of 50,000 cycles.
   2. Basis-of-Design Operator: Lift Master model GH.
      a. Side mount operator.
      b. Chain hoist.
      c. Pneumatic safety edge.

B. Door Alarm: abnormal door condition alarm dry contacts, with ½" conduit installation, for future monitoring by the BAS.

Part 3 – Execution Requirements

A. All doors to be installed plumb and level and completed with trim.

End of Section

Section 08 42 29.23 – Sliding Automatic Entrances

Part 1 – General / Design Requirements

None.

Part 2 – Product Requirements

A. Acceptable Manufacturers and Products:
   1. Stanley Bi-Parting Doors.
   2. Gyro-Tech.
   3. Horton Automatic Doors.

B. Requirements:
   1. Automatic doors shall include auxiliary contacts for condition monitoring by BAS (i.e. door OPEN, door CLOSED, door ALARM).
   2. Automatic door technical documents shall provide configuration passwords and set-up documents.
   3. Door Alarm: Abnormal door condition alarm dry contacts, with ½" conduit installation, for future monitoring by the BAS.
   4. Disconnect switches should be installed with every door to ensure that electrical isolation at the door is provided to ensure maintenance or repair can be efficiently performed.

Part 3 – Execution Requirements

None.

End of Section

Section 08 71 00 – Door Hardware

Part 1 – General / Design Requirements

None.

Part 2 – Product Requirements

2.1 Hinges

A. Acceptable Manufacturers and Products:
   1. Doors up to 3’-0” wide:
      a. Hager or Stanley FBB168 US260, 4-1/2 inches high.
   2. Doors over 3’-0” wide:
      a. Hager Full Mortise Hinge BB1279, 5 inches high.

B. Requirements:
   1. Provide 5 knuckle, concealed bearing hinges.
   2. Provide three hinges per door leaf for doors 90 inches or less in height, and one additional hinge for each 30 inches of additional height.

2.2 Continuous Hinges

A. Acceptable Manufacturers and Products:
   1. Select SL-57HD surface mount.

2.3 Mechanical Locks And Latches

A. Mortise Locks:
   1. Acceptable Manufacturers and Products:
      a. Corbin Russwin Mortise Locksets:
         1) Office Function: ML2051 LL 626
         2) Storeroom Function: ML2057 LL 626
         3) Restroom Privacy Function: ML2030+720F62
      b. Handle: Lustra LWA US32D finish

2.4 Electric Strikes

A. Acceptable Manufacturers and Products:
   1. Hess 1006 series standard 12/24 VDC.
   2. Hess 9600 series for surface mount 12/24 VDC.

B. Requirement:
   1. Doors that are emergency fire exits require electromagnetic strikes installed at top of door header with panic bar hardware.
   2. Doors that are not emergency exits require an electric strike provided at the latch side of door.
   3. See also ACCESSORIES FOR DOORS WITH CARD READERS.

2.5 Electromagnetic Locks

A. Acceptable Manufacturers and Products:
   1. Locknetics 390 Series with DSM x SEC x RTD (standard or delayed) door monitor switch.

2.6 Electromechanical Locks

A. Acceptable Manufacturers and Products:
   1. Schlage CO100993R70 KP SPA 626 JD CO6 RH (Cipher lock)
      a. Used in conjunction with exit devices.
      b. Fitted with cylinder per LOCK CYLINDERS heading below.

2.7 SELF-CONTAINED ELECTRONIC LOCKS

A. Acceptable Manufacturers and Products:
   1. Schlage CO100CY70 KP SPA 626 JD CO6 RH (Less Core).) (For Emergency Exits with Panic Bars)
      a. Used for brand new door installations.
      b. Cylindrical.
      c. Fitted with cylinder per LOCK CYLINDERS heading below.
   2. Schlage CO100MS70 KP SPA 626 JD CO6 RH (Less Core).
      a. Used where existing mortise style lock needs to be replaced with combination lock.
      b. Mortise.
      c. Fitted with cylinder per LOCK CYLINDERS heading below.

2.8 Automatic and Self-Latching Flush Bolts

A. Acceptable Manufacturers and Products:
   1. Ives FB51P for metal doors.
   2. Ives FB61P for wood doors.

2.9 Exit Devices and Auxiliary Items

A. Acceptable Manufacturers and Products:
   1. Exit Device Panic Bar: Von Duprin 99 Series US26D Finish.
   2. Exit Device Trim: 992L-V for lock cylinder. If no cylinder is required, specify “BE” blank escutcheon, trim always operable.

2.10 Lock Cylinders

A. Core Type: Interchangeable Core Shell; Corbin Russwin Large Format key, 6-pin; furnished by contractor. Owner Standard. No substitutions**.**
   1. Corbin 334F182 26D for mortise locks.
   2. Corbin 334F242 26D for exit devices.

B. Construction Cores: Contractor to furnish construction cores that are replaceable by permanent cores. Provide 10 construction master keys
C. Permanent Cores: CVG Lock Shop shall supply, pin, and install permanent KeyMark by Medecco large format cores at the completion of construction.

2.11 Keying

A. By Owner

2.12 Key Control System

A. None.

2.13 Operating Trim

A. Acceptable Manufacturers and Products:
   1. Push Plates: Rockwood 70C 4x16 US32D
   2. Pull Plates: Rockwood 132C 4x16 US32D

2.14 Surface Closers

A. Acceptable Manufacturers and Products:
   1. LCN Super smooth, LCN-4040XP, Smooth Aluminum Finish.
      a. All closer to be through bolted on all doors.

2.15 Doorstops and Holders

A. Acceptable Manufacturers and Products:
   1. Glynn-Johnson F40A Series or equivalent.
      a. Overhead doorstops may be permitted with prior approval.

2.16 Thresholds, Seals, Door Sweeps, and Gasketing

A. None.

2.17 Metal Protective Trim Units

A. None.

2.18 Power Transfer

A. Acceptable Manufacturers and Products:
   1. Von Duprin EPT-10 (012012-36)

2.19 Power Supplies

A. None.

2.20 Touch Keypads

A. Acceptable Manufacturers and Products
   1. IEI Door Guard 212ILW 12/24 VDC.

2.21 Accessories for Doors with Card Readers

A. Provide a single gang box for “EXIT” button to be installed.
B. Provide a double gang box for Matrix card reader to be installed.
C. Provide a ¾” conduit up to junction box and homerun back to Matrix panel.

2.22 Accessories for pairs of Doors

A. None.

Part 3 – Execution Requirements

A. All work will be done in a workman like manner.

End of Section

End of Division 08 - Openings

Division 09 – Finishes

Section 09 05 00 – Common Work Results for Finishes

Part 1 – General / Design Requirements

A. The Design Team must include a formal review with Housekeeping and the CVG Project Manager for review of the following:
   1. All finish materials.
   2. Required sealers, care, cleaning, and maintenance requirements.
B. New materials must not require CVG purchase additional equipment for cleaning or maintenance.
C. Provide detailed finish schedule post submittals inclusive of all room finishes. (walls, floors, ceilings including square footage and ceiling height per room)
D. Provide mock of significant finish systems.

Part 2 – Product Requirements

None.

Part 3 – Execution Requirements

None.

End of Section

Section 09 22 16 – Non-Structural Metal Framing

Part 1 – General / Design Requirements

A. Provide a minimum size of 3-5/8" (20 gauge – 33 mil) on metal stud wall framing with a maximum spacing of 16" o.c. (24" for CH-studs)
B. Three (3) metal studs required at ALL corners and intersections.
C. All jambs (door/window/opening) to have double studs each side (16 gauge – 54 mil).
D. Provide deep leg deflection top track at partitions extending to the floor or roof above.
E. Provide U.L. fire-rated top of partition assemblies at top of all fire-rated partitions.

Part 2 – Product Requirements

None.

Part 3 – Execution Requirements

None.

End of Section

Section 09 29 00 – Gypsum Board

Part 1 – General / Design Requirements

None.

Part 2 – Product Requirements

A. Source Limitations
   1. Obtain each type of gypsum board and other panel products from a single manufacturer.
B. Performance Requirements
   1. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated in accordance with ASTM E119 by an independent testing agency acceptable to authorities having jurisdiction.
   2. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated in accordance with ASTM E90 and classified in accordance with ASTM E413 by an independent testing agency.
C. Interior Gypsum Board
   1. Impact-Resistant Gypsum Board.
      a. Core: 5/8 inch unless otherwise indicated.
      b. Long Edges: Tapered.
   2. Mold-Resistant Gypsum Board.
      a. Core: 5/8 inch unless otherwise indicated.
      b. Long Edges: Tapered.

Part 3 – Execution Requirements

A. Gypsum Board Finish Levels:
   1. Level 4: At panel surfaces exposed to view in NON-OCCUPIED, NON-PUBLIC SPACES (i.e. storage rooms, mechanical rooms, etc.)
      a. Requires approval by CVG.
   2. Level 5: At panel surfaces that will be exposed to view in OCCUPIED AREA and PUBLIC SPACES, unless otherwise indicated.
      a. Existing partitions to remain should also receive Level 5 finish, unless otherwise noted. Remove all fasteners for surface mounted devices / equipment, fill all voids and blemishes, cap or remove all sleeves).
B. Install interior gypsum board in the following locations:
   1. Impact-Resistant Gypsum Board: To a (minimum) height of 4 feet above floor in all PUBLIC SPACES.
   2. Mold-Resistant Gypsum Board: Where there is risk for water exposure (restrooms, janitor's closets, and within 4 feet of sinks or drinking fountains).

End of Section

Section 09 30 13 – Ceramic Tiling

Part 1 – General / Design Requirements

A. Restrooms shall include coved base.
B. Minimize corners in restroom designs to facilitate ease of cleaning.

Part 2 – Product Requirements

A. Waterproof Membranes.
   1. Basis-of-Design: Hydro Ban by Laticrete (See Appendix item 093013-B).

Part 3 – Execution Requirements

A. Preparation:
   1. New and existing floors shall be mechanically scarified (or shot blasted) where recommended by the tile manufacturer prior to installation of any waterproofing materials or tile.
B. Waterproof Membranes:
   1. Waterproofing membranes shall extend 4” up walls were installed under tile floors at restrooms and kitchens located on elevated floor slabs.
   2. Flood testing is required prior to tile installation. This test will be in accordance with ASTM D5957): Standard Guide for Flood Testing Horizontal Waterproofing Installations (See Appendix item 093013-A). The CVG Inspector must witness this test. A copy of this procedure can be found in the Appendix.

End of Section

Section 09 51 13 - Acoustical Panel Ceilings

Part 1 – General / Design Requirements

1.1 Summary

Section includes acoustical panels and exposed suspension systems for interior ceilings.

Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete.

1.2 Action Submittals

A. Product Data: For each type of product.
B. Samples for Initial Selection: For components with factory-applied finishes.
C. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of sizes indicated below:
D. Acoustical Panels: Set of 6-inch-square Samples of each type, color, pattern, and texture.
E. Exposed Suspension-System Members, Moldings, and Trim: Set of 6-inch- long Samples of each type, finish, and color.
F. Delegated-Design Submittal: For seismic restraints for ceiling systems.
G. Include design calculations for seismic restraints including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.3 Informational Submittals

A. Qualification Data: For testing agency.
B. Product Test Reports: For each acoustical panel ceiling, for tests performed by manufacturer and witnessed by a qualified testing agency or a qualified testing agency.
C. Evaluation Reports: For each acoustical panel ceiling suspension system and anchor and fastener type, from ICC-ES.
D. Field quality-control reports.

1.4 Closeout Submittals

A. Maintenance Data: For finishes to include in maintenance manuals.
B. Maintenance Material Submittals
C. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
D. Acoustical Ceiling Units: Full-size panels equal to 2 percent of quantity installed.
E. Suspension-System Components: Quantity of each exposed component equal to 2 percent of quantity installed.

1.5 Quality Assurance

A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

B. Build mockup of typical ceiling area as shown on Drawings.
C. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
D. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 Delivery, Storage, and Handling

A. Deliver acoustical panels, suspension-system components, and accessories to Project site and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

1.7 Field Conditions

Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

Part 2 – Product Requirements

2.1 Manufacturers

A. Source Limitations: Obtain each type of acoustical ceiling panel and its supporting suspension system from single source from single manufacturer

2.2 Performance Requirements

A. Delegated Design: Engage a qualified professional engineer to design seismic restraints for ceiling systems.
B. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
C. Flame-Spread Index: Class A according to ASTM E 1264.
D. Smoke-Developed Index: 50 or less.
E. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
F. Indicate design designations from UL or from the listings of another qualified testing agency.

2.3 Acoustical Panels

A. Acoustical Panel Standard: Provide manufacturer's standard panels according to ASTM E 1264 and designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.

B. Acoustical Panel Basis-of-Design: Provide product indicated below by USG, or comparable products as approved by the Architect.

1. Product: Mars #88985.
2. Edge: Flat Reveal.
3. Modular Size: 24 inches by 48 inches.
4. Color: White.
5. Grid: DXI Identitee White.

C. Acoustical Panel Type Basis-of-Design: Provide product indicated below by USG, or comparable products as approved by the Architect.
1. Product: Mars #88985.
2. Edge: Flat Reveal.
3. Modular Size: 24 inches by 24 inches.
4. Color: White.
5. Grid: DXI Identitee White
6. Acoustical Panel Type: ACT-3.

D. Basis-of-Design: Provide product indicated below by USG, or comparable products as approved by the Architect.
1. Product: Mars #88985.
2. Edge: Flat Reveal.
3. Modular Size: 12 inches by 48 inches.
4. Color: White.
5. Grid: DXI Identitee White.

E. Acoustical Panel Type ACP-1: Basis-of-Design: Provide USG Halcyon Climaplus Panels #97368, or comparable product as approved by the Architect.
1. Item Number: #97368.
2. Edge: Fineline.
3. Modular Size: 24 inches by 72 inches.
4. Color: White.
5. Grid: DXI Identitee White.

F. Antimicrobial Treatment: Manufacturer's standard broad spectrum, antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D 3273, ASTM D 3274, or ASTM G 21 and evaluated according to ASTM D 3274 or ASTM G 21.

2.4 Metal Suspension System

A. Metal Suspension-System Standard: Provide manufacturer's standard, direct-hung, metal suspension system and accessories according to ASTM C 635/C 635M and designated by type, structural classification, and finish indicated.
B. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; pre-painted, electrolytically zinc coated, or hot-dip galvanized, G30 coating designation; with prefinished 15/16-inch-wide metal caps on flanges.
C. Structural Classification: Heavy-duty system.
D. End Condition of Cross Runners: Override (stepped) or butt-edge type.
E. Face Design: Flat, flush.
F. Cap Material: Cold-rolled steel or aluminum.

G. Cap Finish: Painted to match color of acoustical unit, unless otherwise selected by the Architect.
H. Narrow-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; pre-painted, electrolytically zinc coated, or hot-dip galvanized, G30 coating designation; with prefinished 9/16-inch-wide metal caps on flanges.
I. Structural Classification: Heavy-duty system.
J. End Condition of Cross Runners: or butt-edge type.
K. Face Design: Flat, flush or flanges formed with an integral center reveal as selected by the Architect.
L. Cap Material: Cold-rolled steel or aluminum.
M. Cap Finish: Painted to match color of acoustical unit, unless otherwise selected by the Architect.

2.5 Accessories

A. Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.

B. Anchors in Concrete: Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by testing according to ASTM E 488/E 488M or ASTM E 1512 as applicable, conducted by a qualified testing and inspecting agency.
C. Type: Cast-in-place, post installed expansion, or post installed bonded anchors as acceptable to the Structural Engineer.
D. Corrosion Protection: Carbon-steel components zinc plated according to ASTM B 633, Class SC 1 (mild) service condition.
E. Corrosion Protection: Stainless-steel components complying with ASTM F 593 and ASTM F 594, Group 1 Alloy 304 or 316.
F. Corrosion Protection: Components fabricated from nickel-copper-alloy rods complying with ASTM B 164 for UNS No. N04400 alloy.
G. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing according to ASTM E 1190, conducted by a qualified testing, and inspecting agency.
H. Wire Hangers, Braces, and Ties: Provide wires as follows:
I. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
J. Stainless-Steel Wire: ASTM A 580/A 580M, Type 304, nonmagnetic.
K. Nickel-Copper-Alloy Wire: ASTM B 164, nickel-copper-alloy UNS No. N04400.
L. Size: Wire diameter sufficient for its stress at three times hanger design load (ASTM C 635/C 635M, Table 1, "Direct Hung") will be less than yield stress of wire, but not less than 0.106-inch-diameter wire.
M. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.
N. Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.
O. Angle Hangers: Angles with legs not less than 7/8 inch wide; formed with 0.04-inch-thick, galvanized-steel sheet complying with ASTM A 653/A 653M, G90 coating designation; with bolted connections and 5/16-inch-diameter bolts.

2.6 Metal Edge Moldings and Trim

A. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.
B. Edge moldings shall fit acoustical panel edge details and suspension systems indicated and match width and configuration of exposed runners unless otherwise indicated.
C. For lay-in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.
D. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.
E. Extruded-Aluminum Edge Moldings and Trim: Where indicated, provide manufacturer's extruded-aluminum edge moldings and trim of profile indicated or referenced by manufacturer's designations, including splice plates, corner pieces, and attachment and other clips, complying with seismic design requirements.
F. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.
G. Baked-Enamel or Powder-Coat Finish: Minimum dry film thickness of 1.5 mils. Comply with ASTM C 635/C 635M and coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

2.7 Acoustical Sealant

A. Acoustical Sealant: As specified in Section 079219 "Acoustical Joint Sealants.

Part 3 – Execution Requirements

3.1 Examination

Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 Preparation

Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated and comply with layout shown on reflected ceiling plans.

Layout openings for penetrations centered on the penetrating items.

3.3 Installation

A. Install acoustical panel ceilings according to ASTM C 636/C 636M and manufacturer's written instructions.
B. Suspend ceiling hangers from building's structural members and as follows:
C. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
D. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, counter splaying, or other equally effective means.
E. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
F. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to structure or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
G. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
H. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, post installed mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
I. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
J. Do not attach hangers to steel deck tabs.
K. Do not attach hangers to steel roof deck unless permitted by the Structural Engineer and authorities having jurisdiction. Attach hangers to structural members unless otherwise required for structural performance.
L. Space hangers not more than 48 inches o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
M. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
N. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
O. Do not use exposed fasteners, including pop rivets, on moldings and trim.
P. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
Q. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide precise fit.
R. Arrange directionally patterned acoustical panels as follows:
S. As indicated on reflected ceiling plans.

T. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.
U. For reveal-edged panels on suspension-system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
V. For reveal-edged panels on suspension-system members with box-shaped flanges, install panels with reveal surfaces in firm contact with suspension-system surfaces and panel faces flush with bottom face of runners.
W. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.

3.4 Erection Tolerances

A. Suspended Ceilings: Install main and cross runners level to a tolerance of 1/8 inch in 12 feet, non-cumulative.
B. Moldings and Trim: Install moldings and trim to substrate and level with ceiling suspension system to a tolerance of 1/8 inch in 12 feet, non-cumulative.

3.5 Cleaning

A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.
B. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

End of Section

Section 09 53 00 - Ceiling Suspension Assemblies

A. All ceiling suspension systems must be approved by CVG.
B. Ceiling Suspension systems must meet the requirements dictated by the AHJ.
C. Ceiling suspension frames are to be white.

End of Section

Section 09 54 14 – Modular Metal Ceilings

Part 1 – General / Design Requirements

PART 1 - GENERAL

1.1 Summary

Section includes:

A. Modular custom-formed metal ceiling panels IMP-1, IMP-3, IMP-4, and IMP-5.
B. Acoustical backing.
C. Suspension assemblies.
D. Accessories; provide other necessary items including devices for attachment overhead construction, secondary members, splines, splices, connecting clips, wall connectors, wall angles required for a complete installation.
E. Supplemental support framing: Provide fully engineered secondary framing as required to meet code, conforming to layout shown in drawings, to support direct-hung metal ceilings suspension system.
F. Coordinate layout and installation of items penetrating or being installed in ceiling systems with responsible trades.

1.2 Submittals

A. Product Data: Manufacturers product data for each type of product specified in this section.
B. Product Certification: Manufacturer's certifications that products comply with specified requirements and governing codes including product data, laboratory test reports and research reports showing compliance with specified standards.
C. Shop (Coordination) Drawings: Submit shop drawings for reflected ceiling plans (RCP's), drawn to scale, and coordinating penetrations and ceiling mounted items. Show the following details:
D. Reflected ceiling plan including joint patterns & details.
E. Ceiling suspension system plan with appropriate components, suggested hanger locations & details.
F. Method of attaching suspension system hangers to building structure as coordinated by installer.
G. Ceiling-mounted items including light fixtures, air outlets and inlets, speakers, sprinklers, and other interfaces. Coordinate all appliances to be installed in ceiling system. Product selection shall be compatible with ceiling system.
H. Special moldings at walls, column penetrations, and other junctures of acoustical ceilings with adjoining construction.
I. Framing and support details for work supported by ceiling suspension system.
J. List of materials, dimensions, hanger fastenings and any special details.
K. Minimum drawing scale: 1/8" = 1'-0".
L. Shop drawings shall originate from manufacturer. Subcontractor drawings will not be acceptable, except to show attachment to structure.
M. Where requested by architect, provide engineered drawings with direction from consulting SE confirming design integrity to the satisfaction of specification requirement.
N. Coordinate with other work supported by, adjacent to or penetrating through the ceiling

system.

O. Samples for Verification: Full-size units (or as specified below) of each type of ceiling assembly indicated; in sets for each color, texture, and pattern specified, showing the full range of variations expected in these characteristics. Submit samples for each type specified.
   1. 12-inch square metal pan units.
   2. 12-inch long samples of each exposed molding or trim.
   3. 12-inch long samples of each suspension component.

P. Qualification Data: For firms and persons specified in "Quality Assurance" (Section 1.5). Provide documents to demonstrate their capabilities and experience. Include lists of at least 5 completed projects with project names and addresses, names and addresses of Architects and employers, and other information specified.

Q. BIM (Building Information Modeling): Provide 3-D models (as applicable) of the ceiling system including, panels, suspension, and necessary components to make the system complete; compatible with "NavisWorks" or other appropriate 3-D model interfacing software.

1.3 Quality Assurance

A. Unless accepted otherwise by the Architect, use manufacturer and installers that employ a Quality Management System complying with the program described in ISO 9001-2008, or similar system.

B. Installer:
   1. To certify a minimum 5 years experience installing similar systems and scope to those specified or approved in written form by “Basis of Design” manufacturer.
   2. Provide list of at least 5 successful installations with similar products and scope. Include names and contact numbers of Architect and employer for reference.

C. Manufacturer:
   1. To certify a minimum of 5 years’ experience as a manufacturing enterprise engaged in sales and production of similar products to those specified.
   2. Provide support documentation including name and date of similar projects completed. Include names and contact numbers of Architect and employers for reference.
   3. Manufacturer shall be single source, original equipment, engineering, and design, and shall be the fabricator and supplier of appropriate major components. Broker / Package of components will not be acceptable.

D. Fire-Test-Response Characteristics: Provide metal ceilings that comply with the following requirements:
   1. The panels are made from a non-combustible aluminum core and tested in accordance with ASTM E84. Class A (0-25 flame spread) Surface-burning characteristics of metal ceilings per IBC Chapter 8 Section 803.

E. Mock-Ups: Before releasing metal ceilings, if requested, construct mock-ups for each form of construction and finish required to verify selections made under sample submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mock-up to comply with the following minimum requirements, using materials indicated for completed work:
   1. Locate mock-ups in the location and of the size indicated or, if not indicated, as directed by the Architect. Minimum mock-up size to be 10’x 10’ unless otherwise specified.
   2. Notify Architect seven days in advance of the dates and times when mock-ups will be

constructed.
3. Demonstrate the proposed range of aesthetic effects and workmanship.

F. Site Coordination Mock-up:
1. For approval of assembly, sequence of installation, coordination of trades involved, including ceiling panel types and shapes.
2. Sized large enough to include a minimum of 2 adjacent panels Demonstrating interface work of fire protection sprinklers, lighting, mechanical diffusers, anchoring method at steel structure; adjacent vertical wall; skylight and fascia, trim and accessories.
3. Obtain Architect's approval of mock-ups before starting construction of metal ceilings. Submit detailed, ACAD shop drawing illustrating extent and scope of mock-ups. Do not proceed without approval of these drawings.
4. Maintain mock-ups during construction in an undisturbed condition as a standard for judging the completed work.
5. When directed, demolish and remove mock-ups from project site.

G. Approved mock-ups in an undisturbed condition at the time of initial Acceptance may become part of the completed work, subject to Architect / Employer approval.

H. Pre-installation Conference: Conduct conference at Project site as directed by the project Architect.

1.4 Delivery, Storage, and Handling

A. Deliver metal ceiling units and suspension system components in original, unopened packages clearly labeled with the following information: name of manufacturing source and location; product type, description and quantity; clients name and shipping address.

B. Panels, suspension system components, and accessories to be stored in original, unopened packages in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

C. Exercise care in handling components to prevent damage to the surfaces and edges and prevent distortion or other physical damage. Comply with prescribed stacking instructions to prevent damage to the components. Panel's protective layer to be removed only after installation is complete to help prevent panel surface damage.

1.5 Project Conditions

A. Environmental Limitations:
1. Do not install metal pan ceilings until after spaces are enclosed and weather tight and after wet work and work above ceilings is complete and accepted by project Architect. Do not store in unprotected space.
2. Maintain environmental conditions within limits recommended by manufacturer for optimum results.
3. Maintain within a temperature range of 50-100 degrees.
4. Maintain within a 20%-60% relative humidity.

B. Do not install products in exterior space unless the system has been specifically designed and approved for exterior application.

C. If the project is located within range of moisture associated with large bodies of water (fresh or

salt), necessary materials shall be finished with coatings appropriate to condition of use.

1.6 Warranty

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.
B. Failures include, but are not limited to, the following:
   1. Structural failures including rupturing, cracking, or puncturing.
   2. Deterioration of metals and other materials beyond normal wear.
C. Warranty Period: One years from date of Substantial Completion.
D. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
E. Exposed Panel Finish: Deterioration includes, but is not limited to, the following Color fading more than 5 Hunter units when tested according to ASTM D 2244.
F. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
G. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
H. Finish Warranty Period: 20 years from date of Substantial Completion.

1.8 MAINTENANCE & EXTRA MATERIALS

A. Maintenance Instructions: Provide manufacturers standard maintenance and cleaning instructions for finishes provided.
B. Extra Materials: Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents. Only typical system components are included with attic stock.
C. Metal Ceiling Units: Full-size units equal to 1 percent (1%) of amount installed.
D. Ceiling Suspension System Components: Quantity of each grid and exposed component equal to 1 percent (1%) of amount installed.

Part 2 – Product Requirements

2.1 Manufacturers

A. Basis-of-Design Product: Subject to compliance with requirements, provide products indicated below by Ceilings Plus, or comparable products by Armstrong or Hunter Douglas as approved by the Architect:
   1. Product: Illusions.
   2. Description: Fully accessible custom-formed modular metal ceiling at RAC Counter Canopy.
   3. Thickness: 16 gauge.
   4. Sizes: Custom-formed sizes as indicated on the Drawings.
   5. Finish:

2.2 Materials

A. Modular Metal Ceilings:

1. Panels are to be manufactured from single sheets of aluminum selected for surface flatness, smoothness and freedom from surface blemishes where exposed to view in a finished unit. Do not use material where the exposed surface exhibit pitting, seam marks, roller marks, stains, discolorations, or variations in flatness exceeding those permitted by referenced standards for stretcher-leveled aluminum alloy sheets.
2. Panels are to be die formed with a minimum 1-1/4" integral return edge on each of the four panel sides. Steel clips that locate and align panels to the grid with torsion springs, are to be factory machine riveted to the return edge of the panels using counter sunk rivet holes that allow the flat heads of the counter sunk rivets to be flush the face of the panel return. No fasteners of any kind shall be visible on exposed face surfaces of ceiling panels or support tees. Down light openings and other ceiling penetrations shall be factory precision cut whenever viable.
3. Panel material shall be primed aluminum sheet type 5005 series alloy that has 0% recycled content. It shall be machine stretcher-leveled and a minimum of .040" thickness, or greater if required, so that the panel deflection does not exceed L/360.
4. Panel sizes as per drawings. Field cut panels at non-modular perimeter conditions, at column interfaces or as detailed or specified.
5. Edge Profile: Panel joints are butt condition (concealed tee – as per ASTM E 1264) both directions (as per drawings) unless specified otherwise.
6. The plenum shall be 100% accessible. Every panel must be removable. Progressive panel access is not acceptable. Heavy duty torsion springs and steel clip assemblies to be mounted to every panel for downward access, without potential for damage to panel face or hinge assembly. Hinge assembly shall be mounted to every panel with minimum two flush to face, counter sunk chamfered fasteners. Attaching torsion spring directly to panel with fastener will not be acceptable.
7. Provide and install matching finish trim on each side of each suspended area (or as specified). Profile of trim to be minimum 4-1/2" tall @ floating conditions or as detailed.
8. Matching light fixture trim surrounding opening where lay-in units are used.

2.3 Metal Suspension Systems. General

A. Metal Suspension Standard: Provide panel manufacturer's metal suspension systems of types, structural classifications, materials, and finishes indicated that comply with applicable ASTM C635 requirements.
B. Main and cross runners to be specified manufactures Standard "Heavy Duty" tee bar (as per ASTM C635).
C. Face flange of main and cross runners to be factory finished matte black unless known otherwise.
D. Face flange of main runners to be factory slotted to receive torsion springs
E. Provide suspension system made from steel sheet with an average recycled content such that post-consumer recycled content plus one half or pre consumer content is not less than 25%.
F. Suspension Systems: Provide complete suspensions systems with main runners, cross runners, hangers, trim molding, seismic retention clips, load resisting struts and other suspension components required to support ceiling and other ceiling supported construction (some of these parts may be supplied by the installer).
G. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, "Direct-

Hung", unless otherwise indicated (supplied by installer)

H. Provide anchor, for use in the particular application, as approved by the "Structural Engineer of record".
I. Structural substrate, as indicated to support attachment device, also to be approved by the "Structural Engineer of record".
J. Anchors specified must provide corrosion resistance as per metal type and application.
K. Anchors into Steel:
    1. Clip or Clamp.
    2. Shot Pin.
L. Anchors into Steel Deck: This option requires special attention from both the "Structural Engineer of record" and the Professional Engineered retained to provide structural documents in order to coordinate detailing required to provide anchoring device.
M. "Direct-Hung" Suspensions Systems: System composed of main runners supported by hangers attached directly to building structure.
N. "Indirect-Hung" Suspension Systems: System composed of main runners connected to carrying channels that are attached by hangers to building structure, and complying with the following requirements:
    1. Hangers: Type and metal standard with ceiling system manufacturer, sized to comply with structural classification indicated.
    2. Wire Hangers, where applicable, Braces, and Ties: Provide wires complying with the following requirements:
        a. Zinc-Coated Carbon-Steel Wire: ASTM A 641 (ASTM A 641M), Class 1 zinc coating, soft temper.
        b. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635, Table 1, Direct Hung) will be less than yield stress of wire, but provide not less than 2mm diameter wire.
        c. Extruded Aluminum members shall comply with ASTM B209.
        d. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.
        e. Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.
        f. Angle Hangers: Angles with legs not less than 22mm wide, formed with 1mm thick, galvanized steel sheet complying with ASTM A 653/A 653M, G90 coating designation, with bolted connections.

2.4 Finishes, General

A. Comply with "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipment.
C. Appearance of finished work:
    1. Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half range of approved samples.
    2. Noticeable variation in same piece is not acceptable.
    3. Variations in appearance of other components are acceptable if they are within range of approved samples and are assembled or installed to minimize contrast.

Part 3 – Execution Requirements

3.1 Examination

Examine substrates and structural framing to which metal ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect installation and anchorage, and other conditions affecting performance of metal ceilings.

Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 Preparation

A. Coordination: Furnish layouts for cast-in-place anchors, clips, and other ceiling anchors whose installation is specified in other Sections.
B. Measure each ceiling area and establish layout of metal ceiling units to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width units at borders and comply with layout shown on reflected ceiling plans.
C. Survey substrate for wall attachment to assure squareness and proper elevation for wall panel installation.

3.3 Installation

A. General: Install acoustical metal ceilings, per manufacturers shop drawings provided, per manufacturer's written instructions and to comply with publications referenced below.
   1. ClSCA "Ceiling Systems Handbook.
   2. Standard for Ceiling Suspension System Installations - ASTM C 636.
   3. Standard for Ceiling Suspension Systems Requiring Seismic Restraint - ASTM E 580
   4. IBC (International Building Code) standard for Seismic Zone for local area.

B. Suspend ceiling hangers from building's approved structural substrates and as follows:
   1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
   2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, counter-splaying, or other equally effective means.
   3. Where width of ducts and other construction within ceiling plenum produce hanger spacings that interfere with location of hangers at spacing required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
   4. Where used secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure; that are appropriate for substrate; and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
   5. Space hangers not more than 48 inches on center, along each member supported directly from hangers, unless otherwise indicated; and provide hangers not more than 8 inches from ends of each member. Supply supporting calculations from licensed Structural Engineer

verifying hanger spacing meets all requirements, when spacing exceed those recommended.

6. Fine level grid to 1/8 inch in 10 feet from specified elevation(s), square and true.
7. Adjust suspension system runners so they are square (within .5 degree from 90 degrees) and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
8. Secure bracing wires to ceiling suspension members and to supports acceptable to Architect / Engineer and or inspector. Suspend bracing from building's structural members and / or structural deck, as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs (unless directed otherwise).
9. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of metal ceiling. Method of edge trim attachment and design of edge trims to be approved by Architect.
10. Screw-attach moldings to substrate at intervals not more than 18” O.C. and not more than 6” from ends, leveling with ceding suspension system to a tolerance of 1/8” in 10’. Miter corners accurately and connect securely.
11. Do not use exposed fasteners, including pop rivets, on moldings and trim without prior written approval or unless detailed otherwise.
12. Scribe and cut acoustical metal ceiling units for accurate fit at penetrations by, other work through ceilings. Stiffen edges of cut units as required to eliminate evidence of buckling or variations in flatness exceeding referenced standards for stretcher-leveled metal sheet.
13. Install metal ceiling units in coordination with suspension system.
14. Align joints in adjacent courses to form uniform, straight joints parallel to room axis in both directions, unless otherwise indicated. Install directionally patterned or textured panels in directions indicated on approved shop drawings. Panel-joints shall flow smoothly and in a straight line within 1/8” in 10’. Intersections shall be continuous.
15. Fit adjoining units to form flush, tight joints. Scribe and cut units for accurate fit at borders and around construction penetrating ceiling.
16. Remove protective film from panels only when space is completely clean and free of airborne particles. Use white cotton gloves for final installation of panels into grid system.

3.4 Adjusting And Cleaning

A. Adjust ceiling components to provide a consistent finish and appearance in conformity with established tolerances and requirements.
B. Clean exposed surfaces of metal ceilings. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.
C. Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage, including dented and bent units.

End of Section

Section 09 54 14a – Modular Perforated Metal Ceilings

Part 1 – General / Design Requirements

1.1 Summary

Section includes:

A. Perforated metal ceiling panels.
B. Insect screen.
C. Acoustical backing.
D. Suspension assemblies
E. Accessories: provide other necessary items including devices for attachment overhead construction, secondary members, splines, splices, connecting clips, wall connectors, wall angles required for a complete installation.
F. Supplemental support framing: Provide fully engineered secondary framing as required to meet code, conforming to layout shown in drawings, to support direct-hung metal ceilings suspension system.
G. Coordinate layout and installation of items penetrating or being installed in ceiling systems with responsible trades.

1.2 Submittals

A. Product Data: Manufacturers product data for each type of product specified in this section.
B. Product Certification: Manufacturer's certifications that products comply with specified requirements and governing codes including product data, laboratory test reports and research reports showing compliance with specified standards.
C. Shop (Coordination) Drawings: Submit shop drawings for reflected ceiling plans (RCP's), drawn to scale, and coordinating penetrations and ceiling mounted items. Show the following details:
    1. Reflected ceiling plan including joint patterns & details.
    2. Insect screens.
    3. Ceiling suspension system plan with appropriate components, suggested hanger locations & details.
    4. Method of attaching suspension system hangers to building structure as coordinated by installer.
    5. Ceiling-mounted items including: light fixtures, air outlets and inlets, speakers, sprinklers, and other interfaces. Coordinate all appliances to be installed in ceiling system. Product selection shall be compatible with ceiling system.
    6. Special moldings at walls, column penetrations, and other junctures of acoustical ceilings with adjoining construction.
    7. Framing and support details for work supported by ceiling suspension system List of materials, dimensions, hanger fastenings and any special details. 9. Minimum drawing scale: 1/8" = 1'-0".
    8. Provide full scale drawings of perforation patterns. Provide minimum 1"=1'-0" scale layout for each panel type showing perforation layout and orientation as required.
    9. Shop drawings shall originate from manufacturer. Subcontractor drawings will not be acceptable, except to show attachment to structure.
    10. Where requested by architect, provide engineered drawings with direction from consulting

SE confirming design integrity to the satisfaction of specification requirement.

11. Coordinate with other work supported by, adjacent to or penetrating through the ceiling system.

D. Samples for Verification: Full-size units (or as specified below) of each type of ceiling assembly indicated; in sets for each color, texture, and pattern specified, showing the full range of variations expected in these characteristics. Submit samples for each type specified.
   1. 12-inch square metal pan units.
   2. 12-inch-long samples of each exposed molding or trim.
   3. 12-inch-long samples of each suspension component.

E. Qualification Data: For firms and persons specified in "Quality Assurance" (Section 1.5). Provide documents to demonstrate their capabilities and experience. Include lists of at least 5 completed projects with project names and addresses, names and addresses of Architects and employers, and other information specified.

F. BIM (Building Information Modeling): Provide 3-D models (as applicable) of the ceiling system including, panels, suspension and necessary components to make the system complete; compatible with "NavisWorks" or other appropriate 3-D model interfacing software.

1.3 Quality Assurance

A. Unless accepted otherwise by the Architect, use manufacturer and installers that employ a Quality Management System complying with the program described in ISO 9001-2008, or similar system.

B. Installer:
   1. To certify a minimum 5 years experience installing similar systems and scope to those specified or approved in written form by “Basis of Design” manufacturer.
   2. Provide list of at least 5 successful installations with similar products and scope. Include names and contact numbers of Architect and employer for reference.

C. Manufacturer:
   1. To certify a minimum of 5 years experience as a manufacturing enterprise engaged in sales and production of similar products to those specified.
   2. Provide support documentation including name and date of similar projects completed. Include names and contact numbers of Architect and employers for reference Manufacturer shall be single source, original equipment, engineering and design, and shall be the fabricator and supplier of appropriate major components. Broker / Package of components will not be acceptable.

D. Fire-Test-Response Characteristics: Provide metal ceilings that comply with the following requirements:
   1. The panels are made from a non-combustible aluminum core and tested in accordance with ASTM E84. Class A (0-25 flame spread) Surface-burning characteristics of metal ceilings per IBC Chapter 8 Section 803.

E. Mock-Ups: Before releasing metal ceilings, if requested, construct mock-ups for each form of construction and finish required to verify selections made under sample submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mock-up to comply with the following minimum requirements, using materials indicated for completed work:
   1. Locate mock-ups in the location and of the size indicated or, if not indicated, as directed by the Architect. Minimum mock-up size to be 10’x 10’ unless otherwise specified.

2. Notify Architect seven days in advance of the dates and times when mock-ups will be constructed.
3. Demonstrate the proposed range of aesthetic effects and workmanship.

F. Site Coordination Mock-up:
1. For approval of assembly, sequence of installation, coordination of trades involved, including ceiling panel types and shapes.
2. Sized large enough to include a minimum of 2 adjacent panels Demonstrating interface work of fire protection sprinklers, lighting, mechanical diffusers, anchoring method at steel structure; adjacent vertical wall; skylight and fascia, trim and accessories.
3. Obtain Architect's approval of mock-ups before starting construction of metal ceilings. Submit detailed, ACAD shop drawing illustrating extent and scope of mock-ups. Do not proceed without approval of these drawings.
4. Maintain mock-ups during construction in an undisturbed condition as a standard for judging the completed work.
5. When directed, demolish and remove mock-ups from project site

G. Approved mock-ups in an undisturbed condition at the time of initial Acceptance may become part of the completed work, subject to Architect / Employer approval.

H. Pre-installation Conference: Conduct conference at Project site as directed by the project Architect.

1.4 Delivery, Storage, and Handling

A. Deliver metal ceiling units and suspension system components in original, unopened packages clearly labeled with the following information: name of manufacturing source and location; product type, description and quantity; clients name and shipping address.

B. Panels, suspension system components, and accessories to be stored in original, unopened packages in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

C. Exercise care in handling components to prevent damage to the surfaces and edges and prevent distortion or other physical damage. Comply with prescribed stacking instructions to prevent damage to the components. Panel's protective layer to be removed only after installation is complete to help prevent panel surface damage.

1.5 Project Conditions

A. Environmental Limitations:
1. Do not install metal pan ceilings until after spaces are enclosed and weather tight and after wet work and work above ceilings is complete and accepted by project Architect. Do not store in unprotected space.
2. Maintain environmental conditions within limits recommended by manufacturer for optimum results.
3. Maintain within a temperature range of 50-100 degrees.
4. Maintain within a 20%-60% relative humidity.

B. Do not install products in exterior space unless the system has been specifically designed and approved for exterior application.

C. If the project is located within range of moisture associated with large bodies of water (fresh or salt), necessary materials shall be finished with coatings appropriate to condition of use.

1.6 Warranty

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.
B. Failures include, but are not limited to, the following:
   1. Structural failures including rupturing, cracking, or puncturing.
   2. Deterioration of metals and other materials beyond normal wear.
C. Warranty Period: One years from date of Substantial Completion Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory applied finishes within specified warranty period.
D. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
   1. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
   2. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
   3. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
E. Finish Warranty Period: 20 years from date of Substantial Completion.

1.7 Maintenance & Extra Materials

A. Maintenance Instructions: Provide manufacturers standard maintenance and cleaning instructions for finishes provided.
B. Extra Materials: Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents. Only typical system components are included with attic stock.
C. Metal Ceiling Units: Full-size units equal to 1 percent (1%) of amount installed.
D. Ceiling Suspension System Components: Quantity of each grid and exposed component equal to 1 percent (1%) of amount installed.

Part 2 – Product Requirements

2.1 Manufacturers

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated below by Ceilings Plus, or a comparable product by Armstrong or Hunter Douglas as approved by the Architect:
   1. Product: Illusions.
   2. Description: Fully accessible modular metal ceiling.
   3. Finish: Sherwin-Williams Sher-NAR (Kynar 500) Resin-Based Coating.
   4. Color: Blanco Mat.
   5. Perforated Pattern: Custom pattern as selected by the Architect.

2.2 Materials

A. Ceiling Type MCP-1 and MCP-2: Ceilings Plus “Illusions" – Perforated Panels are to be manufactured from single sheets of aluminum selected for surface flatness, smoothness and freedom from surface blemishes where exposed to view in a finished unit. Do not use material where the exposed surface exhibit pitting, seam marks, roller marks, stains, discolorations, or variations in flatness exceeding those permitted by referenced standards for stretcher-leveled aluminum alloy sheets.
B. Panels are to be die formed with a minimum 1-1/4” integral return edge on each of the four panel sides. Steel clips that locate and align panels to the grid with torsion springs, are to be factory machine riveted to the return edge of the panels using counter sunk rivet holes that allow the flat heads of the counter sunk rivets to be flush the face of the panel return. No fasteners of any kind shall be visible on exposed face surfaces of ceiling panels or support tees. Down light openings and other ceiling penetrations shall be factory precision cut whenever viable.
C. Panel material shall be primed aluminum sheet type 5005 series alloy that has 0% recycled content. It shall be machine stretcher-leveled and a minimum of .040” thickness, or greater if required, so that the panel deflection does not exceed L/360.
D. Panel sizes as per drawings. Field cut panels at non modular perimeter conditions, at column interfaces or as detailed or specified.
E. Edge Profile: Panel joints are butt condition (concealed tee – as per ASTM E 1264) both directions (as per drawings) unless specified otherwise.
F. Perforation shall be selected by the Architect from Ceilings Plus’ standard patterns. Panels to have solid non-perforated borders along each of the four sides.
G. The plenum shall be 100% accessible. Every panel must be removable. Progressive panel access is not acceptable. Heavy duty torsion springs and steel clip assemblies to be mounted to every panel for downward access, without potential for damage to panel face or hinge assembly. Hinge assembly shall be mounted to every panel with minimum two flush to face, counter sunk chamfered fasteners. Attaching torsion spring directly to panel with fastener will not be acceptable.
H. Provide and install matching finish trim on each side of each suspended area (or as specified). Profile of trim to be minimum 4-1/2” tall @ floating conditions or as detailed.
I. Matching light fixture trim surrounding opening where lay-in units are used.

2.3 Metal Suspension Systems. General

A. Metal Suspension Standard: Provide panel manufacturer's metal suspension systems of types, structural classifications, materials, and finishes indicated that comply with applicable ASTM C635 requirements.
B. Main and cross runners to be specified manufactures Standard “Heavy Duty” tee bar (as per ASTM C635).
C. Face flange of main and cross runners to be factory finished matte black unless known otherwise.
D. Face flange of main runners to be factory slotted to receive torsion springs
E. Provide suspension system made from steel sheet with an average recycled content such that post-consumer recycled content plus one half or pre consumer content is not less than 25%. Suspension Systems: Provide complete suspensions systems with main runners, cross runners, hangers, trim molding, seismic retention clips, load resisting struts and other suspension

components required to support ceiling and other ceiling supported construction (some of these parts may be supplied by the installer).

F. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, “Direct-Hung”, unless otherwise indicated (supplied by installer)
G. Provide anchor, for use in the particular application, as approved by the “Structural Engineer of record”.
H. Structural substrate, as indicated to support attachment device, also to be approved by the “Structural Engineer of record”.
I. Anchors specified must provide corrosion resistance as per metal type and application.
J. Anchors into Steel:
    1. Clip or Clamp.
    2. Shot Pin.
K. Anchors into Steel Deck: This option requires special attention from both the “Structural Engineer of record” and the Professional Engineered retained to provide structural documents in order to coordinate detailing required to provide anchoring device.
L. “Direct-Hung” Suspensions Systems: System composed of main runners supported by hangers attached directly to building structure.
M. “Indirect-Hung” Suspension Systems: System composed of main runners connected to carrying channels that are attached by hangers to building structure, and complying with the following requirements:
    1. Hangers: Type and metal standard with ceiling system manufacturer, sized to comply with structural classification indicated.
    2. Wire Hangers, where applicable, Braces, and Ties: Provide wires complying with the following requirements:
N. Zinc-Coated Carbon-Steel Wire: ASTM A 641 (ASTM A 641M), Class 1 zinc coating, soft temper.
O. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635, Table 1, Direct Hung) will be less than yield stress of wire but provide not less than 2mm diameter wire.
P. Extruded Aluminum members shall comply with ASTM B209.
Q. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.
R. Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.
S. Angle Hangers: Angles with legs not less than 22mm wide, formed with 1mm thick, galvanized steel sheet complying with ASTM A 653/A 653M, G90 coating designation, with bolted connections.

2.4 Insect Screens

A. General: Fabricate insect screens to integrate with modular metal ceiling. Provide screen behind all perforated panels.
B. Aluminum Wire Fabric: 18-by-16 mesh of 0.011-inch-diameter, coated aluminum wire.
C. Wire-Fabric Finish: Black.

2.5 Finishes, General

A. Comply with "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipment.
C. Appearance of finished work:
   1. Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half range of approved samples.
   2. Noticeable variation in same piece is not acceptable.
   3. Variations in appearance of other components are acceptable if they are within range of approved samples and are assembled or installed to minimize contrast.

Part 3 – Execution Requirements

3.1 Examination

Examine substrates and structural framing to which metal ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect installation and anchorage, and other conditions affecting performance of metal ceilings. B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 Preparation

A. Coordination: Furnish layouts for cast-in-place anchors, clips, and other ceiling anchors whose installation is specified in other Sections.
B. Measure each ceiling area and establish layout of metal ceiling units to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width units at borders and comply with layout shown on reflected ceiling plans.
C. Survey substrate for wall attachment to assure squareness and proper elevation for wall panel installation.

3.3 Installation

A. General: Install acoustical metal ceilings, per manufacturers shop drawings provided, per manufacturer's written instructions and to comply with publications referenced below.
   1. ClSCA "Ceiling Systems Handbook.
   2. Standard for Ceiling Suspension System Installations - ASTM C 636.
   3. Standard for Ceiling Suspension Systems Requiring Seismic Restraint - ASTM E 580
   4. IBC (International Building Code) standard for Seismic Zone for local area.
B. Suspend ceiling hangers from building's approved structural substrates and as follows:
   1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
   2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, counter-splaying, or other equally effective means.
   3. Where width of ducts and other construction within ceiling plenum produce hanger spacings that interfere with location of hangers at spacing required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.

4. Where used secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure; that are appropriate for substrate; and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
5. Space hangers not more than 48 inches on center, along each member supported directly from hangers, unless otherwise indicated; and provide hangers not more than 8 inches from ends of each member. Supply supporting calculations from licensed Structural Engineer verifying hanger spacing meets all requirements, when spacing exceed those recommended.
6. Fine level grid to 1/8 inch in 10 feet from specified elevation(s), square and true.
7. Adjust suspension system runners so they are square (within .5 degree from 90 degrees) and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
8. Secure bracing wires to ceiling suspension members and to supports acceptable to Architect / Engineer and or inspector. Suspend bracing from building's structural members and / or structural deck, as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs(unless directed otherwise).
9. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of metal ceiling. Method of edge trim attachment and design of edge trims to be approved by Architect.
10. Screw attach moldings to substrate at intervals not more than 18” O.C. and not more than 6” from ends, leveling with ceding suspension system to a tolerance of 1/8” in 10’. Miter corners accurately and connect securely.
11. Do not use exposed fasteners, including pop rivets, on moldings and trim without prior written approval or unless detailed otherwise.
12. Scribe and cut acoustical metal ceiling units for accurate fit at penetrations by, other work through ceilings. Stiffen edges of cut units as required to eliminate evidence of buckling or variations in flatness exceeding referenced standards for stretcher-leveled metal sheet.
13. Install metal ceiling units in coordination with suspension system.

C. Align joints in adjacent courses to form uniform, straight joints parallel to room axis in both directions, unless otherwise indicated. Install directionally patterned or textured panels in directions indicated on approved shop drawings. Panel-joints shall flow smoothly and in a straight line within 1/8” in 10’. Intersections shall be continuous.
D. Fit adjoining units to form flush, tight joints. Scribe and cut units for accurate fit at borders and around construction penetrating ceiling.
E. Remove protective film from panels only when space is completely clean and free of airborne particles. Use white cotton gloves for final installation of panels into grid system.

3.4 Adjusting and Cleaning

A. Adjust ceiling components to provide a consistent finish and appearance in conformity with established tolerances and requirements.
B. Clean exposed surfaces of metal ceilings. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.
C. Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage, including dented and bent units

End of Section

Section 09 54 34 – Beam And Baffle Metal Ceiling System

Part 1 – General / Design Requirements

1.1 Summary

Section includes:

A. Baffle ceiling panels.
B. Suspension systems.
C. Accessories; provide other necessary items including devices for attachment overhead construction, secondary members, splines, splices, connecting clips, wall connectors, wall angles, and other devices required for a complete installation.
D. Supplemental support framing: Provide fully engineered secondary framing as required to meet code, conforming to layout shown in drawings, to support direct-hung metal ceilings suspension system.

1.2 Submittals

A. Qualification Data:
B. Test Reports: Certified reports from independent agency substantiating structural compliance to windloads and other governing requirements.
C. Certificates:
    1. Data substantiating manufacturer and installer qualifications.
    2. Certified data attesting fire rated materials comply with specifications.
D. Manufacturer's Instructions: Detailed installation instructions and maintenance data.
E. Product Data: Manufacturer's published literature, including specifications.
F. Product Certification: Manufacturer's certifications that products comply with specified requirements and governing codes including product data, laboratory test reports and research reports showing compliance with specified standards.
G. Shop Drawings: Submit shop drawings for reflected ceiling plans (RCP's), drawn to scale, and indicating penetrations and ceiling mounted items. Show the following details:
    1. Reflected Ceiling Plan(s): Indicating metal ceiling layout, ceiling mounted items and penetrations.
    2. Suspension System, Carrier and Component Layout.
    3. Details of system assembly and connections to building components Samples for Verification: Full-size units (or as specified below) of each type of ceiling assembly indicated; in sets for each color, texture, and pattern specified, showing the full range of variations expected in these characteristics. Submit samples for each type specified.
        a. 11" long metal panel units.
        b. 11" long samples of each exposed molding or trim.
        c. 11" long samples of each suspension component.

1.3 Quality Assurance

A. Manufacturer/Installer Qualifications:
    1. Provide metal ceiling system components produced by a single manufacturer with a minimum 5 years' experience in actual production of specified products and with resources

to provide consistent quality in appearance and physical properties, without delaying the work.
2. Provide suspension system components produced by a single manufacturer to provide compatible components for a complete metal ceiling system installation.
3. Perform installations using a firm with installers having no less than 3 years of successful experience on projects of similar size and requirements.

B. Regulatory Requirements:
1. Fire Rating Performance Characteristics: Install system to provide a flame spread of 0 - 25, complying with certified testing to ASTM E 84.
2. Structural Criteria: Install and certify system to comply with structural and wind load requirements of governing codes.
3. Installation Standard for Suspension System: Comply with ASTM C 636.

C. Mock-Up: Prior to beginning installation erect a mock-up section, where directed, using all system components.

D. Pre-installation Conference: Conduct a conference, prior to start of installation, to review system requirements, shop drawings, and all coordination needs.

1.4 Delivery, Storage and Handling

A. Deliver system components in manufacturer's original unopened packages, clearly labeled.

B. Store components in fully enclosed dry space. Carefully place on skids, to prevent damage from moisture and other construction activities.

C. Handle components to prevent damage to surfaces and edges, and to prevent distortion and other physical damage.

1.5 Project Conditions

A. Begin system installations only after spaces are enclosed and weather-tight, and after all wet work and overhead work have been completed.

B. Prior to starting installations, allow materials to reach ambient room temperature and humidity intended to be maintained for occupancy.

1.6 Warranty

A. Provide specified manufacturer's warranty against defects in workmanship, discoloration, or other defect considered undesirable by the Architect or Employer.

B. This warranty shall remain in effect for a minimum period of one (1) year from date of initial acceptance.

1.7 Maintenance & Extra Materials

A. Maintenance Instructions: Provide manufacturer's standard maintenance and cleaning instructions for finishes provided.

B. Extra Materials: Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents. Only typical system components are included with attic stock.

C. Acoustical Metal Ceiling Pan Units: Full-size units equal to two percent (2%) of amount installed.
D. Ceiling Suspension System Components: Quantity of each grid and exposed component equal to two percent (2%) of amount installed.

Part 2 – Product Requirements

2.1 Beam and Baffle Metal Ceiling System

A. Basis-of-Design: Provide High Profile Series Straight Baffle Ceiling System by Hunter Douglas Architectural, Inc., or a comparable product as approved by the Architect.
   1. Material: Aluminum.
   2. Finish: Powder-coat.
   3. Color: Arctic White 1015P.
   4. Extruded Aluminum Beam Profile: 1-1/2 inches by 8-3/8 inches.
   5. Varying elevations as indicated.
   6. Alternating beam and light profiles as indicated.
   7. Lengths: 10 feet to 20 feet lengths.
   8. Beam Suspension System:

B. Interior Applications:
   1. Hanger Bracket: Patented Ceiling Panel Hanger Bracket with cam-actuated locking device designed to positively lock baffle panel in place, with release device to disengage hanger bracket, allowing panel to slide along Primary Support Channel for access. Hanger Bracket connects baffle panel profile to Primary Support Channel.
   2. Primary Support Channel: 1 5/8" x 1 5/8" Unistrut P1000 Channel with 3/8" return flanges designed to interlock with Panel Hanger Bracket, 20' long. Factory-applied black polyester painted finish. Material: 12 Ga. galvanized steel, GR 33
   3. Threaded Rod: .375" diameter galvanized steel threaded rod.

2.2 Accessory Materials

A. Beam End Caps: Milled end caps to match beam finish
B. Profile Splices: Mill-finish aluminum splices for joining profiles.
C. Air Distribution Devices: Provide distribution devices that are independently suspended, relocatable, capable of being fully integrated with ceiling system that requires no interruption of ceiling components.
D. Lighting Fixtures: Provide fixtures capable of being fully integrated with ceiling system and that require no interruption of ceiling components, and as selected to conform to lighting criteria specified in Division 26.

Part 3 – Execution Requirements

3.1 Examination

Examine substrates and structural framing to which acoustical metal panels attach or abut, with installer present, for compliance with requirements specified in this and other Sections that affect installation and anchorage, and other conditions affecting performance of metal panel

ceilings.

Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 Preparation

A. Coordination: Furnish layouts for cast-in-place anchors, clips, and other ceiling anchors whose installation is specified in other Sections.
B. Measure each ceiling area and establish layout of acoustical metal pan units to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width units at borders, and comply with layout shown on reflected ceiling plans.
C. Survey substrate for wall attachment to assure squareness and proper elevation for wall panel installation.

3.3 Installation

A. General: Install acoustical metal pan ceilings, per manufacturers shop drawings provided, per manufacturer's written instructions and to comply with publications referenced below.
   1. ClSCA “Ceiling Systems Handbook”
   2. Standard for Ceiling Suspension System Installations - ASTM C 636
   3. Standard for Ceiling Suspension Systems Requiring Seismic Restraint - ASTM E 580
   4. IBC (International Building Code) Standard for Seismic Zone for local area

B. Suspend ceiling hangers from building's approved structural substrates and as follows:
   1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
   2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, counter-splaying, or other equally effective means.
   3. Where width of ducts and other construction within ceiling plenum produce hanger spacings that interfere with location of hangers at spacing required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Utilize supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
   4. Where used secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure; that are appropriate for substrate; and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
   5. Space hangers not more than 48” on-center, along each member supported directly from hangers, unless otherwise indicated; and provide hangers not more than 12” from ends of each member. Supply supporting calculations from licensed Structural Engineer verifying hanger spacing meets all requirements, when spacing exceeds those recommended.
   6. Level grid to 1/8” in 10’ from specified elevation(s), square and true.
   7. Adjust suspension system runners so they are square (within .5 degree from 90 degrees) and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

8. Secure bracing wires to ceiling suspension members and to supports acceptable to Architect/Engineer and/or inspector. Suspend bracing from building's structural members and/or structural deck, as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs (unless directed otherwise).
9. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical metal pan. Method of edge trim attachment and design of edge trims to be approved by Architect.
10. Screw attach moldings to substrate at intervals not more than 18” on-center and not more than 6” from ends, leveling with ceding suspension system to a tolerance of 1/8” in 10’. Miter corners accurately and connect securely.
11. Do not use exposed fasteners, including pop rivets, on moldings and trim without prior written approval, or unless detailed otherwise.
12. Scribe and cut acoustical metal panel units for accurate fit at penetrations by other work through ceilings. Stiffen edges of cut units as required to eliminate evidence of buckling or variations in flatness exceeding referenced standards for stretcher-leveled metal sheet.
13. Install acoustical metal panel units in coordination with suspension system.

3.4 Adjust and Clean

A. Adjust components to provide uniform tolerances.
B. Replace all ceiling panels that are scratched, dented or otherwise damaged.
C. Clean exposed surfaces with non-solvent, non-abrasive commercial type cleaner.

End of Section

Section 09 65 19 – Resilient Tile Flooring

Part 1 – General / Design Requirements

TBD.

Part 2 – Product Requirements

TBD.

Part 3 – Execution Requirements

TBD.

End of Section

Section 09 66 23 – Resinous Matrix Terrazzo Flooring

Part 1 – General / Design Requirements

1.1 Reference Standards

A. NTMA (GRAD) - Aggregate Gradation Standards Current Edition.

1.2 Submittals

A. See Section 01 33 00 – Submittal Procedures, for submittal procedures.
B. Product Data: Provide data for divider strips, control joint strips, expansion joints, and sealer; include printed copy of current NTMA recommendations for type of terrazzo specified.
C. Shop Drawings: Indicate divider strip and control and expansion joint layout, and details of adjacent components. For precast units, detail profile and anchorage requirements.
D. Samples: Submit two samples, 12 inch by 12 inch in size illustrating color, chip size and variation, chip gradation, matrix color, and typical divider strip.
E. Manufacturer's Qualification Statement.
F. Installer's Qualification Statement.

1.3 Quality Assurance

A. Perform work in accordance with NTMA recommendations as posted at their web site at www.ntma.com.

1.4 Field Conditions

A. Do not install terrazzo when temperature is below 50 degrees F (10 degrees C) or above 90 degrees F (32 degrees C).
B. Maintain temperature within specified range 24 hours before, during, and 72 hours after installation of flooring.

Part 2 – Product Requirements

2.1 Epoxy Matrix Terrazzo Applications

A. Floors:
   1. Thickness: 3/8 inch (9 mm), nominal.
   2. Color(s): As indicated on drawings.
   3. Aggregate Type: Marble chips.
   4. Aggregate Size: No. 2.

B. Wall Base:
   1. Thickness: Same as floors.
   2. Thickness: 3/8 inch (9 mm), minimum.
   3. Style: Toeless.
   4. Color(s): As indicated on drawings.
   5. Aggregate Type and Size: Same as floors.

2.2 Materials

A. Epoxy Matrix Terrazzo: Aggregate and matrix mix applied to substrate, troweled flat, and ground smooth.
B. Matrix: Two component resin and epoxy hardener with mineral filler and color pigment, non-volatile, thermo-setting.
C. Aggregate: Type as indicated; sized in accordance with NTMA aggregate gradation standards; color(s) as indicated, uniform in color.
D. Finishing Grout: Epoxy, color to match terrazzo matrix.

2.3 Accessories

A. Divider Strips: 1/8 inch (3 mm) thick zinc exposed top strip, zinc coated steel concealed bottom strip, with anchoring features.
B. Control Joint Strips: 1/8 inch (3 mm) nominal width zinc exposed top strips, zinc coated steel concealed bottom strips, 1/8 inch (3 mm) wide neoprene filler strip between vertical strips, with anchoring features.
C. Divider and Control Joint Strip Height: To suit thickness of terrazzo topping, with allowance for grinding.
D. Base Cap, Base Divider Strip, and Separator Strip: Match divider strips.
E. Sealer: Colorless, non-yellowing, penetrating liquid type to completely seal matrix surface; not detrimental to terrazzo components.
F. Primer: Type recommended by resinous flooring manufacturer for substrate and resinous flooring system indicated

Part 3 – Execution Requirements

3.1 Examination

A. Verify that concrete substrate surface levelness and flatness tolerances are within range recommended by NTMA and per Division 03 specifications.
   1. Verify that concrete substrates are dry and moisture-vapor emissions are within acceptable levels according to manufacturer recommendations.
   2. Testing Agency: Engage a qualified testing agency to perform tests.
      a. Moisture Testing: Perform tests so that test areas evenly spaced in installation areas.
      b. Relative Humidity Test:
   3. New Slabs: Maximum allowable relative humidity according to moisture vapor treatment manufacturer's requirements when tested according to ASTM F 2170 using in-situ probes. New slabs are to receive full-coverage moisture vapor treatment.
   4. Existing Slabs: Relative Humidity Test: Maximum 75 percent relative humidity measurement when tested according to ASTM F 2170 using in-situ probes. Existing slabs are to receive moisture vapor treatment where relative humidity levels exceed limitations noted above.
B. Proceed with terrazzo installation only after installation of moisture vapor treatment has been installed if required.

3.2 Preparation

A. Clean substrates of substances, including oil, grease, and curing compounds, that mightimpair terrazzo bond. Provide clean, dry, and neutral pH substrates for terrazzo application.
B. CONCRETE SLABS:
C. Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible withterrazzo.
D. Shot-blast surfaces with an apparatus that abrades the concrete surface, containsthe dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
E. Repair damaged and deteriorated concrete according to terrazzo manufacturer's written recommendations.
F. Use patching and fill material to fill holes and depressions in substrates according to terrazzo manufacturer recommendations.
    1. Substrate-Crack-Suppression Membrane: Install to isolate and suppress substrate cracks according to manufacturer recommendations.
    2. Prepare and prefill substrate cracks with membrane material.
    3. Install membrane at substrate cracks in areas to receive terrazzo.
G. Reinforce membrane with fiberglass scrim if required by membrane manufacturer.
    1. Protect other work from water and dust generated by grinding operations. Control water and dust to comply with environmental protection regulations.
    2. Erect and maintain temporary enclosures and other suitable methods to limit water damage and dust migration and to ensure adequate ambient temperatures andventilation conditions during installation.

3.3 Epoxy-Resin Terrazzo Installation

A. Reference Installation Standard: Comply with applicable NTMA recommendations for terrazzo and accessory installation.
B. Place, rough grind, grout, cure grout, fine grind, and finish terrazzo according tomanufacturer recommendations and NTMA "Terrazzo Specifications and Design Guide."
C. Installation Tolerance: Limit variation in terrazzo surface from level to 1/4 inch in 10feet; noncumulative.
D. Ensure that matrix components and fluids from grinding operations do not stain terrazzo by reacting with divider and control-joint strips.
E. Delay fine grinding until heavy trade work is complete and construction traffic through areais restricted.
F. Flexible Reinforcing Membrane:
    1. Prepare and prefill substrate cracks with 100 percent solids epoxy material.
    2. Install membrane at substrate cracks in areas to receive terrazzo.
    3. Membrane Application for Isolated Cracking: Apply reinforcing membrane, spreading a minimum of 40 mil. Thickness, across the crack allowing a minimum of 9 inches on either side. Embed fiberglass scrim on top of wet membrane. Allow for 10 percent of total Terrazzo square footage in lineal fee of crack detailing.
    4. Reinforce membrane with fiberglass scrim per manufacturer’s instructions.
    5. Prepare membrane according to manufacturer recommendations before applying substrate primer.

6. Moisture Vapor Treatment: Apply to Terrazzo Substrate according to Manufacturer's written instructions.
    a. Primer: Apply to terrazzo substrates according to manufacturer recommendations.
    b. Divider and Control-Joint Strips:

G. Install control, construction, expansion and isolation joints in accordance with NTMA technical Bulletin T-24. All joints shall use a 16 gauge strip.
H. Filler Color: To Match adjacent terrazzo resin.
I. Install strips in adhesive setting bed without voids below strips, or mechanically anchor strips as required to attach strips to substrate, as recommended by strip manufacturer.
J. Abrasive Strips: Install with surface of abrasive strip positioned 1/16 inch higher than terrazzo surface.
    1. Fine Grinding: Grind with stones 3000 grit or finer or comparable diamond abrasives until grout is removed from surface. Repeat rough grinding, grout coat, and fine grinding if large voids exist after initial fine grinding. Produce surface with minimum 70 percent aggregate exposure.

3.4 Surface Finishing:

A. Clean floor with water and remove excess water according to manufacturer's instructions.
B. Continue grinding process with diamond grits 220, 400 and 800, cleaning between each grind. If pinholes are present, grout floor and regrind to 800 diamond grit to fill pinholes.
C. Grind to produce a "natural" or high polish finish which will only require periodic penetrating sealer and will eliminate the need for top coats.
D. Double clean floor with clean water and wet vac.
E. Dry floor thoroughly with fans or blowers.
F. Apply enhancer product with a microfiber applicator to protect marble chips. Wait the recommended drying time recommended by manufacturer.
G. High speed buff the floor using a "purple" 3M pad embedded with a 3000 grit diamond abrasive. Thoroughly buff to reach sheen comparable to existing.
H. Clean floor to remove all dust and debris.
I. Apply a 2nd coat of enhancer, wait the recommended drying time.
J. High speed buff the floor using a "purple" 3M pad embedded with a 3000 grit diamond abrasive. Thoroughly buff to reach desired sheen comparable to existing.
K. Dust mop.
L. Buff the surface with a high speed buffer and a "white" pad.
M. Installation Tolerance: Limit variation in terrazzo surface from level to 1/4 inch in 10 feet; noncumulative.
N. Install and finish poured-in-place terrazzo base at same time adjacent terrazzo flooring is installed.

3.5 Repair

A. Cut out and replace terrazzo areas that evidence lack of bond with substrate. Cut out terrazzo areas in panels defined by strips and replace to match adjacent terrazzo, or repair panels according to NTMA recommendations, as approved by Architect.

3.6 Cleaning and Protection

A. Protection:
   1. Provide final protection and maintain conditions, in manner acceptable to Installer, that ensure that terrazzo is without damage or deterioration at time of Substantial Completion.
   2. Provide hardboard protection for travel paths.
   3. Final Cleaning:
   4. Remove construction dust and other residues from installation.
   5. Wash surfaces with cleaner according to NTMA and enhancer manufacturer recommendations; rinse surfaces with water and allow them to dry thoroughly.

End of Section

Section 09 68 13 – Tile Carpeting

Part 1 – General / Design Requirements

A. In certain instances, Contractor shall utilize CVG held carpet stock. Refer to Section 011000 – Summary and coordinate with CVG project manager. The Airport requires tiled carpet to sheet or rolled carpeting.

Part 2 – Product Requirements

None.

Part 3 – Execution Requirements

A. While installing tile carpeting all manufacturing processes should be followed and the use of pressure sensitive adhesive only.

End of Section

Section 09 78 26 – Glazed Interior Wall Panel System

Part 1 – General / Design Requirements

1.1 Summary

Section includes:

A. Aluminum framing and mounting system for interior glazed wall panels at GLP-1 and GLP-2.
B. Related Requirements:
   1. Section 08 80 00 "Glazing" for Glass Types GLP-1 and GLP-2 for use in glazed interior wall panel systems.
   2. Section 14 27 10 “Elevator Cab Finishes” for framing system at back-lit glass panel system LB-1.

1.2 Preinstallation Meetings

A. Preinstallation Conference: Conduct conference at Project site.

1.3 Action Submittals

A. Product Data: For each type of product.
B. Shop Drawings: Submit complete detailed fabrication and installation drawings based on measurements verified in the field. Include relationship of panels and mounting brackets to substrate, corner trim, base, and ceilings.
C. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of size indicated below:
D. Framed glass panels: Set of three 12-inch-square Samples of each type, finish, color, pattern, and texture. Show edge profile.
E. Glass: Submit three 4-inch square samples of GLP-1 and GLP-2 glass specified in Section 088000 “Glazing.”
F. Extrusions: Submit three 4-inch-long samples of finished aluminum extrusions, clear anodized.
G. Mounting Clips: Three full-size zee-clips.

1.4 Closeout Submittals

A. Maintenance Data: For finishes for inclusion in maintenance manuals. Include clear instruction on how to remove and reinstall panels.

1.5 Maintenance Material Submittals

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Glazed Interior Wall Panels: Panels in sizes indicated, framed with mounting hardware attached.

1.6 Delivery, Storage, and Handling

A. Deliver panels, mounting system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they are

protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Handle components, and accessories carefully to avoid damaging units and finishes in any way.

Part 2 – Product Requirements

2.1 Glass Wall, General

A. Source Limitations: Obtain each component of framed glass wall system including framing and mounting system from single source from single manufacturer.

B. Basis of Design:
   1. Glazed Interior Wall Framing System: LEVELe Wall System by Forms + Surfaces or equivalent product and manufacturer as approved by COTR
   2. Glass Products: GLP-1 and GLP-2 as specified in Section 088000 “Glazing.”

2.2 Framing And Mounting System

A. Framing System: Interlocking extruded aluminum grid panel system with inset glass panels and reveals.

B. Mounting System: Zee-clips.

Part 3 – Execution Requirements

3.1 Examination

A. Examine substrates, areas, and conditions, including structural framing and substrates to which system will attach or abut, with Installer present, for compliance with requirements specified in this and other Sections.

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

3.2 Preparation

Measure each area and establish layout of panels and trim to balance border widths and panel sizes.

3.3 Installation

A. General: Install to comply with manufacturer's written instructions and approved shop drawings.

3.4 Cleaning

A. Clean exposed surfaces including trim and edge moldings. Comply with manufacturer's written instructions for cleaning. Remove and replace components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage, including dented and bent units.

Part 4 – Contractor's Quality Control Requirements

4.1 General

A. Comply with applicable provision of Division 01 Section – Quality Requirements for requirements for Contractor Quality Control Program.

End of Section

Section 09 96 00 - High-Performance Coatings

Part 1 – General / Design Requirements

1.1 Summary

A. Section includes surface preparation and the application of high-performance coating systems on the following substrates:
   1. Interior Substrates:
      a. Concrete masonry units (CMUs).
      b. Steel.
      c. Gypsum board.
   2. Related Requirements:
      a. Section 099113 "Exterior Painting" for general field painting.
      b. Section 099123 "Interior Painting" for general field painting.

1.2 Definitions

A. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
B. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
C. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.3 Action Submittals

A. Product Data: For each type of product. Include preparation requirements and application instructions.
B. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
C. Indicate VOC content.
D. Samples for Initial Selection: For each type of topcoat product indicated.
E. Samples for Verification: For each type of coating system and each color and gloss of topcoat indicated.
F. Submit Samples on rigid backing, 8 inches square.
G. Apply coats on Samples in steps to show each coat required for system.
H. Label each coat of each Sample.
I. Label each Sample for location and application area.
J. Product List: Cross-reference to coating system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.4 Maintenance Material Submittals

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Coatings: 5 percent, but not less than 1 gal. of each material and color applied.

1.5 QUALITY ASSURANCE

A. Mockups: Apply mockups of each coating system indicated to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
B. Architect will select one surface to represent surfaces and conditions for application of each coating system.
C. Wall and Ceiling Surfaces: Provide samples of at least 100 sq. ft.
D. Other Items: Architect will designate items or areas required.
E. Final approval of color selections will be based on mockups.
    1. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
    2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
F. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 Delivery, Storage, And Handling

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
    1. Maintain containers in clean condition, free of foreign materials and residue.
    2. Remove rags and waste from storage areas daily.

1.7 Field Conditions

A. Apply coatings only when temperature of surfaces to be coated and ambient air temperatures are between 50 and 95 deg F.
B. Do not apply coatings when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

Part 2 – Product Requirements

2.1 Manufacturers

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    1. Benjamin Moore & Co.
    2. PPG Architectural Coatings.
    3. Sherwin-Williams Company (The).
    4. Tnemec Inc.
B. Products: Subject to compliance with requirements, provide product listed in the Interior High-Performance Coating Schedule for the coating category indicated.

2.2 High-Performance Coatings, General

A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."
B. Material Compatibility:
   1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
   2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
   3. Products shall be of same manufacturer for each coat in a coating system.
   4. Colors: As selected by Architect from manufacturer's full range.

2.3 Source Quality Control

A. Testing of Coating Materials: Owner reserves the right to invoke the following procedure:
   1. Owner will engage the services of a qualified testing agency to sample coating materials. Contractor will be notified in advance and may be present when samples are taken. If coating materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
   2. Testing agency will perform tests for compliance with product requirements.
   3. Owner may direct Contractor to stop applying coatings if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying coating materials from Project site, pay for testing, and recoat surfaces coated with rejected materials. Contractor will be required to remove rejected materials from previously coated surfaces if, on recoating with complying materials, the two coatings are incompatible.

Part 3 – Execution Requirements

3.1 Examination

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
   1. Masonry (Clay and CMUs): 12 percent.
   2. Gypsum Board: 12 percent.
   3. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
   4. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
   5. Proceed with coating application only after unsatisfactory conditions have been corrected.
   6. Application of coating indicates acceptance of surfaces and conditions.

3.2 Preparation

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and coating systems indicated.
   1. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting
   2. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
   3. Clean substrates of substances that could impair bond of coatings, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
   4. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce coating systems indicated.

B. Masonry Substrates: Remove efflorescence and chalk. Do not coat surfaces if moisture content, alkalinity of surfaces, or alkalinity of mortar joints exceeds that permitted in manufacturer's written instructions.
   1. Clean surfaces with pressurized water. Use pressure range of 100 to 600 psi at 6 to 12 inches.

C. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer.
   1. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

3.3 Application

A. Apply high-performance coatings according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."

B. Use applicators and techniques suited for coating and substrate indicated.

C. Coat surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, coat surfaces behind permanently fixed equipment or furniture with prime coat only.

D. Coat backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.

E. Do not apply coatings over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

F. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of the same material are to be applied. Tint undercoats to match color of finish coat but provide sufficient difference in shade of undercoats to distinguish each separate coat.

G. If undercoats or other conditions show through final coat, apply additional coats until cured film has a uniform coating finish, color, and appearance.

H. Apply coatings to produce surface films without cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections. Produce sharp glass lines and color breaks.

3.4 Field Quality Control

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test coatings for dry film thickness.
   1. Contractor shall touch up and restore coated surfaces damaged by testing.
   2. If test results show that dry film thickness of applied coating does not comply with coating manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with coating manufacturer's written recommendations.

3.5 Cleaning and Protection

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
B. After completing coating application, clean spattered surfaces. Remove spattered coatings by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
C. Protect work of other trades against damage from coating operation. Correct damage to work of other trades by cleaning, repairing, replacing, and recoating, as approved by Architect, and leave in an undamaged condition.
D. At completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces.

3.6 Interior High-Performance Coating Schedule

A. CMU Substrates:
   1. Epoxy System MPI INT 4.2G:
   2. Block Filler: Block filler, epoxy, MPI #116.
   3. Intermediate Coat: Epoxy, matching topcoat.
   4. Topcoat: Epoxy.
      a. Sheen: As selected by the Architect.
B. Steel Substrates:
   1. Epoxy System MPI INT 5.1L:
   2. Prime Coat: Primer, epoxy, anti-corrosive, for metal, MPI #101.
   3. Intermediate Coat: Epoxy, matching topcoat.
   4. Topcoat: Epoxy.
   5. Gypsum Board Substrates:
      a. Epoxy System MPI INT 9.2E:
   6. Prime Coat: Primer sealer, latex, interior, MPI #50.
   7. Intermediate Coat: Epoxy, matching topcoat.
   8. Topcoat: Epoxy.

a. Sheen: As selected by the Architect.

End of Section

Section 09 91 23 – Interior Painting

Part 1 – General / Design Requirements

None.

Part 2 – Product Requirements

A. CVG White Paint (used primarily in the Terminals and Concourses):
   1. Sherwin Williams Nebulous White
B. CVG Gray Paint (used primarily on metal surfaces):
   1. Sherwin Williams Canon Gray
C. All paint is to be applied with a high-grade primer.

Part 3 – Execution Requirements

A. At locations where access panels are to be painted, they shall be painted in such a manner as to prevent doors from bonding to the frame.
B. All surfaces shall be properly cleaned, sanded, and prepped before painting starts, to ensure the best possible finish.
C. Minimal of two coats of paint to all applications not including the primer.

End of Section

End of Division 09 – Finishes

Division 10 – Specialties

Section 10 14 00 Signage

Part 1 – General / Design Requirements

1.1 Summary

Drawings and general provisions of the Contract, including General and Special Conditions and Division 1 Specifications sections, apply to this section.

Section includes:

A. Interior and exterior custom fabricated architectural signage and graphics.

1.2 General

A. Signage dimensions to be coordinated with ceiling in the area.
B. Locations to be coordinated with exit signage and security camera locations.

1.3 **Related Requirements** (to be finalized in 100% submittal)

1.4 Reference Standards

A. ADA STANDARDS FOR ACCESSIBLE DESIGN - March 15, 2012
B. Aluminum Association (AA): "Standards for Aluminum Mill Products," "Designation System for Aluminum Finishes," and "Standard for Anodically Coated Aluminum Alloy for Architectural Applications."
C. American Iron and Steel Institute (AISI).
D. American National Standards Institute (ANSI).
E. American Society for Testing Materials (ASTM)
F. American Welding Society (AWS) "Recommended Practice for Resistance Welding," and "Structural Welding Code."
G. Americans with Disabilities Act (ADA) Design Guidelines (ADADG)
H. National Association of Architectural Metal Manufacturer (NAAMM) "Metal Bar Grading Manual," including Standard Specification, and "Metal Finishes Manual."

1.5 Submittals

The following outlines submittal requirements unique to this section of the work, especially shop drawing content and samples

A. After award of contract, but prior to the beginning of detailed shop drawings, submit drawings showing typical details of connections. The Contractor shall arrange to meet with Architect and Architect 's representative approximately one (1) week after submittal to review drawings and coordinate comments. The typical details as accepted shall be used to control detail design, shop drawing preparation and approval.
B. Shop drawings:

1. Submit complete shop drawings for manufactured and fabricated items. Indicate materials, layouts, sizes, methods, finishes, footings and anchorage devices, connections, and other details of construction, as well as the relation to supporting and adjacent work where applicable. Exact identification of the paint or ink shall be noted on the shop drawings along with method of application. Create and confirm layout conditions not shown on the contract documents.
2. Identify all prefabricated products proposed for use.
3. Indicate manufacturer, brand name, quality, and type paint for each surface to be finished.
4. Submit complete shop drawings and erection drawings conforming to all current applicable industry standards and local codes. Preparation of shop drawings shall not be sublet without the written permission of Architect.

C. Details shown are for concept purposes only; the sign contractor shall submit drawings of sign connection details; drawings shall be stamped, and computations shall be prepared by a registered professional engineer in the state of Florida and shall cover all members, connections (welds, bolts, etc.) indicating such meets the design specifications for sign structures stress requirements and wind load deflection tolerances.

D. Samples: Submit three samples of each of the following, unless otherwise specified:
1. Aluminum extrusions, 12" long minimum, in sizes, profiles and finishes to be utilized in the assembly of sign units.
2. Finishes:
3. Submit three (3) 3" x 5" samples of each finish specified (both color and texture)
4. Submit three (3) 3” x 5” samples of all exterior materials that can be viewed when all finished sign structures are completed and in place.
5. Surface-applied graphics shall be on actual substrate upon which they will appear.
6. Hardware items: Submit samples of each type of anchor, insert or other fastener as requested by Architect.

E. Submit for review, approval, and demonstration of representative craftsmanship Two (2) complete sign units of select sign types, as listed below. Sign types shall be an actual sign unit which may be installed on the project site after approval or correction. One unit will be retained as a control sample.

F. Maintenance data: Submit maintenance recommendations and instructions for each material used as part of contract close-out. Include recommendations for cleaning procedures, intervals and touch-ups.

G. Scheduling: Submit the final schedule for construction of work and installation within ten (10) days of sample approvals. Indicate dates of completion for prototypical units for approval, dates of partial deliveries and total completion. Dates given shall be consistent with the time requirements submitted with the bid.

1.6 Delivery, Storage and Handling

A. Maintain neat, clean conditions in all building areas; remove trash, rags, and waste materials at end of each day's work. Protect the floor and wall surfaces of this space against damage or defacement.

B. Close any open containers at end of day's work. Leave no materials open.
C. Acrylic and other glazing materials or finish materials with or requiring protective wrapping shall only have this protection removed as required during fabrication and installation and once the area is clear of work or activities which might cause damage to the installed work. Care shall be taken in handling surfaces and products to prevent scratching, chipping, or cracking.
H. Store materials a minimum of 4" above ground on framework or blocking and cover with protective waterproof covering. Provide air circulation and ventilation. Store in dry, conditioned space.

1.7 Quality Criteria

A. Fabricators shall meet the following criteria:
   1. Sign contractors and/or subcontractors shall have been regularly engaged in the manufacture, fabrication, and installation of sign systems of comparable scope and quality for a minimum of five (5) years.
   2. Sign contractors and/or subcontractors shall submit a minimum of five (5) references listing project type, scope of work, Architect and date of completion, Owner's address, and telephone number.

1.8 Job Conditions

A. Environmental requirements:
   1. Comply with manufacturer's recommendation regarding environmental conditions under which materials may be applied.
   2. Apply no adhesive or coating materials in spaces where dust is being generated.
I. Coordination: Coordinate work with the work of other sections of the specifications to ensure that surfaces to receive signs are properly completed, inspected, and approved prior to commencement of work. Commencement of work in any space shall constitute acceptance by the Contractor of surfaces to receive identifying devices.

1.9 Warranties

A. Warrant the joints in plastic constructions for a period of five (5) years from Date of Substantial Completion against failure or delamination.
B. Warrant vinyl film for a period of five (5) years from Date of Material Completion against delamination from the substrate.
C. Warrant raised letters for a period of five (5) years from Date of Material Completion against delamination from the substrate.
D. Paints or inks and finishes shall be guaranteed not to cause discoloration, deterioration, or delamination of any materials used in fabrication. Warrant paint finishes on metal and plastic materials for a period of five years from the date of Material completion.
E. Warranty Provisions: During the warranty period, restore defective work to the standard of the contract documents without cost to the Using Agency, including all labor, materials, refinishing and all costs incidental to the work.

F. Warrant all electrical components and signs for a period of at least one year, parts and labor, or greater if stipulated elsewhere in the specification section for electrical work.

1.10 Graphics, Artwork and Electronic Files:

A. The Architect or their consultants shall only furnish artwork in an electronic form if it already exists or was created in that form during the course of designing the project. Formats for graphic designs shall be in that of its original creation and may be manual or photo-mechanical or electronic/digital, and if digital, are likely to have been prepared in graphic design industry standard computer software on Macintosh™ platform computer hardware. Contract document drawings or layouts for the work shall not be transferred or transmitted to the contractor.

Part 2 – Product Requirements

2.1 Custom Signage

A. Provide architectural quality custom signage fabricated per design intent drawings. Signs shall reflect a high level of finish and be fabricated with sufficient internal structure to prevent “oil-canning” of surfaces.

2.2 Metals

A. Metal letterforms
   1. Fabricated letters from aluminum shall be heli-arc welded in conformance with the American Welding Society and the Aluminum Association's specifications. Metal shall be 3003H14 or 60601 alloy.
   2. Fabricated letters shall be braced internally where necessary to be free from waves, buckles, or warps.

2.3 Accessories:

A. Anchors and fasteners:
   1. Anchors, inserts or fasteners shall be compatible with sign materials, shall not result in galvanic action or chemical interaction of adhesives and shall have demonstrable and sufficient strength for intended use.
   2. Anchors and fastenings for aluminum shall be stainless steel, zinc or cadmium coated steel. Anchors and fasteners shall be concealed where possible. Indicate locations on shop drawings.
   3. Anchors and fastenings for exterior use shall be galvanized steel in accordance with ASTM A153-82.
   4. Wherever possible, anchors to concrete and masonry shall be cast-in-place. Use expansion shields where anchors cannot be located before concrete is poured.
   5. Fasteners to solid masonry and concrete shall be one of the following:

a. flat-head drop-in expansion bolts.
b. Powder-actuated fasteners; appropriate size drive pin for concrete and for masonry.
c. Fasteners to cells of hollow masonry shall be drive pins of the appropriate size.

6. Fasteners to roll or formed steel members shall be powder-actuated fasteners of the appropriate size.
   a. Fasteners to metal deck shall be self-drilling, self-tapping screws.
   b. Expansion shields shall be machine bolt type, tubular type, or self-drilling tubular type.
7. Anchor bolts for wood blocking to concrete and masonry shall be the appropriate size steel for masonry, unless otherwise noted, and installed with washer and nut at both ends.
8. Anchor bolts for wood blocking to steel members shall be appropriate size steel and installed with washer and nut.
9. Install using miscellaneous anchors and fasteners as required to secure work in place.
10. Basis of design: Versilok® brand (mfr.: Lord Industrial Adhesives) or an approved equal shall be used as a structural adhesive for aluminum and may be employed in the concealed fastening of components for signs. Approved equal shall comply with requirement listed within Division 1 Specifications for substitutions. Follow manufacturer's instructions for the correct formulation, preparation, and procedures.

2.4 Coatings (Paints):

A. Paint and colors to be finalized in 100% submittal.
B. Refer to manufacturers' standards for paint finishes and preparation.

Part 3 – Execution Requirements

3.1 Inspection

A. Inspection of substrates:
   1. Surfaces to receive identifying devices shall be free from defects and imperfections that would prevent an acceptable installation.
   2. Commencing of work in any space shall constitute acceptance by the Contractor of surfaces to receive identifying devices as being in a satisfactory condition to permit an acceptable installation. If the Contractor's inspection of such surfaces discloses unsatisfactory conditions, he shall notify the Architect in writing and await further instruction; otherwise, no claims will be considered for unsatisfactory work due to real or alleged faulty surfaces.

3.2 Preparation And Protection:

A. Protect the work and adjacent work and materials against damage during progress of work until completion. Drop cloths of paper or plastic shall be used around all areas where paint is being applied and appropriate precautions shall be taken to prevent overspray, hazardous conditions or damage to adjacent work.

3.3 Installation, Application:

A. Installation of sign panels and graphic units:
   1. Erect, mount or install all panels and units to be level, plumb and true.
   2. Use sufficient concealed fasteners and anchors to hold sign panels and graphic units in place. Use only concealed shims. Visible fasteners may only be used where approved in shop drawings or as part of an intentional design detail.
   3. Make Architect aware of conflicts in sign locations as shown in the drawings.
   4. Mount all room identification sign panels at 60" AFF to centerline of sign and 2" from latch-side door jamb.

3.4 Adjusting, Cleaning and Protection:

A. Remove and replace damaged identifying devices with new identifying devices free of defects.
B. Clean exposed surfaces promptly after completion of installation in accordance with recommendations of manufacturer.
C. Clean exposed metal work with cleanser recommended by manufacturer of materials and rinse with clean water. Do not use harsh chemicals or abrasive. Surfaces with stains which cannot be removed by cleaning shall be refined or replaced to the satisfaction of Architect at no extra cost to Using Agency.
D. Signs shall be free of tape, packing paper, dirt, smudges, and other foreign material.
E. Spatters, drippings, smears, and / or spray shall be completely removed.
F. Plastic surfaces shall be cleaned upon completion in accordance with manufacturer's instructions. Supply one pint of manufacturer's recommended cleaner for Using Agency's use.
G. Touch up work after installation shall be performed by the sign manufacturer and approved by Architect.
H. Protection:
   1. Work in progress shall be protected at all times from staining, scratching, chipping or other damage until acceptance by the Architect.
   2. Provide final protection in a manner acceptable to the fabricator and installer until Date of Substantial Completion.

3.5 Sign Quantities and Unit Pricing

A. Provide ITEMIZED bid including shipping, delivery, installation, etc.
B. Provide unit costs good for up to 1 year in the event or additions or re-orders:

End of Section

Section 10 14 23 – Panel Signage

Part 1 – General / Design Requirements

A. Verify existing signage in the location of renovations.
   1. Include documentation of existing signage for an accurate reference to modify or match for the proposed construction.
B. Include temporary signage required during the proposed renovations.
C. All signs shall comply with applicable codes regarding materials, electrical connections, and general construction; must bear the U.L. label when electrified; and have valid sign permits.
D. All electrified signs must be approved by electrical inspector.
E. All signage packages must be coordinated with the CVG PM at the conceptual phase.
F. For exterior signage, refer to Boone County General Signage Requirements for all signs and districts for the basis of design for exterior signage.
G. Prior to fabrication of any sign, Contractor shall submit signage shop drawings to CVG for review and approval. Drawings shall illustrate complete information for CVG to understand the sign design and appearance. Submitted drawings shall provide the following:
   1. Type and size of all lettering and other sign elements in scale.
   2. Dimensioned overall elevation of sign in context.
   3. Signage location.
   4. Sections and details through sign and mounting method(s).
   5. Materials, specifications, fabrication technique, and illumination.
   6. Electronic photographs of previous installation or color and material boards showing proposed signage.
   7. If a structural analysis is required, a drawing stamped by a structural engineer is to be included in the submittal.
H. Signs that have not been approved by CVG but installed by the Tenant may require modification, removal, and/or replacement at no cost to CVG.

Part 2 – Product Requirements

A. All electrified signs must bear the U.L. label for the entire assembly, not individual parts.

Part 3 – Execution Requirements

None.

End of Section

Section 10 14 23.16 – Room-Identification Panel Signage

Part 1 – General / Design Requirements

A. Verify existing signage in the location of renovations.
   1. Include documentation of existing signage for an accurate reference to modify or match for the proposed construction.
B. Include temporary signage required during the proposed renovations.
C. All signs shall comply with applicable codes regarding materials and general construction.
D. All signage packages must be coordinated with the CVG PM at the conceptual phase.
E. Prior to fabrication of any sign, Tenant shall submit signage shop drawings to CVG for review and approval. Drawings shall illustrate complete information for CVG to understand the sign design and appearance. Submitted drawings shall provide the following:
   1. Type and size of all lettering and other sign elements in scale.
   2. Dimensioned overall elevation of sign in context.
   3. Signage location.
   4. Sections and details through sign and mounting method(s).
   5. Materials, specifications, fabrication technique, and illumination.
   6. Electronic photographs of previous installation or color and material boards showing proposed signage.
F. Signs that have not been approved by CVG but installed by the Tenant may require modification, removal, and/or replacement at no cost to CVG.

Part 2 – Product Requirements

None.

Part 3 – Execution Requirements

None.

End of Section

Section 10 14 26 – Post and Panel/Pylon Signage

Part 1 – General / Design Requirements

A. Verify existing signage in the location of renovations.
   1. Include documentation of existing signage for an accurate reference to modify or match for the proposed construction.
B. Include temporary signage required during the proposed renovations.
C. All signs shall comply with applicable codes regarding materials, electrical connections, and general construction; must bear the U.L. label when electrified; and have valid sign permits.
D. All electrified signs must be approved by electrical inspector.
E. All signage packages must be coordinated with the CVG PM at the conceptual phase.
F. For exterior signage, refer to Boone County General Signage Requirements for all signs and districts for the basis of design for exterior signage.
G. Prior to fabrication of any sign, Tenant shall submit signage shop drawings to CVG for review and approval. Drawings shall illustrate complete information for CVG to understand the sign design and appearance. Submitted drawings shall provide the following:
   1. Type and size of all lettering and other sign elements in scale.
   2. Dimensioned overall elevation of sign in context.
   3. Signage location.
   4. Sections and details through sign and mounting method(s).
   5. Materials, specifications, fabrication technique, and illumination.
   6. Electronic photographs of previous installation or color and material boards showing proposed signage.
   7. If a structural analysis is required, a drawing stamped by a structural engineer is to be included in the submittal.
H. Signs that have not been approved by CVG but installed by the Tenant may require modification, removal, and/or replacement at no cost to CVG.

Part 2 – Product Requirements

A. All electrified signs must bear the U.L. label.

Part 3 – Execution Requirements

None.

End of Section

Section 10 21 13.14 –Toilet Compartments

Part 1 – General / Design Requirements

A. Ceiling hung toilet partitions are standard.
    1. Include related Division 05 sections for structural supports.

Part 2 – Product Requirements

A. Accessories:
    1. Coat hook for each stall.
    2. Small shelf above paper dispenser to be provided

Part 3 – Execution Requirements

None.

End of Section

Section 10 21 13.14 – Stainless Steel Corner Guards

Part 1 – General / Design Requirements

1.1 Summary

Section includes:

A. Corner guards.

1.2 Action Submittals

A. Product Data: Include construction details, material descriptions, impact strength, dimensions of individual components and profiles, and finishes for each impact-resistant wall protection unit.

1.3 Quality Assurance

A. Source Limitations: Obtain corner guards from single source from single manufacturer.

1.4 Delivery, Storage, and Handling

A. Store impact-resistant wall protection units in original undamaged packages and containers inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

1.5 Project Conditions

A. Environmental Limitations: Do not deliver or install impact-resistant wall protection units until building is enclosed and weatherproof, wet work is complete and dry, and HVAC system is operating and maintaining temperature at 70 deg F for not less than 72 hours before beginning installation and for the remainder of the construction period.

Part 2 – Product Requirements

2.1 Materials

A. Stainless-Steel Sheet: ASTM A 240/A 240M.
B. Adhesive
C. As recommended by impact-resistant plastic wall protection manufacturer and with a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.2 Fasteners

A. Fastener Materials: Unless otherwise indicated, provide the following:
B. Stainless-Steel Items: Type 304 stainless-steel fasteners.
C. Fasteners for Anchoring to Other Construction: Unless otherwise indicated, select fasteners of type, grade, and class required to produce connections suitable for anchoring indicated items to other types of construction indicated.

D. Provide concealed fasteners for interconnecting components and for attaching decorative metal items to other work unless exposed fasteners are unavoidable.
E. Provide Phillips flat-head machine screws for exposed fasteners unless otherwise indicated.
F. Anchors:
G. Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

2.3 Corner Guards

A. Surface-Mounted, Metal Corner Guards: Fabricated from one-piece, formed, or extruded metal with formed edges; with 90- or 135-degree turn to match wall condition.
B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Arden Architectural Specialties, Inc.
   2. Balco, Inc.
   3. Construction Specialties, Inc.
   4. Korogard Wall Protection Systems; a division of RJF International Corporation.
C. Material: Stainless steel, Type 304.
   1. Thickness: Minimum 0.0625 inch.
   2. Finish: Directional satin, No. 4.
D. Wing Size: Nominal 3-1/2 by 3-1/2 inches.
E. Corner Radius: 1/8 inch.
F. Mounting: Adhesive with flat-head, countersunk screws through factory-drilled mounting holes.

2.4 End-Wall Guards

A. Surface-Mounted, Metal, End-Wall Guards: Fabricated from one-piece, formed or extruded metal that covers entire end of wall; with formed edges.
B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Material: Stainless steel, Type 304.
   2. Thickness: Minimum 0.0625 inch.
   3. Finish: Directional satin, No. 4.
   4. Wing Size: Nominal 3-1/2 by 3-1/2 inches.
   5. Corner Radius: 1/8 inch.
   6. Mounting: Adhesive.

2.5 Fabrication

A. Fabricate impact-resistant wall protection units to comply with requirements indicated for design, dimensions, and member sizes, including thicknesses of components.

B. Assemble components in factory to greatest extent possible to minimize field assembly. Disassemble only as necessary for shipping and handling.
C. Fabricate components with tight seams and joints with exposed edges rolled. Provide surfaces free of wrinkles, chips, dents, uneven coloration, and other imperfections. Fabricate members and fittings to produce flush, smooth, and rigid hairline joints.

2.6 Metal Finishes

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
   1. Remove tool and die marks and stretch lines, or blend into finish.
   2. Grind and polish surfaces to produce uniform finish, free of cross scratches.
   3. Run grain of directional finishes with long dimension of each piece.
   4. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
B. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

Part 3 – Execution Requirements

3.1 Examination

A. Examine substrates and wall areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
   1. Examine walls to which impact-resistant wall protection will be attached for blocking, grounds, and other solid backing that have been installed in the locations required for secure attachment of support fasteners.
   2. For impact-resistant wall protection units attached with adhesive or foam tape, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 Preparation

A. Complete finishing operations, including painting, and grouting tiles before installing impact-resistant wall protection system components.
B. Before installation, clean substrate to remove dust, debris, and loose particles.

3.3 Installation

A. General: Install impact-resistant wall protection units level, plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.
   1. Install impact-resistant wall protection units in locations indicated

2. Provide full height units. Do not splice.

3.4 Cleaning

A. Immediately after completion of installation, clean corner guards.
B. Remove excess adhesive using methods and materials recommended in writing by manufacturer.

End of Section

Section 10 26 00 – Protective Barriers

Part 1 – General / Design Requirements

1.1 Summary

Section Includes:

A. Decorative wall protection.
B. Metal base.
C. Vinyl/Rubber wall base

1.2 Quality Assurance

A. Fabricator Qualifications: A firm experienced in producing decorative metal similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

1.3 Coordination

A. Coordinate installation of anchorages for decorative metal items. Furnish setting drawings,
   1. templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor
   2. bolts, and items with integral anchors, that are to be embedded in concrete or masonry.
B. Deliver such items to Project site in time for installation.

Part 2 – Product Requirements

2.1 General

A. Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. Provide materials without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.

2.2 Stainless Steel

A. Castings: ASTM A743/A743M, Grade CF 8 or CF 20.
B. Sheet, Strip, Plate, and Flat Bar: ASTM A666, Type 304.

2.3 Fasteners

A. Fastener Materials: Unless otherwise indicated, provide the following:
   1. Stainless-Steel Items: Type 304 stainless-steel fasteners.
B. Fasteners for Anchoring to Other Construction: Unless otherwise indicated, select fasteners of type, grade, and class required to produce connections suitable for anchoring indicated items to other types of construction indicated.
C. Provide concealed fasteners for interconnecting components and for attaching decorative metal items to other work unless exposed fasteners are unavoidable.

1. Provide Phillips flat-head machine screws for exposed fasteners unless otherwise indicated.

D. Anchors, General: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

2.4 Miscellaneous Materials

A. Laminating Adhesive: Adhesive recommended by metal fabricator that will fully bond metal to metal and that will prevent telegraphing and oil canning and is compatible with substrate and noncombustible after curing.
B. Contact Adhesive: VOC content of not more than 80 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.5 Fabrication, General

A. Assemble items in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations.
B. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
C. Form decorative metal to required shapes and sizes, true to line and level with true curves and accurate angles and surfaces. Finish exposed surfaces to smooth, sharp, well-defined lines and arris.
D. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing the Work.
E. Form simple and compound curves in bars by bending members in jigs to produce uniform curvature for each configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces.
F. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
G. Mill joints to a tight, hairline fit.
H. Grind smooth and polish exposed metal edges and corners.
I. Provide necessary rebates, lugs, and brackets to assemble units and to attach to other work. Cut, reinforce, drill, and tap as needed to receive finish hardware, screws, and similar items unless otherwise indicated.
J. Comply with AWS for recommended practices in shop welding. Weld behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded joints of flux, and dress exposed and contact surfaces.
K. Where welding cannot be concealed behind finished surfaces, finish joints to comply with NOMMA's "Voluntary Joint Finish Standards" for Type 1 Welds: no evidence of a welded joint.

L. Provide castings that are sound and free of warp, cracks, blowholes, or other defects that impair strength or appearance. Grind, wire brush, sandblast, and buff castings to remove seams, gate marks, casting flash, and other casting marks.

2.6 Decorative Wall Protection

A. Bumper Rail:
   1. Assembly consisting of continuous metal bars and wall brackets; designed to withstand impacts.
B. Rail:
   1. Stainless steel flat bar, in dimensions and profiles indicated on Drawings.
C. Wall Bracket:
   1. Cast stainless-steel shape, in dimensions and profiles indicated on Drawings.
D. Finish:
   1. Directional satin, No. 4.
E. Accessories:
   1. Anchors to connect bumper rail to other work.
F. Mounting:
   1. Surface mounted directly to wall.
   2. Surface-Mounted, Metal Corner Guards:
      a. Fabricated from metal bars welded to two mounting brackets. Interconnect corner guard components with full-length, full penetration welds. Use welding method that is appropriate for metal and finish indicated and that develops full strength of members joined. Finish exposed welds and surfaces smooth, flush, and blended to match adjoining surfaces.
   3. Material: Stainless steel, Type 304.
   4. Bar: 1/2-inch-diameter stainless-steel bar.
   5. Mounting Brackets: Fabricated from one-piece, formed or extruded stainless steel with formed edges; with 90- or 135-degree turn to match wall condition
   6. Wing Size: 1-1/2 inches high by 1 inch wide.
   7. Corner Radius: 1/8 inch.
   8. Mounting: Flat-head, countersunk screws through factory-drilled mounting holes

2.7 Metal Base

A. Form metal base from stainless-steel sheet, No. 4 finish, thickness as indicated on Drawings.

2.8 Finishes, General

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

2.9 Stainless-Steel Finishes

A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.
   1. Run grain of directional finishes with long dimension of each piece.
   2. Directional Satin Finish: No. 4.
   3. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

Part 3 – Execution Requirements

3.1 Examination

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of decorative metal.
B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 Installation, General

A. Provide anchorage devices and fasteners where needed to secure decorative metal to in-place construction.
B. Perform cutting, drilling, and fitting required to install decorative metal. Set products accurately in location, alignment, and elevation, measured from established lines and levels.
C. Fit exposed connections accurately together to form tight, hairline joints or, where indicated, uniform reveals. Where cutting, welding, and grinding are required for proper shop fitting and jointing of decorative metal, restore finishes to eliminate evidence of such corrective work.
D. Do not cut or abrade finishes that cannot be completely restored in the field. Return items with such finishes to the shop for required alterations, followed by complete refinishing, or provide new units as required.
E. Restore protective coverings that have been damaged during shipment or installation. Remove protective coverings only when there is no possibility of damage from other work yet to be performed at same location.

3.3 Decorative Wall Protection Installation

A. General: Install decorative wall protection units level, plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.
B. Install decorative wall protection units in locations and at mounting heights indicated on Drawings.
C. Provide mounting hardware, anchors, and other accessories required for a complete installation.

3.4 Metal Base Installation

A. Install metal base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
B. Tightly adhere metal base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
C. On masonry surfaces or other similar irregular substrates, fill voids along top edge of metal base with manufacturer's recommended adhesive filler material.

3.5 Cleaning and Protection

A. Unless otherwise indicated, clean metals by washing thoroughly with clean water and soap, rinsing with clean water, and drying with soft cloths.

End of Section

Section 10 28 00 – Toilet, Bath, and Laundry Accessories

Part 1 – General / Design Requirements

A. The Design Team shall coordinate with Janitorial and the CVG Project Manager to verify current Owner Standard (No Substitution) accessories and vendors for inclusion in Specifications.
B. CVG preference is for recessed or semi-recessed accessories in stalls with walls other than toilet partitions.
C. The projection on any toilet accessory shall be ADA compliant.
D. All blocking for accessories shall be metal or fire-retardant treated wood and concealed.
E. Accessory access required for refill and maintenance must be pre-approved.
    1. Refill and maintenance shall be a non-strenuous activity from a standing position.
F. Restroom fixtures (sinks, toilets, faucets, shower faucets, and drain hardware) should be readily available at or through local plumbing suppliers with no custom design or functionality.
G. Restroom fixture replacement and repair parts should be readily available through local plumbing suppliers.

Part 2 – Product Requirements

A. Baby Changing Stations: Include at all public restrooms, one in each Women's and Men's restrooms.

Part 3 – Execution Requirements

None.

End of Section

Section 10 41 16 – Emergency Key Cabinets

Part 1 – General / Design Requirements

A. Refer to Cincinnati/Northern Kentucky International Airport Fire Department New Facility Fire/Safety Information Packet (See Appendix item 00 New Facility Fire Safety Information Packet) for Knox Box requirements.
   1. See Appendix item 104116-A Knox Box Order Form.

Part 2 – Product Requirements

None.

Part 3 – Execution Requirements

A. Drywall installations will be with only flush mounted style Knox boxes.

End of Section

End of Division 10 – Specialties

Division 12 – Furniture

Section 12 48 13 - Entrance Floor Mats and Frames

Part 1 – General / Design Requirements

1.1 Summary

A. Section Includes:
   1. Resilient entrance mats.
   2. Recessed frames.
B. Related Requirements:
   1. Section 124816 "Entrance Floor Grilles" for rigid floor grilles and frames.

1.2 Coordination

Coordinate size and location of recesses in concrete to receive floor mats and frames.

1.3 Action Submittals

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for floor mats and frames.
B. Shop Drawings:
   1. Items penetrating floor mats and frames, including door control devices.
   2. Divisions between mat sections.
   3. Perimeter floor frames.
      a. Custom Graphics: Scale drawing indicating colors.
   4. Samples: For the following products, in manufacturer's standard sizes:
   5. Floor Mat: Assembled sections of floor mat.
C. read Rail: Sample of each type and color.
D. Frame Members: Sample of each type and color.

1.4 Closeout Submittals

A. Maintenance Data: For floor mats to include in maintenance manuals.

1.5 Maintenance Material Submittals

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Resilient-Tile Entrance Mats: Full-size tile units equal to 2 percent of amount installed, but no fewer than 10 units.

Part 2 – Product Requirements

2.1 Entrance Floor Mats, General

A. Structural Performance: Provide roll-up rail mats and frames capable of withstanding the following loads and stresses within limits and under conditions indicated:
   1. Uniform floor load of 300 lbf/sq. ft.
   2. Wheel load of 350 lb per wheel.

B. Accessibility Standard: Comply with applicable provisions in the DOJ's "2010 ADA Standards for Accessible Design" and ICC A117.1.

2.2 Resilient Entrance Mats

A. Rubber or Vinyl Mats: 1/2-inch- thick mats; with square edges for recessed installations.
   1. Style: As selected by the Architect.
   2. Color: As selected by Architect from full range of industry colors.
   3. Mat Size: As indicated.

B. B.A. Carpet-Type Mats: Nylon carpet bonded to 1/8- to 1/4-inch-thick, flexible vinyl backing to form mats 3/8 or 7/16 inch thick with non-raveling edges.
   1. Basis-of-Design: Subject to compliance with requirements, provide product indicated below by Milliken Contract, or a comparable product as approved by the Architect:
   2. Colors, Textures, and Patterns: Quadrus Orbit Brush. As selected by Architect from full range of industry colors.
   3. Mat Size: As indicated.
   4. Graphics: Custom inlaid or woven-in graphic as selected by the Owner.

2.3 Frames

A. Recessed Frames: Manufacturer's standard extrusion.
   1. Extruded Aluminum: ASTM B 221, Alloy 6061-T6 or Alloy 6063-T5, T6, or T52.

2.4 Concrete Fill and Grout Materials

B. Provide concrete fill and grout equivalent in strength to cast-in-place concrete slabs for recessed mats and frames. Use aggregates no larger than one-third fill thickness.

2.5 Fabrication

A. Floor Mats: Shop fabricate units to greatest extent possible in sizes indicated. Unless otherwise indicated, provide single unit for each mat installation; do not exceed manufacturer's recommended maximum sizes for units that are removed for maintenance and cleaning. Where joints in mats are necessary, space symmetrically and away from normal traffic lanes. Miter corner joints in framing elements with hairline joints or provide prefabricated corner units without joints.

B. Recessed Frames: As indicated, for permanent recessed installation, complete with corner pins or reinforcement and anchorage devices.
C. Fabricate edge-frame members in single lengths or, where frame dimensions exceed maximum available lengths, provide minimum number of pieces possible, with hairline joints equally spaced and pieces spliced together by straight connecting pins.
D. Coat concealed surfaces of aluminum frames that contact cementitious material with manufacturer's standard protective coating.

2.6 Aluminum Finishes

A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.
B. Color Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.

Part 3 – Execution Requirements

3.1 Examination

A. Examine substrates and floor conditions for compliance with requirements for location, sizes, minimum recess depth, and other conditions affecting installation of floor mats and frames.
B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 Installation

A. Install recessed mat frames and mats to comply with manufacturer's written instructions so that tops of mats will be flush with adjoining finished flooring. Set mats with tops at height recommended by manufacturer for most effective cleaning action; coordinate tops of mat surfaces with bottoms of doors that swing across mats to provide clearance between door and mat.
B. For installation in terrazzo flooring areas, allow for grinding and polishing of terrazzo without grinding surface of recessed frames. Coordinate with other trades as required.
C. Install necessary shims, spacers, and anchorages for proper location, and secure attachment of frames.
D. Install grout and fill around frames and, if required to set mat tops at proper elevations, in recesses under mats. Finish grout and fill smooth and level.
E. Delay setting mats until construction traffic has ended.
F. Install surface-type units to comply with manufacturer's written instructions, coordinate with entrance locations and traffic patterns.
G. Anchor fixed surface-type frame members to floor with devices spaced as recommended by manufacturer.

3.3 Protection

After completing frame installation and concrete work, provide temporary filler of plywood or fiberboard in recesses and cover frames with plywood protective flooring. Maintain protection until construction traffic has ended and Project is near Substantial Completion.

End of Section

End of Division 12 – Furniture

Division 14 – Conveyances

Section 14 21 50 – Electric Traction Elevators

Part 1 – General / Design Requirements

1.1 Summary

A. Section Includes: Gearless Machine Room Less (MRL)Traction elevators as follows:
   1. Passenger Elevators
   2. Service Elevators
B. Contractor supplying and installing the unit must be KY licensed.
C. The warranty does not start until the elevator has been commissioned. The manufacturer is required to coordinate manufacturing with project schedule. The owner is not to pay for storage of the elevator cars off site.

Part 2 – Product Requirements

2.1 Manufacturers

A. Subject to compliance with project requirements, provide products by one of the following. MRL Systems:
   a. Otis Elevator Company: Gen3 Peak.
   b. Schindler Elevator Corporation: 5500, 3300XL.
   c. TK Elevator: EVO 200, Synergy Building Supported.

2.2 Performance Requirements

A. Passenger Elevator Door Equipment (Operators, interlocks, pickup assemblies, Tracks, Hangers, and Closers):
   1. High Speed Door Operators: 2.5 fps
   2. Approved products meeting performance requirements.
   3. GAL.
   4. Wittur.
   5. Car Speed:
      a. ± 3% of contract speed under any loading condition.
   6. Car Capacity:
      a. Safely lower, stop and hold 125% of rated load.
   7. Car Stopping Zone:
      a. ±1/4" under any loading condition.
   8. Car Ride Quality:
   9. Acceleration and Deceleration:
   10. Smooth, constant, and not less than 2.5 feet/second^2

11. Initial ramp between 0.5 and 0.75 second.
12. Sustained Jerk:
    a. Not more than 6 feet/second^3 or twice the rate of acceleration.

2.3 Elevators

A. Passenger Elevators Description: Main Terminal, Concourse A, Concourse B
B. Elevator Identification:
    1. Capacity: 4,000 lbs.
    2. Class of Loading: Class A.
    3. Contract Speed: 350.
    4. Roping: 2:1 Overslung
    5. Machine: Gearless.
    6. Machine Location: Overhead in Hoistway.
    7. Control System: Group automatic
    8. Entrance Size: 4'-0" Wide X 7'-0" High.
    9. Entrance Type: Single speed center opening.

2.4 Equipment Space Equipment

A. Arrange equipment in dedicated control room spaces.
B. Controller locations not located in a dedicated controller room are prohibited.

2.5 Hoistway Equipment

A. Gearless Traction Hoist Machine:
    1. AC induction or P.M.S.M. ACV^{3}F gearless traction motor with brakes, drive sheave, and deflector sheave mounted in proper alignment.
    2. Provide hoist machine mounted direct drive, digital, closed-loop velocity encoder.
    3. Machine and Equipment Support Beams:
        a. Provide structural steel beams required for direct support of and attachment to building structure of hoist machine, deflector sheaves, overhead sheaves, governor, and hoist rope dead-end hitch assemblies.
        b. Provide bearing plates, anchors, shelf angles, blocking, embedment, for support and fastening of machine beams or equipment to the building structure.
    4. Isolate machine and overhead sheave beams to prevent noise and vibration transmission to building structure.
B. Suspension Means:
    1. 9 x 19 or 8 x 25 Seale construction, traction steel.
    2. Fasten with staggered length, adjustable, spring isolated wedge shackles.
    3. Noncircular elastomeric-coated steel belt comprising of several steel cords arranged in parallel and molded within a coating.

2.6 Car Equipment

A. Door Operator:
   1. High speed, heavy-duty door operator capable of opening doors at no less than 2.5 fps.
   2. Accomplish reversal within 2½" of door movement.
   3. Provide solid-state door control with closed loop circuitry to constantly monitor and automatically adjust door operation based upon velocity, position, and motor current.
   4. Provide a minimum of four controller-based motion profiles, per floor, per door, to maintain consistent, smooth, and quiet door operation at all floors, regardless of door weight or varying air pressure.

2.7 Communication

A. Car Communication System:
   1. Hands-Free Phone System:
   2. Emergency Personnel Communication:
      a. Communication system is provided allowing emergency personnel to establish communications with each elevator individually.
      b. Emergency Personnel Communication overrides any existing connection outside of building.
      c. Adjacent light jewel illuminates and flashes when call is acknowledged.
B. Provide operating instructions.
C. On the same car operating panel as the phone push button, provide capability to communicate with and obtain responses from passengers.
D. Provide display video capability for entrapment assessment.
E. Communication for deaf, hearing and speech impaired:
   1. On the same car operating panel as the phone push button, provide capability to communicate visually with and obtain responses from passengers, including those passengers who cannot communicate verbally or hear.
   2. Provide shielded twisted pair wiring to communicate to control room network box.
   3. Device shall be open-sourced and capable of being monitored by any entity as selected by the owner. All software, hardware, and training cost associated with the device shall be included within this project. Associated monthly monitoring costs will not be accepted.
F. Coordinate communication requirements with existing equipment, communication infrastructure, and Owner's operational requirements.
G. Remote Monitoring:
   1. Integrate new equipment into existing Owner monitoring equipment and operational procedures.
H. Elevator Management System and Information:
   1. Integrate new equipment into existing Owner Elevator Management System equipment and operational procedures.

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2.8 Group Control and Firefighters' Control Panel

A. Match existing equipment Group Control and Lobby Panel configuration.

End of Section

CINCINNATI/NORTHERN KENTUCKY INTERNATIONAL AIRPORT

Section 14 31 00 – Escalators

Part 1 – General / Design Requirements

1.1 Summary

Scope Includes:

A. Escalators as follows.
   1. Step Width
      a. Escalators: 40” step.
   2. Balustrade
      a. Escalators: Glass.

B. The warranty does not start until the escalator has been commissioned. The manufacturer is required to coordinate manufacturing with project schedule. The owner is not to pay for storage of the escalator off site.

Part 2 – Product Requirements

2.1 Manufacturers

A. Subject to compliance with project requirements, provide products by one of the following:
   1. Otis Elevator Company
   2. Schindler Elevator Corporation
   3. TK Elevator

2.2 Performance

A. Ride Quality:
   1. Maximum 15 milli-g in all axes, measured in accordance with ISO 18738 standard.
B. Step Speed:
   1. Unit shall be capable of operating at rated speed under any loading condition in either direction of travel
C. Handrail Speed:
   1. Synchronize with steps.
D. Speed Variation:
   1. Speed of steps and handrail shall not vary more than 2% from contract speed.
   2. Handrail speed must be synchronized with steps.
E. Public Escalator Duty Type:
   1. Escalator system and all individual components or subsystems designed to operate under moderate loads and operation:
      a. 2.0 persons per step.
      b. Loading factor of 265 lbs. per step.
      c. Continuous operation:
         1) 18 hours per day

2) 7 days per week

2. 150,000 hours of useful life preceding replacement or major component obsolescence.

F. Designed Minimum Component Lifecycle Before Replacement:
1. Components designed for 10 year (44,000 operating hours) minimum service life before replacement is required:
   a. Bearings.
   b. Step chain rollers.
   c. Step rollers.
   d. Step chains.
   e. Main drive chains.
   f. Belts.
   g. Gear box: Bearings, ring, and pinion gears.
   h. Step tracks.
   i. Handrails.
2. Components designed for 5 year (22,000 operating hours) minimum service life before replacement is required:
   a. Handrail Drive.

G. Noise and Vibration Control:
1. Limit noise levels relating to escalator equipment and its operation to no more than 50 dBA, measured 3’-0” above escalator at any point of its length.
2. Mechanically isolate escalator equipment from the building structure and other components to minimize noise and vibrations being transmitted to occupied areas of the building.

2.3 Escalators

A. Description:
1. Size:
   a. Escalators: 40” Step.
      1) Match existing adjacent unit number of flat steps where appliable otherwise provide 3 flat steps.
2. Speed: 100 fpm.
3. Angle of Inclination: 30°.
4. Operation: Reversible.
5. Drive Motor Gear Box: Worm,
6. Balustrade Panel Gap: Perpendicular to deck.
7. Balustrade Material: 1/2” Transparent Glass
8. Step Tread and Riser: Cleated and meshed with adjacent step with tread demarcation inserts, rear and sides.
9. Demarcation Color: Yellow.
10. Power Supply: 480 Volts, 3 Phase, 60 Hertz.
11. Additional Features:
   a. Emergency stop buttons.

b. Comb plate lighting.
c. Truss length extension or reduction to utilize structural support locations.
d. Aligned Newels
e. Anti-slide knobs.
f. Reduced speed operation and passenger approach detection and counter.

2.4 Operation

A. Each unit shall be capable of operating smoothly and quietly at rated speed with synchronized step and handrail operation in both directions.
B. Reduced Speed and Passenger Approach Activity.

2.5 Machine Space

A. Driving Machine
   1. Worm geared, reduction unit coupled directly to AC Permanent Magnet Synchronous drive motor.
   2. Handrail drive shall be directly coupled to drive machine.
B. Brake
   1. Electromechanical brake to safely decelerate, stop, and hold brake rated load.
   2. Brake shall stop escalator operating in the down direction at an average rate not to exceed 3.0 feet/second^2.
C. Controller
   1. NEMA 4 ingress rated enclosure
   2. Compartment:
      a. Securely mount all assemblies, relays, power supplies, and chassis switches, in a substantial, self-supporting steel cabinet, removable from machine space for access to controls and wiring.
   3. Diagnostics
      a. Equip controller with standard ports, interface boards, and drivers to accept maintenance, data logging, fault finding diagnostic, and monitoring system computers, keyboards, modems, and programming tools.
      b. Provide wireless connection to contractor's cellular provided at no additional cost.
   4. Provide control panel compliant with UL 508A SB. SCCR of 5000A required.

2.6 Wellway Equipment

A. Step Tracks
   1. Bolted sections including transitions to facilitate maintenance and replacement when required.
   2. Thickness: 2.5 mm on incline and 5 mm on transition curves.
   3. Upper track transition radius: 2.7 m
   4. Lower track transition radius: 2 m

B. Step Drive Assembly
   1. Machine drive sprockets at each side which engage step chains.
   2. Individual track sections, together with transition section, main drive shaft, and handrail drive shaft shall form a fully independent assembly.

C. Step Chain
   1. Roller chain constructed of steel links with hardened pins or cast links connecting adjacent steps and engaging step drive assembly. 2. 3" synthetic roller assemblies with sealed bearings.

D. Automatic Oiler

E. Lower Reversing Station Tension Carriage
   1. Fully independent, floating track system with spring tensioning device to maintain constant step band tension.

F. Step Assembly
   1. Steps shall be removable from unit without disassembly of balustrade.
   2. Provide renewable step demarcation inserts on trailing edge of each step tread and both sides of each step tread.
   3. Paint step tread and riser black between machined surfaces of cleats.

G. Safety Devices
   1. Provide step and handrail safety devices:
      c. Broken step chain.
      d. Broken drive chain/drive belt.
      e. Skirt obstruction.
      f. Reversal stops.
      g. Step up-thrust.
      h. Handrail speed.
      i. Missing step.
      j. Step level.
      k. Handrail entry.
      l. Combplate impact.
      m. Step Demarcation Lights.
      n. Stop Button.
      o. Speed Monitoring Devices.
      p. Disconnected Motor Safety.
      q. Braking Distance Monitor.

2.7 Handrails

A. Handrail Drive
   1. Chain driven V-groove sheave.
   2. Handrails shall be driven in both directions and synchronize precisely with step band.

2.8 Balustrade

A. Interior Panel:
   1. 1/2” Glass.

2.9 Landings

A. Flat Steps
   1. Field Verify and match existing unit number of flat steps when located adjacent to existing units.
      a. Provide three flat steps when not located adjacent to existing units.
B. Step Demarcation Lighting
   1. Provide minimum of two green LED step demarcation lights within the step band at upper and lower landings.
C. Combplates
   1. Plastic Composite provided with non-slip surface.
   2. Provide removable comb sections.
   3. Apply yellow powder coat finish.
D. Comb plate Lighting
   1. Provide comb plate LED lighting in skirt panel on both sides of units at both upper and lower landings.

2.10 Signal And Control Fixtures

A. Operating Station
   1. Provide newel or inner deck mounted operating stations.
   2. Mount on right side when facing unit.
   3. Match deck finish.
   4. Function and operating positions of switches and buttons shall be identified with engraved characters which are easily visible from a standing position.
   5. Each station shall contain the following:
      a. Red “emergency stop” button.
         1) The button shall be covered with a transparent cover which can be readily lifted or pushed aside.
         2) When the cover is moved, an audible warning signal shall be activated.
         3) The signal shall have a minimum sound intensity of 80 dBA at the button location.
         4) The cover shall be engraved “EMERGENCY STOP”; “MOVE COVER” or equivalent legend, and “PUSH BUTTON.”
         5) “EMERGENCY STOP” shall be in letters not less than 1/2" (13mm) high.
         6) Other required wording shall be in letters not less than 3/16" (4.8mm) high.
         7) The cover shall be spring loaded to return to closed position.
      b. Key switch to “start” unit.
      c. Key directional control switch.
B. Fault Indicator

1. Provide upper and lower fault indicator to display fault code without removal of equipment access plate.

C. Diagnostic Access

1. Provide diagnostic access port at upper and lower landings.

End of Section

CINCINNATI/NORTHERN KENTUCKY INTERNATIONAL AIRPORT

Section 14 32 00 – Moving Walks

Part 1 – General / Design Requirements

1.1 Summary

Section includes:

A. Moving Walks as follows:
   1. Moving Walk Width:
      a. Moving Walk: 48” (40” pallet).
   2. Moving Walk Balustrade:
      a. Moving Walk(s): Mullion less Glass.

Part 2 – Product Requirements

2.1 Performance Requirements

A. Pallet Speed:
   1. Unit shall be capable of operating at contract speed under any loading condition in either direction of travel.
B. Handrail Speed:
   1. Substantially same as pallet speed.

2.2 Moving Walks

A. Moving Walk System, General:
   1. Manufacturer’s standard moving walk systems.
   2. Unless otherwise indicated, manufacturer’s standard components shall be used, as included in standard moving walk systems and as required for complete system.
B. Description:
   1. Moving Walk
   2. Size:
      a. Moving Walk: 48" Wide (40" Pallet).
   3. Speed: 100 fpm.
   4. Configuration: Linear.
   5. Operation: Reversible.
   6. Drive Motor Gear Box: Worm, Planetary, or Helical.
      a. Handrail drive shall be directly coupled to drive machine
   7. Balustrades: Vertical to deck.
   8. Pallet Tread and Riser: Cleated and meshed with adjacent pallet with tread demarcation inserts, rear and sides.
   9. Additional Features:
      a. Truss extension or reduction to suit structural support locations, moving walk.
      b. Truss isolation

c. Combplate lighting.
d. Emergency stop buttons: Manual Emergency Stop

2.3 Machine Room Equipment

A. Driving Machine
   1. Worm geared, planetary, or helical spur gear reduction unit coupled directly to AC induction or P.M.S.M. drive motor.
   2. Handrail drive shall be directly coupled to drive machine.
B. Drive Motor
   1. Three-phase, operating at no greater than 1800 rpm.
   2. Motors shall be designed to operate in confined unvented spaces.
   3. Motor insulation class “F” or greater.
C. Brake
   1. Electromechanical brake to safely decelerate, stop, and hold rated load.
   2. Brake shall stop moving walk operating in the down direction at a relatively constant rate not greater than 3.0 feet/second^2.
D. Controller
   1. UL/CSA labeled.
   2. Compartment:
      a. Securely mount all assemblies, power supplies, chassis switches, relays, etc., on a substantial, self-supporting steel frame.
   3. Microprocessor Hardware.
E. Pallet Drive Assembly
   1. Direct or indirect drive.
   2. Machine sprockets at each side over which pallet chains, pallet chain rollers, or steel cord reinforced polyurethane cog belt shall pass and transmit motion from machine to pallets.
   3. If indirect chain drive is used between machine and drive sprocket, provide emergency brake on drive assembly to automatically set if drive chain fails.
   4. Provide roller-type sealed bearings.

2.4 Well-Way Equipment

A. Truss
   1. Steel truss to safely carry entire load of moving walk, including all components, full-capacity load and weight of exterior truss and balustrade covering material; manufacturer’s standard (not to exceed 10psf) per architectural design.
B. Intermediate Supports
   1. Provide intermediate truss supports at locations shown on contract documents to suit building structural support locations.
C. Truss Isolation

1. Provide isolation pads at support locations to isolate truss and prevent transmission of vibration to building structure.

2.5 Handrails

A. Construction:
   1. Reinforced rubber running on metal guides.
   2. Handrail shall be spliced and vulcanized with smooth joint.
   3. Handrail shall be driven at the same speed as the pallets.
   4. Provide tensioning device and slack-tension switch.

2.6 Balustrade

A. Interior Panel:
B. Glass.
C. Skirt Panels:
   1. Provide panels with skirt brushes.
   2. Extend skirt panel beyond combplates and wrap around base of newel.
D. Newel Ends:
   1. Continuous metal guides at upper and lower end of the balustrade, matching profile of handrail guides.
   2. Newel end shall include a multi-roller bearing system to minimize friction and provide smooth return of handrail.

2.7 Landings

A. Pallet Demarcation Lighting:
   1. Provide minimum of two green fluorescent pallet demarcation lights within the pallet band at upper and lower landings.
   2. Locate within a maximum of 16" from combplates.
B. Combplates:
   1. Aluminum or other alloy provided with non-slip surface.
   2. Provide removable comb sections.
   3. Apply yellow powder coat finish.
C. Comb plate Lighting:
   1. Provide combplate lighting in skirt panel on both sides of units at both upper and lower landings.

2.8 Signal and Control Fixtures

A. Operating Station:
   1. Provide upper and lower newel or stanchion mounted operating stations.
   2. Each station shall contain the following:
   3. Red “emergency stop” button.

4. The button shall be covered with a transparent cover which can be readily lifted or pushed aside.

B. When the cover is moved, an audible warning signal shall be activated.
C. The signal shall have a minimum sound intensity of 80 dBA at the button location.
D. The cover shall be engraved “EMERGENCY STOP”; “MOVE COVER” or equivalent legend, and “PUSH BUTTON.”
E. “EMERGENCY STOP” shall be in letters not less than 1/2" (13mm) high
F. Other required wording shall be in letters not less than 3/16" (4.8mm) high.
G. The cover shall be spring loaded to return to closed position.
   1. Key switch to “start” unit.
   2. Key directional control switch.
   3. Fault Indicator:
      a. Provide upper and lower end of truss with fault indicator to display source of fault without removal of equipment access plate.
      b. Locate indicator in handrail inlet box or deck board visible from landing plate.
      c. Diagnostic Access Port:
H. Provide upper and lower landings with RJ-11 diagnostic access port.

End of Section

End of Division 14 – Conveying Systems

Division 21 – Fire Suppression

Section 21 05 00 – Common Work Results for Fire Suppression

Part 1 – General / Design Requirements

A. Designer must coordinate with CVG staff prior to releasing a final design.
B. AUTHORITY HAVING JURISDICTION
   1. In most cases, CVG Airport Rescue and Fire Fighting (ARFF) is the Authority Having Jurisdiction in conjunction with the Boone County Building Inspection Department. CVG ARFF is generally the responding agency but may coordinate with mutual aid community partners, particularly on Non-Aviation Use Developments. CVG ARFF must review drawings at the conceptual stage, through coordination with CVG Project Manager, to determine if CVG ARFF specifications will apply or if another local responding agency should be coordinated with. Be advised, there may be a difference between CVG ARFF Fire Department Connections and Hydrants and local requirements if CVG ARFF defers.
C. PERMIT PROCESS
   1. Permit to install the Fire Suppression System is granted as part of the Boone County Building Permit process, in conjunction with review by the CVG Rescue and Fire Fighting, as the Authority Having Jurisdiction.
D. INSPECTION PROCESS BY CVG Rescue and Fire Fighting (ARFF)
   1. The contractor shall be aware that the CVG ARFF will only perform Inspections Monday through Friday, upon request, with a minimum of 48 hour notice.
E. SPRINKLER SHUTDOWN
   1. If the job requires a sprinkler system to be shutdown, the airport fire department must be contacted 24 hours in advance. The shutdowns will occur between the hours of 7:00AM and 2:00 PM. The shutdown will be coordinated with the Fire Department Inspection Bureau. Contractors will call when they are on site and the fire department representative will meet them at the job site.
F. The fire suppression system (sprinklers, standpipes, controls, etc.) must be designed and installed by a Fire Suppression Contractor who is licensed in Fire Suppression Systems.

Part 2 – Product Requirements

None.

Part 3 – Execution Requirements

A. Contractor must follow Airport 7016 Planned Utility Outage for any connection to Airport utilities.
B. Contractor must take all precautions to protect sprayed-on fireproofing. Furthermore, contractor shall be responsible for the repair of the same if damaged or removed.

C. There shall NOT be any connection to the Life Safety or Sprinkler Systems without written approval from the CVG Representative.

End of Section

CINCINNATI/NORTHERN KENTUCKY INTERNATIONAL AIRPORT

Section 21 05 23 – General-Duty Valves for Water-Based Fire-Suppression Piping

Part 1 – General / Design Requirements

TBD.

Part 2 – Product Requirements

TBD.

Part 3 – Execution Requirements

TBD.

End of Section

Section 21 05 29 – Hangers and Supports For Fire-Suppression Piping and Equipment

Part 1 – General / Design Requirements

None.

Part 2 – Product Requirements

None.

Part 3 – Execution Requirements

A. Fire sprinkler and plumbing piping shall be on independent hangers.

End of Section

CINCINNATI/NORTHERN KENTUCKY INTERNATIONAL AIRPORT

Section 21 05 53 – Identification for Fire-Suppression Piping and Equipment

Part 1 – General / Design Requirements

None.

Part 2 – Product Requirements

None.

Part 3 – Execution Requirements

A. All piping shall be identified by pipe markers.
B. Any equipment outside of the immediate lease space, such as in equipment room, telephone room, IDF, on roof, etc. shall be clearly marked with the equipment usage, tenant owner. For example, on roof exhaust hood there should be a sign stating, “Exhaust Hood, XZY Restaurant” or conduit running to telephone room labeled “Telephone, ABC Store”.
C. Contractor to provide identification signage for Fire Suppression Systems.

End of Section

CINCINNATI/NORTHERN KENTUCKY INTERNATIONAL AIRPORT

Section 21 11 16 – Facility Fire hydrants

Hydrant Specifications

Hydrant Placement

A. Every 300 feet and within 30 feet of the Fire Department Connection (FDC) for the building.
B. Depth of Bury – Four Feet
C. Bolt Pattern – 3 Bolt
D. Exterior Finish – Red Alkyd – Gloss Enamel on Bonnet, Caps and Barrel
E. M & H Fire Hydrant Style 129/ Above ground
F. M & H Fire Hydrant Style 229/ Below ground
    1. Operating Nut – Right Clockwise, 1” Square Tapered
    2. Drain Holes Plugged
    3. Opening Sizes – 2 – 2-1/2” and 1 – 4-1/2”
    4. Thread Style – Cincinnati Combo Threads on 2-1/2 inch outlets, National Standard on 4-1/2 outlet
G. Contact: M & H Valve Company
    1. (256) 237-3521
    2. mh-valve.com
H. Hydrants should be visible and have a unobstructed 3’6” radius from center of Hydrant

Hydra-Storz Adapter

A. A 5” Hydra-Storz adapter will be installed on each hydrant. This is a self-closing butterfly valve assembly with a protective cap.
    1. Adapter Part Number HYST-5.0-4.5 NH-NS
    2. Hydra-Snap Protective Cap
B. Contact: Hyrda-Shield Manufacturing
    1. (800)676-0911
    2. hydra-shield.com

End of Section

CINCINNATI/NORTHERN KENTUCKY INTERNATIONAL AIRPORT

Section 21 13 13 – Wet-Pipe Sprinkler Systems

Part 1 – General / Design Requirements

None.

Part 2 – Product Requirements

None.

Part 3 – Execution Requirements

A. BACKFLOW PREVENTER

1. Backflow preventers shall be required on all fire protection system mains. Backflow preventers shall be Reduced Pressure Zone (RPZ).

a. Basis of design models include:

1) Watts: 909, 919, 994, 009
2) Wilkins Zurn Model 975, or 375
3) Stainless?

End of Section

End of Division 21 – Fire Suppression

Division 22 – Plumbing

Section 22 05 00 – Common Work Results for Plumbing

Part 1 – General / Design Requirements

A. Designer must coordinate with CVG staff prior to releasing a final design.

Part 2 – Product Requirements

None.

Part 3 – Execution Requirements

A. All piping, fixtures, appliances, and appurtenances shall be supported to the satisfaction of the Administrative Authority.
B. Contractor must follow Airport 7016 Planned Utility Outage for any connection to Airport utilities.

End of Section

Section 22 05 23 – Valves for Plumbing Piping

Part 1 – General / Design Requirements

A. Section 211116 – Facility Fire hydrants

Part 2 – Product Requirements

A. All water distribution isolation valves shall be ¼ turn full port ball or butterfly valves.

Part 3 – Execution Requirements

A. All tenant spaces shall have an isolation valve installed on their system. If the existing Tenant space does not have a valve, the new tenant will be responsible for installing one
B. A pressure reducing valve shall be installed on the water distribution system if the water pressure is over 80 psi.

End of Section

Section 22 05 29 – Hangers and Supports for Plumbing Piping and Equipment

Part 1 – General / Design Requirements

A. All hangers and supports must be code compliant and appropriate for the application being supported.

Part 2 – Product Requirements

None.

Part 3 – Execution Requirements

A. Fire sprinkler and plumbing piping shall be on independent hangers.

End of Section

CINCINNATI/NORTHERN KENTUCKY INTERNATIONAL AIRPORT

Section 22 05 53 – Identification for Plumbing Piping and Equipment

Part 1 – General / Design Requirements

A. All piping shall be identified by pipe markers.
B. Any equipment outside of the immediate lease space, such as in equipment room, telephone room, IDF, on roof, etc. shall be clearly marked with the equipment usage, tenant owner. For example, on roof exhaust hood there should be a sign stating, “Exhaust Hood, XZY Restaurant” or conduit running to telephone room labeled “Telephone, ABC Store”.
C. All isolation valves must be tagged and labeled for the space they serve.

Part 2 – Product Requirements

None.

Part 3 – Execution Requirements

None.

End of Section

Section 22 07 16 – Plumbing Equipment Insulation

Part 1 – General / Design Requirements

A. All PVC piping in a plenum space must be appropriately fire wrapped Plumbing in areas with potential for freezing must be installed with heat tape and insulation.

Part 2 – Product Requirements

TBD.

Part 3 – Execution Requirements

TBD.

End of Section

Section 22 07 19 – Plumbing Piping Insulation

Part 1 – General / Design Requirements

None.

Part 2 – Product Requirements

A. All water lines should be insulated and labeled accordingly.

Part 3 – Execution Requirements

A. All PVC drains or vents running through an open plenum space must have fireproof insulation installed.

End of Section

Section 22 11 13 – Facility Water Distribution Piping

Part 1 – General / Design Requirements

None.

Part 2 – Product Requirements

A. Backflow Assemblies
   1. Backflow assemblies shall be required on all domestic potable water and fire protection system mains. Backflow assemblies shall be Reduced Pressure Zone (RPZ).
   2. Basis of design models include:
      a. Watts: 909, 919, 994, 009
      b. Wilkins Zurn Model 975, or 375
      c. Stainless assemblies are required
      d. Backflow assemblies shall not be installed higher than 5’ off the ground and shall be made accessible for testing and servicing.
      e. If backflow assemblies are installed over 5’ off the ground, a permanent platform must be installed for testing and repairing the assembly.
      f. The backflow assembly must be installed by an active licensed Kentucky Journeyman Plumber and are required to be tested after installation by someone with a current Kentucky cross connection certification.
   3. Others may be used upon review and approval from the CVG.

B. Water Meters
   1. Water meters shall be installed and programmed to read cubic feet by a licensed technician. All meters shall be placed in a location that can be accessed by the CVG’s Facilities staff.
      a. Manufacturer: Sensus
         1) Omni+ Compound (C2) Water Meter with touch pad for 1-1/2” and larger sizes.
         2) SR II Low Lead Meter for 1” and less sizes.

C. Piping Materials
   1. All water distribution piping must be a minimum of type “L” copper unless approved.

Part 3 – Execution Requirements

A. Potable Water
   1. In most instances, potable water service is available via private feed from CVG. CVG service is provided the Northern Kentucky Water District, and their standard drawings and specifications shall apply. Contact CVG Project Manager to determine if your project will be served by CVG or a direct feed from NKWD, or other surrounding utility provider. Depending on project location, project may also be provided service from City of Florence, Ky (CoF) or the Boone County Water District (BCWD). In instances where CoF or BCWD supplies service, the standard drawings and specifications of those entities will apply. Plans shall include proposed feeds to the project site and may be subject to off-site easements.

2. All Silcock/hose bibs installed inside and outside of structures need to be equipped with vacuum breakers

B. Temporary Water Service
   1. In the event that a contractor would need to utilize a temporary water service, a request must be made to the CVG Project Manager. Temporary meters, if needed, will be provided by the CVG.

C. Flow Tests
   1. In the event that a tenant, or their representative require flow tests for the design of their potable water system, a plan will be supplied to the CVG Project Manager identifying the three nearest fire hydrants. CVG Project Manager shall coordinate flow tests with CVG Rescue and Fire Fighting to perform testing and supply results. It is recommended that design professional, or record, be present during flow test.

D. Connections to CVG Potable Water Service
   1. All connections to CVG Water Service shall be made with an RPZ Backflow Assembly in place.
      a. All airgap drains from backflow assemblies must be piped to a drain receptacle or to the outside of the structure.
      b. All backflow devices must be assemblies.
      c. Wye strainers with an appropriately sized ball valve, brass nipple and plug shall be installed before all backflow assemblies for flushing out debris.
   2. All meters shall be placed in a location that can be accessed by CVG's Facilities staff.
   3. A pressure reducing valve shall be installed on the water distribution system if the water pressure is over 80 psi.
   4. An appropriately sized and pressurized expansion tank must be installed next to water heaters where pressure reducing valves have been installed on the water distribution system.

End of Section

CINCINNATI/NORTHERN KENTUCKY INTERNATIONAL AIRPORT

Section 22 11 16 – Domestic Water Piping

Part 1 – General / Design Requirements

None.

Part 2 – Product Requirements

A. Water Meters
   1. Water meters shall be installed and programmed to read cubic feet by a licensed technician. All meters shall be placed in a location that can be accessed by the CVG's Facilities staff.
      a. Manufacturer: Sensus
         1) Omni+ Compound (C2) Water Meter with touch pad for 1-1/2" and larger sizes.
         2) SR II Low Lead Meter for 1" and less sizes.

B. Check Valves
   1. Check valves 1-1/4" and smaller shall be Zurn Model 700XL.

C. Piping Materials
   1. All water distribution piping must be a minimum of type "L" copper unless approved.

Part 3 – Execution Requirements

A. Potable Water
   1. In most instances, potable water service is available via private feed from CVG. CVG service is provided the Northern Kentucky Water District, and their standard drawings and specifications shall apply. Contact CVG Project Manager to determine if your project will be served by CVG or a direct feed from NKWD, or other surrounding utility provider. Depending on project location, project may also be provided service from City of Florence, Ky (CoF) or the Boone County Water District (BCWD). In instances where CoF or BCWD supplies service, the standard drawings and specifications of those entities will apply. Plans shall include proposed feeds to the project site and may be subject to off-site easements.
   2. Unions shall be installed within 12" of regulating equipment, water heating, conditioning tanks, and similar equipment which may require service by removal or replacement in a manner which will facilitate its ready removal.
   3. All piping, fixtures, appliances, and appurtenances shall be supported to the satisfaction of the Administrative Authority.
   4. All Silcock/hose bibs installed inside and outside of structures need to be equipped with vacuum breakers.

B. Temporary Water Service
   1. In the event that a contractor would need to utilize a temporary water service, a request must be made to the CVG Project Manager. Temporary meters, if needed, will be provided by the CVG.

C. Flow Tests
   1. In the event that a tenant, or their representative require flow tests for the design of their potable water system, a plan will be supplied to the CVG Project Manager identifying the

three nearest fire hydrants. CVG Project Manager shall coordinate flow tests with CVG Rescue and Fire Fighting to perform testing and supply results. It is recommended that design professional, or record, be present during flow test.

End of Section

CINCINNATI/NORTHERN KENTUCKY INTERNATIONAL AIRPORT

Section 22 11 19 – Domestic Water Piping Specialties

Part 1 – General / Design Requirements

None.

Part 2 – Product Requirements

A. Backflow Assemblies
   1. Backflow assemblies shall be required on all domestic potable water and fire protection system mains. Backflow assemblies shall be Reduced Pressure Zone (RPZ).
   2. Basis of design models include:
      a. Watts: 909, 919, 994, 009
      b. Wilkins Zurn Model 975, or 375
      c. Stainless assemblies are required
   3. Others may be used upon review and approval from the CVG.

B. Check Valves
   1. Check valves 1-1/4” and smaller shall be Zurn Model 700XL.

C. Vacuum Breakers
   1. Hose connection vacuum breakers shall be Zurn Model BFP-9 for interior locations not susceptible to freezing.
   2. Hose connection vacuum breakers shall be Zurn Model BFP-8F for locations susceptible to freezing.

Part 3 – Execution Requirements

A. Potable Water
   1. All Silcock/hose bibs installed inside and outside of structures need to be equipped with vacuum breakers

B. Connections To Cvg Potable Water Service
   1. All connections to CVG Water Service shall be made with an RPZ Backflow Preventer in place.
      a. All airgap drains from backflow assemblies must be piped to a drain receptacle or to the outside of the structure.
      b. All backflow assemblies must be assemblies.
      c. Wye strainers with an appropriately sized ball valve, brass nipple and plug shall be installed before all backflow assemblies for flushing out debris.
   2. A pressure reducing valve shall be installed on the water distribution system if the water pressure is over 80 psi.
   3. All water meters shall not be installed higher than 5’ from the ground and have proper clearance for reading and servicing the meter. If they are needed to be installed over 5’ from the ground, they must have an adequate platform to test and repair the assembly.

End of Section

Section 22 13 16 – Sanitary Waste and Vent Piping

Part 1 – General / Design Requirements

A. Sanitary sewer lines may be owned by the Airport and must be designed in accordance with the requirements of the Northern Kentucky Sanitation District No. 1 (SD1) specifications. The Tenant shall work with the PM to determine if the Tenant's project affected sanitary sewer lines are owned by the Airport. Sanitary sewer is Airport-owned from the corner of Cox Drive and Donaldson Road. Tenant must submit a capacity request to SD1 to confirm capacity is available at the receiving treatment plant.

B. Grease traps are required in facilities where food preparation, maintenance, or other operation of areas where grease, fats, or similar types of materials can enter the sanitary lines. Discharge of environmentally sensitive materials (ie. heavy metals) without special environmental approvals and control is prohibited.

C. Where there is potential for foreign objects or oils to enter the sanitary system (ie. vehicle maintenance storage areas), an oil/solids interceptor must be included.

D. The sanitary and storm sewers on the Airport are separate systems. Northern Kentucky Sanitation District No. 1 (SD1) receives the effluent from the Airport system for treatment. SD1's ability to treat special types of waste should be verified. The Tenant shall advise the Airport of special treatment requirements for effluent and of estimated sanitary discharge volumes so that sewer capacities will not be exceeded. Sewer structures shall be precast type constructed of solid masonry units if build in place. Existing structures and grating that are removed shall be returned to the Airport. There are no sewer tap fees if on the Airport-owned system. The tap location shall be as directed by the Airport.

E. Agreement is needed for Tenant to tap into Airport sanitary and/or storm water systems. The Tenant will be required to prove that capacity in the existing systems exists on the Airport system and Sanitation District No. 1 system.

Part 2 – Product Requirements

None.

Part 3 – Execution Requirements

A. Sanitary Sewer
   1. CVG is served by the Sanitation District No. 1.
   2. Refer to SD1 standard drawings and specifications for all components related to sanitary sewer requirements
   3. Cleanouts on main stacks in plumbing chases should be extended above the flood level rim of the fixtures and made accessible.
   4. All lavatory and kitchen drain line tubular shall be made accessible for cleaning with slip-nut connections including the trap arm connection to the drain.
   5. Horizontal drainage piping less than 4" shall have a minimum slope of ¼" per foot
   6. Horizontal drainage piping 4" and larger shall have a minimum slope of 1/8" per foot.

7. All PVC drains or vents running through an open plenum space must have fireproof insulation installed.
8. All floor drain receptacles shall be equipped with a waterless trap seal device or a trap primer.

End of Section

Section 22 13 19 – Sanitary Waste and Vent Piping Specialties

Part 1 – General / Design Requirements

None.

Part 2 – Product Requirements

None.

Part 3 – Execution Requirements

A. All cleanouts on drains or vents shall be made accessible.
B. All PVC drains or vents running through an open plenum space must have fireproof insulation installed.

End of Section

CINCINNATI/NORTHERN KENTUCKY INTERNATIONAL AIRPORT

Section 22 13 23 – Sanitary Waste Interceptors

Part 1 – General / Design Requirements

None.

Part 2 – Product Requirements

None.

Part 3 – Execution Requirements

A. All grease interceptors shall be made readily accessible for cleaning.
B. All three compartment sinks for kitchens shall have a grease interceptor installed.
C. All grease interceptors need to be installed above ground and inside the space they serve.

End of Section

Section 22 14 14 – Storm Drainage Piping

Part 1 – General / Design Requirements

A. Agreement is needed for Tenant to tap into Airport sanitary and/or storm water systems. The Tenant will be required to prove that capacity in the existing systems exists on the Airport system and Sanitation District No. 1 system.

Part 2 – Product Requirements

None.

Part 3 – Execution Requirements

A. All PVC drains or vents running through an open plenum space must have fireproof insulation installed.

End of Section

CINCINNATI/NORTHERN KENTUCKY INTERNATIONAL AIRPORT

Section 22 14 23 – Storm Drainage Piping Specialties

Part 1 – General / Design Requirements

A. Pipes and/or structures located within Runway or Taxiway Safety areas must be designed to accommodate the single wheel load of the largest aircraft that can utilize the airport, the largest maintenance equipment load, or the earth load, whichever is greater. Underground piping and components used in drainage systems for terminal and aircraft fueling ramp drainage shall be noncombustible and inert to fuel in accordance with National Fire Protection Association (NFPA) 415.
B. Typically, drainage pipes are designed for highway loadings, however, a modified design will be necessary when aircraft loadings are greater than AASHTO HS20 live loads.
C. It is acceptable to specify storm drains and drainage structures meeting state DOT specifications for materials. Include all referenced state specifications in the project specification.
D. The Engineer should indicate the required class, schedule, standard dimension ratio (SDR), gauge, and/or strength of pipe desired.
E. The Engineer shall select the pipe used for the project and delete inappropriate requirements from paragraph 701-2.2 and from the list of material requirements. The Engineer shall include industry standard references (for example, ASTM and/or AASHTO) for installation if necessary.

Part 2 – Product Requirements

A. Materials shall meet the requirements shown on the plans and specified below. Underground piping and components used in drainage systems for terminal and aircraft fueling ramp drainage shall be noncombustible and inert to fuel in accordance with National Fire Protection Association (NFPA) 415.
B. Pipe for Storm Drains and Culverts
    1. The pipe shall be of the type called for on the plans or in the proposal and shall be in accordance with the following appropriate requirements:
    2. [American Association of State Highway and Transportation Officials (AASHTO) M167 Standard Specification for Corrugated Steel Structural Plate, Zinc-Coated, for Field-Bolted Pipe, Pipe-Arches, and Arches
    3. AASHTO M190 Standard Specification for Bituminous-Coated Corrugated Metal Culvert Pipe and Pipe Arches
    4. AASHTO M196 Standard Specification for Corrugated Aluminum Pipe for Sewers and Drains
    5. AASHTO M219 Standard Specification for Corrugated Aluminum Alloy Structural Plate for Field-Bolted Pipe, Pipe-Arches, and Arches
    6. AASHTO M243 Standard Specification for Field-Applied Coating of Corrugated Metal Structural Plate for Pipe, Pipe-Arches, and Arches
    7. AASHTO M252 Standard Specification for Corrugated Polyethylene Drainage Pipe
    8. AASHTO M294 Standard Specification for Corrugated Polyethylene Pipe, 300- to 1500-mm (12- to 60-in.) Diameter

9. AASHTO M304 Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Wall Drain Pipe and Fittings Based on Controlled Inside Diameter
10. AASHTO MP20 Standard Specification for Steel Reinforced Polyethylene (PE) Ribbed Pipe, 300- to 900-mm (12- to 36-in.) Diameter
11. AASHTO R73 Standard Practice for Evaluation of Precast Concrete Drainage Productions
12. ASTM A760 Standard Specification for Corrugated Steel Pipe, Metallic-Coated for Sewers and Drains
13. ASTM A761 Standard Specification for Corrugated Structural Steel Plate, Zinc-Coated, for Field-Bolted Pipe, Pipe-Arches, and Arches
14. ASTM A762 Standard Specification for Corrugated Steel Pipe, Polymer Precoated for Sewers and Drains
15. ASTM A849 Standard Specification for Post Applied Coatings, Pavings, and Linings for Corrugated Steel Sewer and Drainage Pipe
16. ASTM B745 Standard Specification for Corrugated Aluminum Pipe for Sewers and Drains
17. ASTM C14 Standard Specification for Nonreinforced Concrete Sewer, Storm Drain, and Culvert Pipe
18. ASTM C76 Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
19. ASTM C506 Standard Specification for Reinforced Concrete Arch Culvert, Storm Drain, and Sewer Pipe
20. ASTM C507 Standard Specification for Reinforced Concrete Elliptical Culvert, Storm Drain, and Sewer Pipe
21. ASTM C655 Standard Specification for Reinforced Concrete D-Load Culvert, Storm Drain, and Sewer Pipe
22. ASTM C1433 Standard Specification for Precast Reinforced Concrete Monolithic Box Sections for Culverts, Storm Drains, and Sewers
23. ASTM C1479 Standard Practice for Installation of Precast Concrete Sewer, Storm Drain, and Culvert Pipe Using Standard Installations
24. ASTM C1577 Standard Specification for Precast Reinforced Concrete Monolithic Box Sections for Culverts, Storm Drains, and Sewers Designed According to AASHTO LRFD
25. ASTM C1786 Standard Specification for Segmental Precast Reinforced Concrete Box Sections for Culverts, Storm Drains, and Sewers Designed According to AASHTO LRFD
26. ASTM C1840 Standard Practice for Inspection and Acceptance of Installed Reinforced Concrete Culvert, Storm Drain, and Storm Sewer Pipe
27. ASTM D3262 Standard Specification for “Fiberglass” (Glass-Fiber-Reinforced Thermosetting-Resin) Sewer Pipe
28. ASTM D4161 Standard Specification for “Fiberglass” (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe Joints Using Flexible Elastomeric Seals
29. ASTM F667 Standard Specification for 3 through 24 in Corrugated Polyethylene Pipe and Fittings

30. ASTM F714 Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Outside Diameter
31. ASTM F794 Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter
32. ASTM F894 Standard Specification for Polyethylene (PE) Large Diameter Profile Wall Sewer and Drain Pipe
33. ASTM F949 Standard Specification for Poly (Vinyl Chloride) (PVC) Corrugated Sewer Pipe with a Smooth Interior and Fittings
34. ASTM F2435 Standard Specification for Steel Reinforced Polyethylene (PE) Corrugated Pipe
35. ASTM F2562 Specification for Steel Reinforced Thermoplastic Ribbed Pipe and Fittings for Non-Pressure Drainage and Sewerage
36. ASTM F2736 Standard Specification for 6 to 30 in. (152 to 762 mm) Polypropylene (PP) Corrugated Single Wall Pipe and Double Wall Pipe
37. ASTM F2764 Standard Specification for 30 to 60 in. (750 to 1500 mm) Polypropylene (PP) Triple Wall Pipe and Fittings for Non-Pressure Sanitary Sewer Applications
38. ASTM F2881 Standard Specification for 12 to 60 in. (300 to 1500 mm) Polypropylene (PP) Dual Wall Pipe and Fittings for Non-Pressure Storm Sewer Applications
39. ASTM D3034 Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings
40. Rubber gaskets for rigid pipe shall conform to the requirements of ASTM C443. Rubber gaskets for PVC pipe, polyethylene, and polypropylene pipe shall conform to the requirements of ASTM F477. Rubber gaskets for zinc-coated steel pipe and precoated galvanized pipe shall conform to the requirements of ASTM D1056, for the “RE” closed cell grades. Rubber gaskets for steel reinforced thermoplastic ribbed pipe shall conform to the requirements of ASTM F477.
41. Pipe joint mortar shall consist of one part Portland cement and two parts sand. The Portland cement shall conform to the requirements of ASTM C150, Type I. The sand shall conform to the requirements of ASTM C144
42. Joint fillers. Poured filler for joints shall conform to the requirements of ASTM D6690.
43. Precast box culverts. Manufactured in accordance with and conforming to ASTM C1433.
44. Precast concrete pipe. Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or American Concrete Pipe Association QCast Plant Certification program.

C. Slotted Drains
   1. This item shall consist of the construction of steel slotted drains or cast iron slotted vane drains in accordance with these specifications and in reasonably close conformity with the lines and grades shown on the plans. Typical details shall be shown on the plans.
   2. All slotted drains shall meet the requirements shown on the plans and specified below. All slotted drains shall meet specified hydraulic design requirements and shall support the loadings specified.

D. Pipe
   1. Steel slotted drain. Pipe shall be metallic coated (galvanized or aluminized type 2) corrugated steel type I meeting the requirements of ASTM A760. Pipe diameter and gauge shall be as shown on the plans. The corrugated steel pipe shall have a minimum of two rerolled annular end.
   2. Cast iron slotted vane drain. Polyvinyl Chloride (PVC) pipe shall meet the requirements of ASTM D3034. Pipe diameter shall be as shown on the plans. The pipe shall have an open slot to accept the cast iron slotted vane drain castings.

E. Grates and castings
   1. Steel Slotted Drain. Grates shall be manufactured from ASTM A36 Grade 36 steel. Spacers and bearing bars (sides) shall be 3/16-inch (5 mm) material. The spacers shall be welded to each bearing bar with four 1-1/4 inch long by 3/16 inch wide (32 mm long by 5 mm wide) fillet welds on each side of the bearing bar at spacings not exceeding 6 inches (150 mm). The grates shall be 6 inches (150 mm) high or as shown on the plans and shall have a maximum 1-3/4 inch (45 mm) opening in the top. Grates shall be galvanized in accordance with ASTM A123 except with a 2 ounce / square feet (0.61 kg/sq m) galvanized coating. The grates shall be fillet welded to the corrugated steel pipe with a minimum weld one inch (25 mm) long on each side of the grate at every other corrugation. Weld areas and the heat affected zones where the slot is welded to the corrugated pipe shall be thoroughly cleaned and painted with a zinc-rich paint in accordance with repair of damaged coatings in ASTM A760.Each 20-foot (6.1-m) length of drain delivered to the job site shall be within the following tolerances: vertical bow ±3/8 inch (9 mm), horizontal bow ±5/8 inch (16 mm), twist ±1/2 inch (12 mm).

F. Cast iron slotted vane drain.
   1. Castings shall meet the requirements of ASTM A48, Class 35B gray iron. Castings shall be furnished with no coatings. Castings shall be designed to fit on open slots in 15 inch (38 cm) PVC pipe. Casting sections shall not exceed 3 feet (1 m) in length. Casting sections shall have a built-in vane configuration with bar spacings not exceeding 6 inches (150 mm). The opening at the surface shall not exceed 3-3/4 inch (95 mm), and the vane shall be constructed on a radius so that the opening shall be less than 1-1/2 inch (38 mm) at a depth of 1-1/2 inch (38 mm) as measured vertically from the surface. Casting sections shall integrally lock into the concrete by use of top and bottoms flanges and shear tabs. Castings shall accept bolts for bolting sections together and shall accept wire for fitting to pipe.

G. Pipe Underdrains for Airports
   1. Pipe. The pipe shall be of the type called for on the plans or in the proposal and shall be in accordance with the following appropriate requirements.
      a. American Association of State Highway and Transportation Officials (AASHTO) M196 Standard Specification for Corrugated Aluminum Pipe for Sewers and Drains
      b. AASHTO M252 Standard Specification for Corrugated Polyethylene Drainage Pipe
      c. AASHTO M294 Standard Specification for Corrugated Polyethylene Pipe, 300- to 1500-mm (12- to 60-in.) Diameter
      d. AASHTO Fittings Based on Controlled Inside Diameter

e. AASHTO MP20 Standard Specification for Steel Reinforced Polyethylene (PE) Ribbed Pipe, 300- to 900-mm (12- to 36-in.) Diameter
f. ASTM A760 Standard Specification for Corrugated Steel Pipe, Metallic-Coated for Sewers and Drains
g. ASTM A762 Standard Specification for Corrugated Steel Pipe, Polymer Precoated for Sewers and Drains
h. ASTM C444 Standard Specification for Perforated Concrete Pipe
i. ASTM C654 Standard Specification for Porous Concrete Pipe
j. ASTM D3262 Standard Specification for "Fiberglass" (Glass-Fiber Reinforced Thermosetting Resin) Sewer Pipe
k. ASTM D4161 Standard Specification for "Fiberglass" (Glass-Fiber Reinforced Thermosetting Resin) Pipe Joints Using Flexible Elastomeric Seals
l. ASTM F758 Standard Specification for Smooth-Wall Poly (Vinyl Chloride) (PVC) Plastic Underdrain Systems for Highway, Airport, and Similar Drainage
m. ASTM F794 Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe & Fittings Based on Controlled Inside Diameter
n. ASTM F949 Standard Specification for Poly (Vinyl Chloride) (PVC) Corrugated Sewer Pipe with a Smooth Interior and Fittings
o. ASTM F2562 Specification for Steel Reinforced Thermoplastic Ribbed Pipe and Fittings for Non-Pressure Drainage and Sewerage.

Part 3 – Execution Requirements

A. Slotted Drains
1. Installation. Slotted drains shall be laid in sections joined firmly together as shown on the plans. The top of all drains shall be held firmly in place to the proper grade, to preclude movement during the backfilling operation.
2. Joining. Slotted steel drain joints shall be firmly joined by modified hugger type bands, or as indicated, to secure the pipe and prevent infiltration of the backfill. When the slotted steel drain is banded together, the adjacent grates shall have a maximum 3-inch (75 mm) gap. Cast iron drain castings shall be bolted together.

End of Section

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Section 22 33 00 – Electric Domestic Water Heaters

Part 1 – General / Design Requirements

None.

Part 2 – Product Requirements

None.

Part 3 – Execution Requirements

A. All water heaters shall have an expansion tank installed if there is a pressure reducing valve installed on the water distribution system.
B. Thermometers need installed on the discharge piping of water heaters and mixing valves.
C. All water heater temperature and pressure relief valve drain piping, shall extend to the water heater drain pan or to an approved receptacle.
D. All water heaters shall be equipped with dielectric insulators.
E. All tank style water heaters shall have a watertight pan installed below it on installation and the drain from the pan must be piped to an approved receptacle.
F. All piping, fixtures, appliances, and appurtenances shall be supported to the satisfaction of the Administrative Authority.

End of Section

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Section 22 34 00 – Fuel-Fired Domestic Water Heaters

Part 1 – General / Design Requirements

None.

Part 2 – Product Requirements

None.

Part 3 – Execution Requirements

A. All water heaters shall have an expansion tank installed if there is a pressure reducing valve installed on the water distribution system.
B. Thermometers need installed on the discharge piping of water heaters and mixing valves.
C. All water heater temperature and pressure relief valve drain piping, shall extend to the water heater drain pan or to an approved receptacle.
D. All water heaters shall be equipped with dielectric insulators.
E. All tank style water heaters shall have a watertight pan installed below it on installation and the drain from the pan must be piped to an approved receptacle.
F. All piping, fixtures, appliances, and appurtenances shall be supported to the satisfaction of the Administrative Authority.

End of Section

Section 22 42 13 – Commercial Water Closets and Urinals

Part 1 – General / Design Requirements

A. All fixtures shall be low flow to meet the requirements of LEED V4.

Part 2 – Product Requirements

None.

Part 3 – Execution Requirements

A. All piping, fixtures, appliances, and appurtenances shall be supported to the satisfaction of the Administrative Authority.
B. All plumbing fixtures shall be constructed of dense, durable, non-absorbent materials and shall have smooth, impervious surfaces, free from unnecessary concealed fouling surfaces.

End of Section

Section 22 42 16 – Commercial Lavatories and Sinks

Part 1 – General / Design Requirements

A. All fixtures shall be low flow to meet the requirements of LEED V4.

Part 2 – Product Requirements

None.

Part 3 – Execution Requirements

A. All piping, fixtures, appliances, and appurtenances shall be supported to the satisfaction of the Administrative Authority.
B. All plumbing fixtures shall be constructed of dense, durable, non-absorbent materials and shall have smooth, impervious surfaces, free from unnecessary concealed fouling surfaces.
C. All three compartment sinks for kitchens shall have a grease interceptor installed.

End of Section

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Section 22 45 00 – Emergency Plumbing Fixtures

Part 1 – General / Design Requirements

None.

Part 2 – Product Requirements

None.

Part 3 – Execution Requirements

A. All piping, fixtures, appliances, and appurtenances shall be supported to the satisfaction of the Administrative Authority.
B. All plumbing fixtures shall be constructed of dense, durable, non-absorbent materials and shall have smooth, impervious surfaces, free from unnecessary concealed fouling surfaces.

End of Section

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Section 22 47 16 – Pressure Water Coolers

Part 1 – General / Design Requirements

None.

Part 2 – Product Requirements

None.

Part 3 – Execution Requirements

A. All piping, fixtures, appliances, and appurtenances shall be supported to the satisfaction of the Administrative Authority.

End of Section

End of Division 22 – Plumbing

CINCINNATI/NORTHERN KENTUCKY INTERNATIONAL AIRPORT

Division 23 – Heating, Ventilating, and Air Conditioning (HVAC)

Section 23 05 00 – Common Work Results for HVAC

Part 1 – General / Design Requirements

A. Tenant's designer must coordinate with CVG staff prior to releasing a final design.
B. Tenant's designer must visit the site to determine and incorporate existing conditions.
C. Any modifications to an existing system must be identified in the design.
D. If a Tenant anticipates modifying the airflow into their space and recommends a tie into an existing duct, the Tenant's designer is responsible for determining volume and capacity of the intended space and verifying the air handler has the reserve capacity and that the temperature of air guaranteed by contract is feasible by the airport. Additional buildouts on the tenants' part may be necessary depending on the size and purpose of the space. The modification must not alter or adversely affect the capacity to adjacent spaces, utilizing the same duct.
E. Design teams shall evaluate ways to reduce energy consumption and carbon emissions through the HVAC renovations in accordance with the airport Sustainability Master Plan.
F. Conditioning of server rooms should be accomplished with redundancy. The airport prefers having multiple systems providing conditioning to server rooms to prevent outages. The preference is to have a D/X split system computer room air-conditioning (CRAC) as well as a remote CRAC unit fed by chilled water. The D/X CRAC unit can be placed directly within the server room, while the CRAC unit fed by chilled water should be located remotely and ducted into the room.

Part 2 – Product Requirements

None.

Part 3 – Execution Requirements

A. Contractor must follow Airport 7016 Planned Utility Outage for any connection to Airport utilities.

End of Section

CINCINNATI/NORTHERN KENTUCKY INTERNATIONAL AIRPORT

Section 23 05 23 – Valves for HVAC Piping

Part 1 – General / Design Requirements

A. For isolation valves in tenant spaces, ball-valves will be used.

Part 2 – Product Requirements

A. Any style of ball valves will be used for isolating both supply and return piping, except three-piece ball valves, which will not be used as isolation valves. Water/Oil/Gas (WOG) Valves are the preferred method of isolating supply and return piping for tenant spaces.

Part 3 – Execution Requirements

A. All tenant spaces shall have an isolation valve installed on their system. If the existing Tenant space does not have a valve, the new tenant will be responsible for installing one prior to commissioning. Ball Valves will be emplaced such that the individual units are capable of isolation within proximity of the unit it should isolate.

End of Section

CINCINNATI/NORTHERN KENTUCKY INTERNATIONAL AIRPORT

Section 23 05 29 – Hangers and supports for HVAC Piping and Equipment

Part 1 – General / Design Requirements

A. Hangers and supports will be constructed with metals that will not cause corrosion or electrolysis with the metals to be hung. When no other means of hanging/supporting is available, then sufficient insulation will be provided between them to prevent corrosion and electrolysis.

Part 2 – Product Requirements

TBD.

Part 3 – Execution Requirements

TBD.

End of Section

CINCINNATI/NORTHERN KENTUCKY INTERNATIONAL AIRPORT

Section 23 05 53 – Identification for HVAC Piping and Equipment

Part 1 – General / Design Requirements

None.

Part 2 – Product Requirements

None.

Part 3 – Execution Requirements

A. All piping shall be identified by pipe markers. The following will be stickered onto appropriate piping, with direction of flow:
   1. “CHILLED WATER SUPPLY”
   2. “CHILLED WATER RETURN”
   3. “HOT WATER SUPPLY”
   4. “HOT WATER RETURN”
   5. “DOMESTIC WATER”
   6. “GLYCOL SUPPLY”
   7. “GLYCOL RETURN”
   8. “CONDENSATE DRAIN”
   9. ‘'REFRIGERANT”

B. All natural gas lines installed and/or maintained in buildings or spaces will be labeled and painted yellow.

C. Any equipment outside of the immediate lease space, such as in equipment room, telephone room, IDF, on roof, etc. shall be clearly marked with the equipment usage, tenant owner. For example, on roof exhaust hood there should be a sign stating, “Exhaust Hood, XZY Restaurant” or conduit running to telephone room labeled “Telephone, ABC Store”.

End of Section

CINCINNATI/NORTHERN KENTUCKY INTERNATIONAL AIRPORT

Section 23 05 93 – Testing, Adjusting, and Balancing for HVAC

Part 1 – General / Design Requirements

None.

Part 2 – Product Requirements

None.

Part 3 – Execution Requirements

A. A Test & Balance is to be conducted prior to start of construction and after construction to verify existing, unrenovated portions of the system were not altered. These Tests and Balances should be completed by a third-party contractor holding a National Environmental Balancing Bureau (NEBB) Certification.

End of Section

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Section 23 07 13 – Duct Insulation

Part 1 – General / Design Requirements

A. Ductwork installed will not be internally insulated but should be externally insulated in all cases.

Part 2 – Product Requirements

None.

Part 3 – Execution Requirements

End of Section

Section 23 07 16 – HVAC Equipment Insulation

Part 1 – General / Design Requirements

A. Chilled Water and Glycol Pumps will be insulated, as well as associated piping (see section 230717).
B. Internally insulated equipment, such as VAVs, AHUs, etc., will be used.

Part 2 – Product Requirements

TBD.

Part 3 – Execution Requirements

TBD.

End of Section

Section 23 07 19 – HVAC Piping Insulation

Part 1 – General / Design Requirements

A. All piping that conveys chilled water or glycol will be insulated.

Part 2 – Product Requirements

A. Any insulation added to piping that is outdoors, or that will be exposed to the sun's rays, or ultraviolet light similar or alike to the sun, will be rated for outdoor use.

Part 3 – Execution Requirements

TBD.

End of Section

Section 23 11 23 – Facility Natural Gas Piping

Part 1 – General / Design Requirements

None.

Part 2 – Product Requirements

None.

Part 3 – Execution Requirements

A. All gas lines to appliances shall have a drip leg, gas cock (no more than 3’ from unit) and union installed before the unit.
B. All gas cocks shall be full port.
C. All natural gas lines installed and/or maintained in buildings or spaces will be labeled and painted yellow.

End of Section

CINCINNATI/NORTHERN KENTUCKY INTERNATIONAL AIRPORT

Section 23 31 13 – Metal Ducts

Part 1 – General / Design Requirements

None.

Part 2 – Product Requirements

A. Fiberglass duct, snap-lock duct, and in most cases, adjustable duct elbows are not allowed.
B. Round duct must be spiral.

Part 3 – Execution Requirements

A. All duct construction and installation shall be per the latest SMACNA standards.

End of Section

CINCINNATI/NORTHERN KENTUCKY INTERNATIONAL AIRPORT

Section 23 31 16 – Non-Metal Ducts

Part 1 – General / Design Requirements

None.

Part 2 – Product Requirements

A. Fiberglass duct, snap-lock duct, and in most cases, adjustable duct elbows are not allowed.

Part 3 – Execution Requirements

A. All duct construction and installation shall be per the latest SMACNA standards.

End of Section

CINCINNATI/NORTHERN KENTUCKY INTERNATIONAL AIRPORT

Section 23 33 00 – Air Duct Accessories

Part 1 – General / Design Requirements

None.

Part 2 – Product Requirements

A. Only aluminum diffusers will be used. The top of diffusers will be insulated to prevent condensation.
B. Balancing Dampers will be required for all air-supplying devices.

Part 3 – Execution Requirements

A. Quadrant locking devices are acceptable for use on dampers of square duct only for all other applications, ensure shaft to control damper is raised to avoid damage to surrounding insulation.

End of Section

CINCINNATI/NORTHERN KENTUCKY INTERNATIONAL AIRPORT

Section 23 33 46 – Flexible Ducts

Part 1 – General / Design Requirements

A. Flexible ducts will not be used for return air applications.

Part 2 – Product Requirements

None.

Part 3 – Execution Requirements

A. All duct construction and installation shall be per the latest SMACNA standards.
B. Flexible duct will be affixed/hung in the same manner as rigid ductwork and will not be held in position by gravity.
C. Flexible duct can only be used for the last 5 foot of a duct run and cannot be used as an elbow in the middle of a duct run.

End of Section

Section 23 36 00 – Air Terminal Units

Part 1 – General / Design Requirements

None.

Part 2 – Product Requirements

A. VAVs will be sized appropriately for the space. Type and style of VAV should follow engineered specifications.

Part 3 – Execution Requirements

A. During construction, VAV boxes should be replaced, as well as any pneumatic controls must be replaced with BACnet DDC controls.

End of Section

Section 23 82 16.11 – Hydronic Air Coils

Part 1 – General / Design Requirements

A. All new chilled water coils shall be designed for an entering water temperature of 42° F. The minimum delta T across the coils shall be 15° F per ASHRAE 90.1.
B. All new hot water coils shall be designed for a maximum entering water temperature of 140° F. New coils should also be sized for a 40° F delta T to minimize the increase in required flow.

Part 2 – Product Requirements

None.

Part 3 – Execution Requirements

None.

End of Section

End of Division 23 – Heating, Ventilating and Air Conditioning (HVAC)

Division 26 – Electrical

Section 26 00 10 – General Requirements for Electrical Systems

Part 1 – General / Design Requirements

A. All electrical codes and standards shall be applied to the design of all Airport Areas except for connections to utility services, which shall also comply with respective utility provider standards.
B. All electrical construction is subject to inspection and acceptance by the Norther Kentucky Electrical Inspector NKYEI . Contractors are responsible for arranging, obtaining, and paying for any and all necessary permits. Such inspections shall be arranged before installations are covered and concealed.
C. An electrical inspection certificate is required with a copy submitted to the P&D Office before use or occupancy is granted.
D. At the completion stage, both Electrical As-Built Documents and Record Documents shall be submitted following the appropriate submittal requirements outlined in this Manual.
E. All work shall be done in accordance with the Commonwealth of Kentucky adopted edition of the National Electric Code (NEC) including all applicable Kentucky Department of Housing, Buildings & Construction amendments to the NEC.
F. There are multiple communication service providers in the vicinity of the Cincinnati/Northern Kentucky International CVG (CVG). The CVG may have conduit systems available for use dependent on location. Contact CVG Project Manager to determine availability of conduit. Any new lines installed on CVG property to serve a development will require a Concept Request from the utility provider and will be subject to the CVG Tenant Manual process. This includes site plans through final documentation. Directional drilling for installation may not be approved unless the service provider can adequately provide as-builts within 1' of the actual location of the utility. Utility may be subject to off-site easements.
G. Access to all electrical rooms must follow this standard
    1. Designation of a qualified worker is established by CVG Safety and only staff that have been properly trained to the satisfaction of CVG Safety and Facilities will be granted key or card access to these areas
    2. Qualified Worker: Required to follow KRS 227
        a. Required CVG Safety Training: Arc Flash Training
        b. Electrical Safety for Qualified Workers Room Access:
            1) Facilities will review all electrical/mechanical room access requests at least 48 hours in advance of requested access.
            2) Room Admittance:
            3) Electrical Room NEC Code Compliant:
            4) Authority Having Jurisdiction (AHJ) will ensure all electrical work done by contractors is National Electrical Code compliant. Electrical rooms are to be kept free of storage and debris.

Part 2 – Product Requirements

None.

Part 3 – Execution Requirements

A. Contractor must follow Airport 7016 Planned Utility Outage for any connection to Airport utilities.

End of Section

Section 26 05 00 – Common Work Results for Electrical Systems

Part 1 – General / Design Requirements

A. Electrical terminations into any CVG equipment are not permitted without written approval, and filing a Utility Isolation request must be filed by the CVG Project Manager.

B. All proposed additional loads require a 30-day load monitoring period for approval. Designer is to comply with NEC 220.87 for requirements related to 30-day load study. CVG must perform or observe the monitoring. Meter readings must be documented and provided to CVG for consideration of approval. In addition, the project design must include a written report provided by an electrical engineer confirming a proposed load. (CVG standards do not accept rebuilding or re-use of existing panels, replacement is the acceptable method). Other considerations shall include the following.
   1. Location of connections to distribution system – shown with a single line diagram in the plans. (Provide the Airport Utilities Supervisor a Red Line Drawing showing the intended modifications).
   2. Upstream sources shall be identified including capacity.

C. Connected and demand loads and adequacy of overcurrent projection shall be identified.

D. Include detailed characteristics of special loads including but not limited to large motors, compressors, baggage handling systems, etc.

E. Single lines of new and modified work shall be included and indicate room numbers of all electrical and data rooms.

F. All newly installed electrical panels, disconnects, transformers, and other components are to be infrared scanned by a certified thermographer. Results of the inspection must be provided to the Airport utilities manager for comparison from the required baselines provided during design of the project.

G. As part of project closeout, provide the following for all equipment.
   1. Type of equipment (substation, panel, disconnect, transformer)
   2. Equipment Name (voltage, ampacity, phase)
   3. Equipment Location (building, floor, vector/area, as applicable)
   4. Upstream source name (substation, panel, or transformer)
   5. Final loads (connected, demand)
   6. Modified circuit breaker or fuse settings. (Based on manufacturers recommendations).

Part 2 – Product Requirements

None.

Part 3 – Execution Requirements

None.

End of Section

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Section 26 05 05 – Selective Demolition for Electrical

Part 1 – General / Design Requirements

None.

Part 2 – Product Requirements

None.

Part 3 – Execution Requirements

A. All abandoned conductors shall be removed back to source.
B. All abandoned raceways shall be removed back to source, and documented on the as-build drawings.
C. Any electrical assets over 30 years old, or that pose a safety risk, shall be replaced.
D. Utilization of existing conduits and pathways through existing facilities must be formally submitted to the CVG project Manager for review and acceptance by the Airport Utilities Supervisor. If use of existing conduits are granted, the contractor is responsible to bring that conduit and associated junction/pull boxes up to current standards, codes and specs

End of Section

Section 26 05 13 – Medium Voltage Cables

Part 1 – General / Design Requirements

A. All conductor types and sizes shall be indicated on the drawings.

Part 2 – Product Requirements

A. All conductors shall be copper.

Part 3 – Execution Requirements

A. All MVC's are to be tested using an insulation resistance meter from terminal to terminal prior to energization. Results are to be given to the CVG Project Manager and the Airport Utilities Manager.

End of Section

Section 26 05 19 – Low-Voltage Electrical Power Conductors and Cables

Part 1 – General / Design Requirements

A. All conductor types and sizes shall be indicated on the drawings.

Part 2 – Product Requirements

A. All conductors shall be copper.
B. All conductors shall be stranded or solid based on the need of the wire type. CVG will approve wire types, during design review.

Part 3 – Execution Requirements

A. A separate grounding conductor shall be provided in all raceways containing power circuits including but not limited to lighting fixtures, motors, receptacles, etc. The ground conductor shall be insulated and color-coded green, sized in accordance to the National Electrical Code. Raceways shall not be used as a substitute grounding conductor at CVG, regardless of the NEC Allowances.

End of Section

Section 26 05 26 – Grounding and Bonding for Electrical Systems

Part 1 – General / Design Requirements

A. All conductor types and sizes shall be indicated on the drawings.

Part 2 – Product Requirements

A. All conductors shall be copper.

Part 3 – Execution Requirements

A. All metallic structures exposed to the exterior shall be provided with a grounding system that complies with the National Electrical Code.
B. All metallic structures exposed to the exterior such as large HVAC equipment mounted on rubber isolators, light poles, aerial structures, manhole covers, and any other in-ground fixtures shall be bonded to the grounding conductor and grounded to separate electrodes.
C. Fence enclosures around or adjacent to electrical substations shall be grounded to electrodes with flexible braid at NFPA required intervals with bonding jumpers at gates and fence openings to provide metallic continuity.
D. Apron ground connections for aircraft refueling shall be connected to ground rods driven at each parking area or hydrant fueling pit. All grounding test points shall be accessible for verification.
E. A separate ground bus connection shall be provided between communication room equipment and the associated ground grid using insulated wire.
F. A separate grounding conductor shall be provided in all raceway and conduit systems containing power circuits including but not limited to lighting fixtures, motors, receptacles, etc. The ground conductor shall be insulated and color-coded green, sized in accordance to the National Electrical Code. EMT shall not be used as a substitute grounding conductor.
G. A grounding conductor shall be provided for all power circuits over 600 V. Ground rod shall be 10 feet.

End of Section

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Section 26 05 33 – Raceways and Boxes for Electrical Systems

Part 1 – General / Design Requirements

A. The minimum size raceway for electrical systems is ¾”inch trade size

Part 2 – Product Requirements

A. All EMT fittings shall be Steel. Diecast fittings are not acceptable.
B. Liquid tight Flexible Nonmetallic Conduit (LFNC) shall not be used.
C. All exterior raceways exposed to physical damage shall be Galvanized Rigid Metal Conduit (GRMC).
D. Electrical Metallic Tubing (EMT) shall not be installed in damp or wet locations.
E. Metal Clad Cable (MC) is prohibited except for a 6’ light fixture whip.

Part 3 – Execution Requirements

A. Electrical runs shall not exceed industry standard requirements, if the distances are in excess of standard, corrective action to remedy the situation will be required at no cost to CVG. This includes but is not limited to junction boxes, wire fill, voltage drop, etc.
B. A separate grounding conductor shall be provided in all raceway and conduit systems containing power circuits including but not limited to lighting fixtures, motors, receptacles, etc. The ground conductor shall be insulated and color-coded green, sized in accordance with the National Electrical Code. EMT shall not be used as a substitute grounding conductor.
C. Install all overhead raceways as high as possible, with building lines.
D. Use conduit hangers for single overhead runs and strut channel systems for multiple runs.
E. Conduit shall not be supported by suspended ceiling drop wire clips.
F. All raceways shall be marked with tenant name or panel number a maximum of every 20 feet when outside of their exclusive use space
G. Utilization of existing conduits and pathways through existing facilities must be formally submitted to the PM for review and acceptance by the Airport Utilities Manager. If use of existing conduits is granted, the contractor is responsible to bring that conduit and associated junction/pull boxes up to current standards, code, and specs
H. The CVG standard is “no exposed” electrical raceways. Any intended variance must be formally requested for approval by the Airport Utilities Manager.
I. Reference specification sections 083323 Overhead Coiling Doors; 083613 Sectional Doors; for requirements to install ½” conduit installation, for future monitoring by the BAS

End of Section

Section 26 05 43 – Underground Ducts and Raceways for Electrical Systems

Part 1 – General / Design Requirements

A. Minimum size raceway for underground electrical systems is 1”.
B. All feeder / service raceways / duct banks to be concrete encased in RED dyed concrete.

Part 2 – Product Requirements

A. Rigid Polyvinyl Chloride Conduit (PVC) installed below grade shall be schedule 40. All associated below grade 90-degree elbows shall be Rigid Metal Conduit (RMC).
B. Underground quazite boxes to be class 22 rated flush mounted to finish grade with poured concrete collar added.

Part 3 – Execution Requirements

A. Electrical runs shall not exceed industry standard requirements. If the distances are in excess of standard, corrective action to remedy the situation will be required at no cost to CVG.

End of Section

Section 26 05 53 – Identification for Electrical Systems

Part 1 – General / Design Requirements

A. All panelboards shall be labeled with panel number and "fed from" locations, Examples are included below in Execution Requirements.

Part 2 – Product Requirements

None.

Part 3 – Execution Requirements

A. Provide identification to all power distribution equipment as per "Airport Identification and Labeling Standards. See appendix item CVG Electrical Arc Flash panel example.
B. All raceways shall be marked with tenant name or panel number a maximum of every 20 feet when outside of their exclusive use space.
C. All trim plates and J-boxes shall reflect the panel name, panel space number and circuit number.
D. All labels shall be located on the face so nothing must be removed to identify it.
E. All engraved labels for normal power shall be black letters on white face. All engraved legends for emergency power shall be white letters on red face and include the upstream panel and space number.
F. Phenolic labels are required on all electrical equipment with name, voltage, amperage, phase and upstream OCP.
G. Project Manager and Facilities Maintenance to replace or add new name plates on panelboard, switchgear, switchboards, tenant meter, shutoff, transformers etc. for all spaces in CVG. All electric equipment (panels, disconnects, etc.) shall have a new printed panel schedule on card stock this new phenolic label with the tenant name, equipment name and "source" location. See below for labels:
    1. Tags For Labeling Electric Panels, Switchgears and Transformers
        a. Disconnect Tag Example:
            1) Disconnect for T-PBDT3LG-E
                a) Fed from DSDTH1F-E (ckt 5)
                b) 480V, 3PH 4 Wire
                c) Brown, Orange, Yellow, Grey
        b. Transformer Tag Example:
            1) Transformer T-PBDT3LG-E
                d) Fed from Disconnect or Panel XYZ (ckt X)
                e) 480V to 208V, 3PH 4 Wire
        c. Panel tag Example:
            1) Panel PBDT3LG-E
                f) Fed from T-PBDT3LG-E (ckt X)
                g) 208V, 3PH 4 Wire
                h) Black, Red, Blue, White

End of Section

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Section 26 05 73 – Power System Studies

Part 1 – General / Design Requirements

A. Power system studies require accurate and detailed data collection. Power system studies consultant should work closely to gather all information from CVG facilities as well as visually verify the equipment that is to be modeled and analyzed.

Part 2 – Product Requirements

None.

Part 3 – Execution Requirements

A. For new or modified electrical equipment, conduct Arc Flash evaluation, and provide arc flash and shock hazard warning labels on switchgears, switchboards, transformers, motor control centers, panel boards, motor controllers, disconnect switches, and other electrical equipment. Arc Flash analysis shall be completed by a Professional Engineer and shall include at minimum:
   1. Computer modeling of electrical system
   2. Arc flash working distance.
   3. Required PPE FR clothing category.
   4. Permanent arc flash labeling
   5. Coordination Studies performed in format designated by Airport or AHJ
   6. Electronic copies of the model and report delivered to Airport.

B. When adding additional panels, transformers, or distribution boards, Contractor shall update the arc flash report to include an updated model, coordination study, and arc flash stickers. This update must be coordinated with the PM and Facilities Maintenance Representative to capture the data in Easy Power.

End of Section

Section 26 09 13 – Electrical Power Monitoring

Part 1 – General / Design Requirements

A. Where necessary, the power distribution system meter (feeders, switchgear, transformers, panels and over current protective devices), including coordination of plans regarding connections and available capacities with CVG utilities shall be depicted on the drawings.

Part 2 – Product Requirements

A. Manufacturers:
   1. Schneider Electric Tenant Meters:
      a. PM5500 Power Meters –p/n METSEPM5563RD
      b. MV or Current based CT's required based on load. If current based, include shorting block GE EB27B06S
   2. Metering with I/O:
      a. p/n -METSEPM8214
      b. Digital I/O Cards –p/n METSEPM89M2600 (if required per CVGAA)
      c. Analog I/O Cards –p/n METSEPM89M0024 (if required per CVGAA)
      d. Phoenix Contact –UPS p/n 2320238
      e. Phoenix Contact –Battery p/n 2320306
      f. Phoenix Contact –Power Supply p/n 2866776
      g. 15A Circuit Breaker –M9F52115
      h. 1A Circuit Breaker –M9F52101
      i. 3A Circuit Breaker –M9F42103
   3. Multi-circuit metering:
      a. HDPM6000 Backplate -METSEHDPM242016BMW
      b. Head Unit –p/n METSEHDPM6S480VC
      c. CT Unit –p/n METSEHDPM6R24WF
      d. 4.3" HMI –p/n METSEHDPM6HMI4
      e. 800A CTs –p/n METSEHD800A30
      f. 1600A CTs –p/n METSEHD1600A30
      g. Phoenix Contact –UPS p/n 2320238
      h. Phoenix Contact –Battery p/n 2320306
      i. Phoenix Contact –Power Supply p/n 2866776
      j. 15A Circuit Breaker –M9F52115
      k. 1A Circuit Breaker –M9F52101
      l. 3A Circuit Breaker –M9F42103
   4. Additional options CVG my require:
      a. Terminal blocks
         2) DN-T12-A
         3) DN-G4MN
         4) DN-EB35
         5) FBS 2-5
   5. Scope and install specs:

a. Wiring shall all be of type MTW 600 volt rated
b. All components to be mounted on din rail (where applicable, any other mounting options would require CVGAA to approve)
c. Wire management systems are required (Ty wraps, sticky backs, wire looms, spiral wire looms, or other CVGAA approved means)
d. The install to comply with the current state adopted NEC code cycle

6. CVGAA has the right to modify this document at any given time without notification to comply with the latest codes and standards.
7. Heat shrinkable cable identification labels are required on all wire terminations.
8. Where applicable, additional Emergency circuit may need to be ran to the equipment being monitored.
9. Nameplate above the meter head units of the meters shall be white lettering on black background phenolic label with adhesion material on the back.

Part 3 – Execution Requirements

A. Once the temporary or permanent meter is installed, coordination with the PM and Facilities Maintenance Department will be required to ensure sequence numbering of meters is accurate as it is required to allow CVG Facilities to track power loads. Case by Case only when changes are made.
B. Coordinate with Airport Utilities Manager through the PM for meter equipment location.

End of Section

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Section 26 09 23 – Lighting Control Devices

Part 1 – General / Design Requirements

A. Where code allows, all lighting control not required to have a central or timed control shall be accommodated via occupancy or vacancy sensors.

Part 2 – Product Requirements

A. Basis of design for all lighting control systems for areas that are required to have central or timed controls should be Acuity NLight.

Part 3 – Execution Requirements

TBD.

End of Section

Section 26 11 16 – Secondary Unit Substations

Part 1 – General / Design Requirements

A. All newly installed substations are to be infrared scanned by a certified thermographer. Result must be provided to CVG for comparison from the required baselines provided during design of the project.
B. All electrical distribution equipment shall be rated to carry the available fault current, the available fault current to be calculated by the design engineer.

Part 2 – Product Requirements

None.

Part 3 – Execution Requirements

None.

End of Section

Section 26 12 16 – Dry-Type, Medium-Voltage Substation Transformers

Part 1 – General / Design Requirements

A. All newly installed transformers, and other components are to be infrared scanned by a certified thermographer. Results must be provided to CVG for comparison from the required baselines provided during design of the project.
B. All electrical distribution equipment shall be rated to carry the available fault current, available fault current to be calculated by the design engineer.

Part 2 – Product Requirements

A. All transformers shall have copper windings.

Part 3 – Execution Requirements

A. New transformers shall be designed come with minimum 25% spare load capacity.
B. New transformers shall also be sized to achieve the maximum bus rating of their associated panelboard or load.

End of Section

Section 26 12 19 – Pad-Mounted, Liquid-Filled, Medium-Voltage Transformers

Part 1 – General / Design Requirements

A. All newly installed transformers, and other components are to be infrared scanned by a certified thermographer. Result must be provided to CVG for comparison from the required baselines provided during design of the project.
B. All electrical distribution equipment shall be rated to carry the available fault current, available fault current to be calculated by the design engineer.

Part 2 – Product Requirements

A. All transformers shall have copper windings.

Part 3 – Execution Requirements

A. New transformers shall be designed come with minimum 25% spare load capacity.
B. New transformers shall also be sized to achieve the maximum bus rating of their associated panelboard or load.

End of Section

Section 26 13 00 – Medium-Voltage Switchgear

Part 1 – General / Design Requirements

A. All newly installed switchboards and other components are to be infrared scanned by a certified thermographer. Result must be provided to CVG for comparison from the required baselines provided during design of the project.
B. All electrical distribution equipment shall be rated to carry the available fault current, available fault current to be calculated by the design engineer.
C. All new metal enclosed, or metal clad switch gear shall meet or exceed the applicable IEEE C37.20 standards.

Part 2 – Product Requirements

A. Approved Manufacturers
   1. Square D
   2. Eaton Electrical
   3. ABB
   4. Siemens

Part 3 – Execution Requirements

A. Installer shall provide robust surge arresting devices that are IEEE C62.11 compliant and sized with respect to the expected MCOV and duty cycle.
B. Provide Infrared Inspection windows, UL listed and labeled for the application, and installed to allow for visual and infrared inspection of cable terminations, exposed bolted connections, finger clusters, and pressure-held switches, as applicable.

End of Section

Section 26 22 00 – Low-Voltage Transformers

Part 1 – General / Design Requirements

A. All newly installed switchgear and other components are to be infrared scanned by a certified thermographer. Result must be provided to CVG for comparison from the required baselines provided during design of the project.
B. All electrical distribution equipment shall be rated to carry the available fault current, available fault current to be calculated by the design engineer.

Part 2 – Product Requirements

A. Approved Manufacturers
   1. Square D
   2. Eaton Electrical
   3. ABB
   4. Siemens

Part 3 – Execution Requirements

A. New transformers shall be designed come with minimum 25% spare load capacity.
B. New transformers shall also be sized to achieve the maximum bus rating of their associated panelboard or load.

End of Section

Section 26 23 00 – Low-Voltage Switchgear

Part 1 – General / Design Requirements

A. All newly installed switchgear and other components are to be infrared scanned by a certified thermographer. Result must be provided to CVG for comparison from the required baselines provided during design of the project.
B. All electrical distribution equipment shall be rated to carry the available fault current, available fault current to be calculated by the design engineer.

Part 2 – Product Requirements

A. Approved Manufacturers
   1. Square D
   2. Eaton Electrical
   3. ABB
   4. Siemens

Part 3 – Execution Requirements

A. Provide appropriate surge protective devices that are IEEE C62.41 compliant and appropriately sized to protect the airport and its electrical assets.

End of Section

Section 26 24 13 – Switchboards

Part 1 – General / Design Requirements

A. All newly installed electrical switchboards and other components are to be infrared scanned by a certified thermographer. Result must be provided to CVG for comparison from the required baselines provided during design of the project.
B. All electrical distribution equipment shall be rated to carry the available fault current, available fault current to be calculated by the design engineer.

Part 2 – Product Requirements

A. Approved manufacturers
   1. Square D
   2. Eaton Electrical
   3. ABB
   4. Siemens

Part 3 – Execution Requirements

A. Provide appropriate surge protective devices that are IEEE C62.41 compliant and appropriately sized to protect the airport and it's electrical assets.

End of Section

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Section 26 24 16 – Panelboards

Part 1 – General / Design Requirements

A. All newly installed electrical panels and other components are to be infrared scanned by a certified thermographer. Results must be provided to CVG for comparison from the required baselines provided during project design.
B. All electrical distribution equipment shall be rated to carry the available fault current, available fault current to be calculated by the design engineer.

Part 2 – Product Requirements

A. All electrical panel covers shall be double hinged.

Part 3 – Execution Requirements

A. New panel boards shall come with a minimum of 25% spare load capacity. Panel boards shall come fully furnished with 20amp 1 pole spare circuit breakers in all available spaces. Panel boards shall be 3 phase, 42 pole/space max. (208/120volt 200amp, 480/277volt 400amp).

End of Section

Section 26 27 26 – Wiring Devices

Part 1 – General / Design Requirements

None.

Part 2 – Product Requirements

None.

Part 3 – Execution Requirements

A. Electrical outlets backed up by the UPS shall be provided with a blue trim plate.

End of Section

Section 26 28 16 – Enclosed Switches and Circuit Breakers

Part 1 – General / Design Requirements

A. All electrical distribution equipment shall be rated to carry the available fault current, available fault current to be calculated by the design engineer.

Part 2 – Product Requirements

None.

Part 3 – Execution Requirements

None.

End of Section

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Section 26 32 13 – Diesel Engine Generator Sets

Part 1 – General / Design Requirements

TBD.

Part 2 – Product Requirements

TBD.

Part 3 – Execution Requirements

TBD.

End of Section

Section 26 32 13 – Gas Engine Generator Sets

Part 1 – General / Design Requirements

TBD.

Part 2 – Product Requirements

TBD.

Part 3 – Execution Requirements

TBD.

End of Section

Section 26 36 00 – Transfer Switches

Part 1 – General / Design Requirements

A. All electrical distribution equipment shall be rated to carry the available fault current, available fault current to be calculated by the design engineer.

Part 2 – Product Requirements

TBD.

Part 3 – Execution Requirements

TBD.

End of Section

Section 26 41 00 – Facility Lightning Protection

Part 1 – General / Design Requirements

A. Where required by the Airport, lightning protection systems shall be supplied and installed in accordance with the National Fire Protection Association (NFPA) 780 – Standard for the Installation of Lightning Protection Systems.

Part 2 – Product Requirements

A. Preferred representative is Maxwell Lightning Protection System contact maxwell@maxwell-lp.com. Wayne Maxwell 937-228-7250. Others are considered but will need to be approved by CVG.
B. All connections shall be made using -approved compression type connectors.
C. Grounding rods shall be minimum 10’ of copper or copper-clad steel material. Top connections shall be contained in precast concrete maintenance holes with a lid, and be accessible for inspection, in accordance with Airport standard details. All underground connections shall be made using -approved compression type connectors installed using tools and methods recommended by the manufacturer.

Part 3 – Execution Requirements

A. The Consultant shall determine the requirements for lightning protection for all permanent and/or temporary buildings and structures, for acceptance by the P&D Office.
B. Lightning protection conductors shall be installed in conduit if routed inside buildings. The preferred method is to run lightning conductors down at the periphery of a building rather than the interior.
C. Design and install lightning conductor system so as not to cause interference with Airport data and communication systems.
D. Refer to spacing requirements listed in NFPA 789 for standard installation of lighting protection systems.
E. All penetrations, installations, or modifications on existing roofs to be coordinated with current roof warranty. Reference (KCAB Asset Management Department) for coordination and compliance of existing warranties.

End of Section

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Section 264300 – Surge Protective Devices

Part 1 – General / Design Requirements

TBD.

Part 2 Product Requirements

TBD.

Part 3 Execution Requirements

TBD.

End of Section

CINCINNATI/NORTHERN KENTUCKY INTERNATIONAL AIRPORT

Section 26 50 00 – Lighting

Part 1 – General / Design Requirements

A. In general, tenants can refer to the Boone County Planning and Zoning requirements for applicable lighting requirements.
B. Site Photometric plans shall be submitted to the CVG project manager along with the site lighting plans.
C. All light poles will be subject to a FAA 7460 obstruction evaluation and should be included in the overall 7460 submittal for the project.
D. All lighting design shall be as energy efficient as possible. Dimmable LED's shall be used in lieu of fluorescent luminaires utilizing the appropriate color temperatures while providing consistent color temperature (tight binning), high CRI (85+) and rated life >50,000 hours. This also includes all ramp lighting.
E. All ramp lighting applications shall have integrated controls with applications that meet or exceed the owner's needs.
F. Ramp lighting and high mast lighting luminaires shall possess listings as required by NFPA 70 and ANSI/UL 1598. They shall also be "wet" rated per UL 1598. Drivers and LED arrays, modules or assemblies shall comply with UL8750 Wet location test requirements. Polymeric optics shall have 5VA flame rating or utilize a fire barrier as specified in UL8750 Section 6.3.
G. For ramp lighting levels, aircraft parking position shall have a horizontal illuminance average of 20 Lux (2fc). Cargo facility operations such as loading and unloading on the ramp shall have a horizontal illuminance of 50lux (5fc).
H. For ramp lighting measurements, foot candle readings are to be taken at specified points around the aircraft parking. At the measured point of the aircraft nose the standard reading of 5 fc is to be achieved. At the measured point of the aircraft tail, the standard ready of 1 fc is to be achieved. Designer shall follow all design standards for ramp lighting published by the FAA.
I. For ramp lighting and high mast lighting, the manufacturer should be able to demonstrate success with LED lighting at a minimum of two (2) US commercial airports. Products shall be made in the USA.

Part 2 – Product Requirements

A. CVG standard for all interior lighting LED lighting is 4000K (+/- 300K)
B. CVG Standard for ramp lighting is 5000K (+/- 300K)
C. LED Lighting Requirements
    1. Product testing: Comply with U.L. 1598 and 8750. Test according to IES LM-79 and LM-80
    2. Drivers shall operate at started rated voltage of driver, and not "over driven."
    3. Minimum efficacy of 120 lm/W
    4. A minimum design life of 50,000 hours or more at 12hours/start.
    5. A minimum of 94% lumen maintenance during life cycle.
    6. A CRI greater than 85
    7. A power factor greater than 0.9.
    8. A full-length rigid aluminum structure for all LED tubes
    9. A minimum bean angle of 120 degrees (+/- 10 degrees).

10. A minimum allowable flicker of less than 1% for direct wire and less than 10% for direct fit on replacements or retrofits
11. A maximum total harmonic distortion of 20% (+/- 2%)

D. Fluorescent Ballasts (rarely used and only when required, mainly for renovations)
   1. Instant start and designed for the type and quantity of lamps served.
   2. Shall be designed for full light output unless dimmer or bilevel control is indicated. Comply with ANSI C82011.
   3. Have a ballast factor of low or normal.
   4. Universal input voltage (120-277VAC)
   5. Able to produce over 100 lm/W
   6. Have a total harmonic distortion of <10%
   7. Operate at >42 kHz to reduce interference with infrared control systems.
   8. Parallel circuitry so remaining lamps stay lit if one or more goes out.
   9. Anti-striation technology

E. Fluorescent lamps (rarely used and only when required, mainly for renovations)
   1. A minimum efficacy of 60 lm/W for lamps greater than 40 watts.
   2. A minimum efficacy of 50 lm/W for lamps greater than or equal to 15 watts and less than or equal to 40 watts.
   3. A minimum efficacy of 40 lm/W for lamps less than 15 watts.
   4. A minimum design life of 20,000 hours or more at 12 hours/start
   5. A minimum 94% lumen maintenance during life cycle.
   6. A CRI greater than 80.

F. Ramp High Mast lighting
   1. A CRI greater than 80.
   2. Luminaires must be designed or be provided with integrated shields to reduce glaring angles.
   3. Luminaires shall be field rotatable in the horizontal plane to facilitate proper aiming.
   4. Minimum luminaire light output shall be greater than 70,000 lumens (L70 at 100k hours) after losses from optics are included. Luminaire light output shall be verified via LM-79-08 using absolute photometry.
   5. LM-80-09 data on LED's used in the luminaire shall be for 10,000 hours duration, minimum.
   6. Heat dissipation shall be exclusively via passive means. No forced air-cooling fans, or other mechanical methods subject to wear and tear.
   7. Heat sinks shall be protected from direct exposure by means of removable secondary cover.

G. Ramp lighting controls and monitoring.
   1. Luminaires controllers must have integrated energy metering. Luminaire controllers must be available with location awareness via GPS.
   2. The control system shall be a "mesh" network. Gateways shall be contained in an outdoor rated NEMA 4X enclosure. The controller must also be able to tie into the airport BAS system for system monitoring.

Part 3 – Execution Requirements

A. Contractor must submit a variance for approval if 4000K lighting for LED, or 3500K for fluorescent lighting is not proposed for any new or replaced interior lighting.

B. For existing work, demolished or abandoned fixtures shall be disconnected and removed. Wiring and conduit should be removed back to source and panelboards shall be relabeled accordingly.
C. Identify the panel and circuit number for all lighting, switches, etc. in area of construction. Provide clear adhesive labels with black lettering. Mark insides of all device boxes with panel and circuit number.
D. Locate chain hung industrial fixtures in mechanical rooms to avoid ductwork and piping, to maximize available light. Space around equipment, air handlers, etc. to provide adequate lighting to all areas of room. Provide additional fixtures of the same type as needed to fulfill this requirement.
E. Recessed luminaires shall be secured such that the force required for inserting lamps, trim lenses, louvers, or door frames does not shift the housing. All trims shall be completely flush with finished ceilings at completion.
F. All lighting fixture lenses, downlights, cylinders, etc. shall be handled with cotton cloves during installation to avoid fingerprints or dirt deposits. Any fixture showing dirt or fingerprints shall be cleaned with solvent recommended by the manufacturer or replaced as necessary to turn over to the owner at occupancy.

End of Section

End of Division 26 - Electrical

Division 27 – Communications

Section 27 00 10 – General Provisions - Communications

Part 1 – General / Design Requirements

TBD.

Part 2 – Product Requirements

A. All data cable shall Cat 6A
B. Telephone backboards shall be ¾" A-C grade, void-free and fire-rated plywood.
C. All fiber optical cable shall be Corning Single Mode with LC connectors.

Part 3 – Execution Requirements

A. All data cable shall be installed in a raceway, cable tray, or j-hooks that meet NEC requirements.
B. Minimum size raceway for Data is 1"
C. All low voltage cabling for all low voltage systems other than life safety/fire alarm will be blue in color. Life safety/fire alarm will remain red.
D. Data runs shall not exceed industry standard requirements, if the distances are in excess of standard, corrective action to remedy the situation will be required at no cost to CVG.
E. Data runs shall not change directions in a j-box. All directional changes shall be made in the raceway.
F. All telephone plywood backboards shall be installed with C side against wall. The plywood shall be painted on all sides with at least one coat of flat white fire-resistant (intumescent) paint. Securely fasten plywood to wall-frame.
G. Any communications equipment outside of the immediate lease space, such as in equipment room, telephone room, IDF, on roof, etc., shall be clearly marked with the equipment usage, tenant owner.
H. Permits for low voltage wiring shall include the following.
    1. Electrical permits are required for raceways enclosing low voltage (telephone, television cable, data cable) wiring.
    2. Any request for an exception to permitting requirements must be accompanied by a letter from the AHJ stating a permit is not required.

End of Section

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Distributed Antenna Systems (DAS)

Part 1 – General / Design Requirements

A. Any DAS system and associated components must operate as vendor-neutral, and support enhanced wireless communications services across all available wireless communications services carriers (AT&T, Verizon, T-Mobile, etc.).

Part 2 – Product Requirements

A. Current DAS system contract has been awarded to American Tower (ATC). All equipment related to the DAS system shall be compatible with the equipment and design provided and supported by the existing contract.

Part 3 – Execution Requirements

A. System must distribute commercial wireless voice and data services to the public by means of Federal Communications Commission (FCC) licensed frequencies.
B. System shall be operated and be available on a continuous and uninterrupted basis seven days a week, twenty-four hours a day.

End of Section

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Public Wi-Fi

Part 1 – General / Design Requirements

TBD.

Part 2 – Product Requirements

A. Current Public Wi-Fi contract has been awarded to AltaFiber; all additional equipment required shall be compatible with the equipment and design provided and supported by the existing contract.

Part 3 – Execution Requirements

TBD.

End of Section

Private Wi-Fi

Part 1 – General / Design Requirements

TBD.

Part 2 – Product Requirements

A. CVG Standard equipment for Private Wi-Fi are Ruckus Access Points and vSmartZone controllers. CVG IT manages and maintains this equipment and will determine placement internally.

Part 3 – Execution Requirements

TBD.

End of Section

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Information Display System Requirements (BIDS, FIDS, GIDS)

Part 1 – General / Design Requirements

TBD.

Part 2 – Product Requirements

A. All information displays shall be 49” UHD IPS panels, with a minimum of 3 HDMI IN, RJ$% LAN IN, powered via direction NEMA 5-25p cable and requiring no alternate transformer of power supply.
B. Mounting Systems shall be standard VESA mount compatible.
C. No third-Party software or proprietary systems are to be used.
D. All information display units shall support website information feeds via System-On-a-CHIP features: CVG’s preference is LG units with WebOS 6 SOC.
E. Ticket counter backwall displays shall provide infrastructure to support future needs of display technology that will be mounted at 48’ AFF and minimum height of 48” tall
F. Continuous display monitors above baggage belt at ticketing counters are preferred.
G. Suggested Manufacturers for Display systems:
    1. Nanolumens
    2. Daktronics
    3. Toshiba
    4. Samsung
    5. LG

Part 3 – Execution Requirements

TBD.

End of Section

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Emergency Visual Paging

Part 1 – General / Design Requirements

TBD.

Part 2 – Product Requirements

A. Current Emergency Visual Paging is contracted with Art of Context and delivered via the Information Display System.

Part 3 – Execution Requirements

TBD.

End of Section

CINCINNATI/NORTHERN KENTUCKY INTERNATIONAL AIRPORT

Paging System

Part 1 – General / Design Requirements

A. The current paging system (in 2024) consists of a management server, dedicated network, AtlasIED Globalcom Control KOM vACS (primary and lifeline), QSC QSYS cores, microphone stations, and speakers.
B. Currently vACS are installed in the Main Terminal, Concourse A and Concourse B, while the QSYS cores are at the fire stations.
C. The goal of the new system is to replace components with new. This would eliminate the physically separated paging network, consolidation of the AtlasIED and QSYS components, and install a secure, monitored, and monitored paging/public announcement system.

Part 2 – Product Requirements

A. Product shall include the following:
   1. Cloud hosted.
   2. Included with multi-language.
   3. Volume control, but master control and zone control
   4. Integration with AODB (with feed provided by CVG's contractor)
   5. Manual and automated announcement functionality including:
      a. Test to speech.
      b. PA override
      c. Controllable by airline staff
      d. Waterfall capability for full automation
   6. Dashboard for system oversight and performance monitoring
   7. Integration with current airport PA for expansions related to phasing.
   8. Included with integration related to AtlasIED and Collins common use system.
   9. Customizable
   10. Multi-carrier equipped.
   11. Expandable to include integration with safety announcements and alarms/airport dispatch system.

Part 3 – Execution Requirements

A. Contractor and manufacturer must provide a Cyber Security plan and design that protects the system from an evolving threat.

End of Section

End of Division 27 – Communications

Division 28 – Electronic Safety and Security

Section 28 10 00 – Access Control Systems

Part 1 – General / Design Requirements

A. Only the CVG facilities department can connect devise into the CVG existing security card access system for doors and gates that are penetrations into the secured area. Coordinate all connections with CVG facilities department.
B. Matrix installation process requires approval by CVG subject matter expert.

Part 2 – Product Requirements

A. Matrix Keypad Card Reader – Model MX2
    1. Power Requirements: 12VDC powered from its associated controller, including its standby power source. Shall not dissipate more than 5W.
B. Matrix Enclosure
    1. Suitable for surface, semi flush, pedestal or weatherproof surface mounted. Mounting types shall additionally be suitable for installations in the following areas.

I. Indoors, controlled environment
II. Indoors, uncontrolled environment
III. Outdoors

C. Matrix Display
    1. 32 Character, LED backlit liquid crystal display. Indicate whether user passage requests have been accepted or rejected, and whether the door is locked or unlocked.
D. Keypad and Mag-stripe Readers
    1. Each card reader has high-impact, ABS plastic construction, a sealed membrane keypad, a built-in tamper switch, and high-security mounting screws with a 2-gang switchbox mounting.
E. Electric Mortise Locks
    1. Shall be installed within the door and an electric transfer hinge shall be utilized to allow the wires to be transferred from the door frame to the lock. If utilized with a double door then the lock shall be installed inside the active leaf.
F. Electromagnetic Locks
    1. These locks shall be without mechanical linkage utilizing no moving parts and securing the door to its frame solely on electromagnetic force.
    2. Shall be comprised of two pieces, the maglock, and the door plate. The maglock shall be surface mounted to the door frame and the door plate shall be surface mounted to the door.
    3. Electromagnetic locks shall meet the following minimum technical characteristics:
        a. Operating Voltage: 24DC
        b. Current Draw: 5A
        c. Holding Force

1) Swing Doors: 1500lbs.
2) Sliding Doors: 1500lbs

d. Must include a door position switch.
e. Power supplies shall be UL rated and adequately power two entry control devices on a continuous base without failure.
f. Shall meet the following requirements:
   1) Input Power: 110VAC
   2) Output Voltage: 12VDC Nominal (13.8VDC); 24VDC Nominal (27.6VDC Filtered and Regulated
   3) Battery: Dependent on Output Voltage shall provide up to 14Ah
   4) Output Current: 10-amp max @ 13.8VDC or 5-amp max @ 27.6VDC.

Part 3 – Execution Requirements

A. All low voltage cabling for all low voltage systems other than life safety/fire alarm will be blue in color. Life safety/fire alarm will remain red.
B. Any communications equipment outside of the immediate lease space, such as in equipment room, telephone room, IDF, on roof, etc., shall be clearly marked with the equipment usage, tenant owner.
C. Permits for low voltage wiring shall include the following.
   1. Electrical permits are required for raceways enclosing low voltage (telephone, television cable, data cable, access control, CCTV, etc.) wiring.
   2. Any request for an exception to permitting requirements must be accompanied by a letter from the AHJ stating a permit is not required.

End of Section

Section 28 20 00 – Video Surveillance Systems

Part 1 – General / Design Requirements

A. Only the CVG Information Technology Department and/or Facilities Department can connect devices to the CVG's security surveillance system. Any installation of camera equipment or recording equipment, either independent of, or to be added to the CVG's security surveillance system, must be approved by the CVG Operations Division. Coordinate all closely with CVG facilities department prior to design completion.

Part 2 – Product Requirements

None.

Part 3 – Execution Requirements

A. All low voltage cabling for all low voltage systems other than life safety/fire alarm will be blue in color. Life safety/fire alarm will remain red.
B. Any communications equipment outside of the immediate lease space, such as in equipment room, telephone room, IDF, on roof, etc., shall be clearly marked with the equipment usage, tenant owner.
C. Permits for low voltage wiring shall include the following.
    1. Electrical permits are required for raceways enclosing low voltage (telephone, television cable, data cable, access control, CCTV, etc.) wiring.
    2. Any request for an exception to permitting requirements must be accompanied by a letter from the AHJ stating a permit is not required.
D. Include all conduits, raceway, cameras, and cabling.
E. Coordinate plans with CVG's information technology department to determine the demarcation point and specific requirements pertaining to labeling of fiber feeds.

End of Section

Section 28 31 00 – Intrusion Detection Systems

Part 1 – General / Design Requirements

A. Upon review with the CVG security team, it may be determined that a Perimeter Intrusion Detection system (PIDS) is required. This will be determined on a case-by-case basis dependent upon the tenant's security program. Coordinate whether this system is required with CVG facilities department prior to design completion.

Part 2 – Product Requirements

A. If required for a single-taxiway connector with tower-to-tower distance of 660' or less, the tenant shall purchase and install:
   1. (4) TAKEX PB-200HF-KH Unit Photoelectric Beam Sensors
   2. (4) TAKEX TAD-150 Tower Enclosures
   3. (2) Concrete pads with masonry black wall on three sides with 120V circuit at each pad.
      a. Requires a weatherproof enclosure for 12-24V power supplies
   4. At the tenants building, the tenant shall purchase and install
      a. Matrix RDP with (1) RCM
      b. Matric MX2 badge reader to acknowledge the PID Alarm
      c. (8) Conductors (sizing determined by distance) from the pad with the receivers to the Matrix PDP, use Matrix cable.
      d. An audible alarm (the type will be determined by location) that can be heard with the PIDS is activated.
      e. Altronix 6062 Timers.

Part 3 – Execution Requirements

A. All low voltage cabling for all low voltage systems other than life safety/fire alarm will be blue in color. Life safety/fire alarm will remain red.
B. Any communications equipment outside of the immediate lease space, such as in equipment room, telephone room, IDF, on roof, etc., shall be clearly marked with the equipment usage, tenant owner.
C. Permits for low voltage wiring shall include the following.
   1. Electrical permits are required for raceways enclosing low voltage (telephone, television cable, data cable, access control, CCTV, etc.) wiring.
   2. Any request for an exception to permitting requirements must be accompanied by a letter from the AHJ stating a permit is not required.

End of Section

Section 28 46 13 – Addressable Fire Alarm Systems

Part 1 – General / Design Requirements

A. Additions and alterations to fire alarm systems and any other systems that are interconnected to it shall use components and devices manufactured by the same supplier of the building system within an Airport-maintained building to ensure compatible connections and integrity of the system in accordance with the National Fire Code.

Part 2 – Product Requirements

A. Fire Alarm Controls – Honeywell
   1. XLS3000 Intelligent Fire Alarm Control panel
      a. Exception for Smaller Buildings: XLS140-2 Intelligent Fire Alarm Control Panel
   2. XLS-DVC Digital Voice Command (only when Voice Evacuation System is required)

B. Intelligent Sensors and Modules – Honeywell
   1. B210LP – Low profile based for smoke and heat sensors.
   2. TC806B1076 – (photo electric) Analog Smoke Sensor, Addressable, Ceiling Mounted
   3. TC807B1059 – (ionization) Analog Smoke Sensor, Addressable, Ceiling Mounted.
   4. TC808B1041 - (thermal) 135dF Analog Heat Sensor, Addressable, Ceiling Mounted
   5. TC808B1066 - (thermal) 190dF Analog Heat Sensor, Addressable, Ceiling Mounted
   6. DNR(A) - Addressable Duct Smoke Detector Housing
   7. TC806DNR(CDN) (photo-electric) Analog Duct Smoke Sensor, Addressable, Duct Mounted
   8. RTS151 - Remote Test Station for Addressable Duct Smoke Sensors
   9. TC809A1059 - Addressable Monitor Module for Sprinkler System Switches and Kitchen Extinguishing Systems
   10. TC809B1008 - Addressable Mini Monitor Module for Fire Pull Stations
   11. TC810R1024 - Addressable Relay Control Module for HVAC Shutdown, Secured Door Overrides, Fire Door Holders, etc...
   12. TC810N1013 - Addressable Supervised Output Control Module

C. Non-intelligent Heat Detectors for Pre-action Sprinkler Systems and Weatherproof/Indoor and Outdoor Applications – Thermotech
   1. 302-ET-135 Fixed Temperature, Restorable, 135dF
   2. 302-ET-194 Fixed Temperature, Restorable, 194dF

D. Fire Pull Stations – Reliable Security Group (RSG, Inc)
   1. RMS-1T-KL (with CAT30 key lock)

E. Fire Pull Stations for Weatherproof/Outdoor Applications – Honeywell
   1. S464F1008WP

F. Sprinkler Systems Monitoring – Potter Electric
   1. VSR-S Water flow Indicator Switch (vane type)
   2. PS10-2A Waterflow Indicator Switch (pressure type)
   3. PS40-2 High/Low Air Pressure Indicator Switch
   4. OSYSU-2 Valve Supervisory Switch
   5. PCVS-2 Valve Supervisory Switch

6. RTS-O Room Temperature Switch

G. Notification Appliances for EVAC Systems – Edwards Signaling Technologies Genesis
   1. EG4SVWF - 25vrms Speaker with 15-110cd Strobe Light with White Grill and Wall Mounted.
   2. GCHFWF-S2VM - 25vrms Speaker with 15-95cd Strobe Light with White Grill and Ceiling Mounted.
      a. (Use permitted only in areas with insufficient wall space as determined by KCAB)
   3. GCHFWF-S2VMH - 25vrms Speaker with 95-177cd Strobe Light with White Grill and Ceiling Mounted.
      a. (Use permitted only in areas with insufficient wall space as determined by KCAB)

H. Notification Appliances – Edwards Signaling Technologies Genesis
   1. EG1-HDVM Temporal Tone Horn with 15 to 110cd Strobe Light with White Grill and Wall Mounted with EG1T-FIRE White Two-gang Plate marked “Fire”
   2. EG1-VM 15 to 110cd Strobe Light with White Grill and Wall Mounted with EG1T-FIRE White Two-gang Trim Plate marked "FIRE".
   3. WG4WF-HVMC Temporal Tone Horn with 15-87cd Strobe Light with White Grill and Wall or Ceiling Mounted marked “Fire” for Weatherproof/Outdoor Locations.
   4. WG4WF-HVMHC Temporal Tone Horn with 102-161cd Strobe Light with White Grill and Wall or Ceiling Mounted marked “Fire” for Weatherproof/Outdoor Locations.
   5. EGCF-HDVMH Temporal Tone Horn with 95 to 177cd Strobe Light with White Grill and Ceiling Mounted.
   6. (Use permitted only in areas with insufficient wall space as determined by KCAB)
   7. Note: The white colored models show in items a through e above can be substituted with red colored models in order to color match existing devices in a building. The following Genesis models for items f and g would apply:
   8. EG1R-HDVM Temporal Tone Horn with 15 to 110cd Strobe Light with Red Grill and Wall Mounted with EG1RT-FIRE Red Two-gang Trim Plate marked "FIRE".
   9. EG1R-VM 15 to 110cd Strobe Light with Red Grill and Wall Mounted with EG1RT-FIRE Red Two-gang Trim Plate marked "FIRE".
   10. 116DEGEX-FJ – Explosionproof & weatherproof Strobe Light, ceiling (125cd) or wall (60cd) mounted with wall and/or ceiling mounting modules.
   11. 889D-AW – Explosionproof horn, wall mounted, red.

I. Distributed Strobe Power Supply – Silent Knight
   1. SK-5499

J. Auxiliary Power Supply – Honeywell
   1. HP600ULM

K. Caron Monoxide Sensor – RKI Industries
   1. Beacon -110, 0-300ppm Sensor for Garages, Tunnels and Boiler Rooms

L. Refrigerant Gas Leak Sensor Manufacturer – Thema Gas
   1. 131-113+ACL Halo guard R-22 0-1000ppm Sensor for Chiller Room
   2. 141-113+ACL Halo guard R-134a 0-1000ppm Sensor for Chiller Room
   3. 171-113+ACLT Halo guard R-123 0-1000ppm Sensor for Chiller Room

M. Flame Detector – Honeywell

1. Fire Sentry FS24X with SM4 Swivel Mount

N. Wire Requirements – Honeywell, Paige Electric or Equivalent
   1. Intelligent (AE)Loop: Red/Yellow # 16 Honeywell part # AK3712R or Paige Electric 443712R or Equivalent.
   2. Evacuation System Class B Audio Circuits: Brown/Yellow # 16 Honeywell part # AK3712B or Paige Electric 443712B or Equivalent.
   3. Horn or Strobe light Class B Circuits: White/Black # 16 Honeywell part # AK3712BW or Paige Electric 443712W or Equivalent.
   4. DC Power or Class B Initiation Circuits: Red/Black # 16 Honeywell part # AK3712BR or Paige Electric 443712BB or Equivalent.

Part 3 – Execution Requirements

A. Fire alarm system design and equipment data proposed shall be submitted to the P&D Office and the ICCC for review. The submittals shall include equipment lists, manufacturer specification data, brochure cuts of system components including the make and model number, fire alarm panels, all detection devices, and all alarm supervisory and transmitting devices, etc.
B. Drawings and specifications indicating the layout of the fire alarm system and devices, including single-line diagrams, sequence of operation and connections to Airport-maintained systems, etc. shall be reviewed by the P&D Office before starting any installations.
C. All low voltage cabling for all life safety/fire alarm systems shall be red.
D. Minimum 16 awg, solid, twisted pair, non-jacketed wiring in conduit is required for all fire alarm wiring.
E. All conduits for fire alarm shall be ¾" EMT painted red and all junction box covers are to be a minimum 4"x4" x 2 1/8" deep. Junction box and cover to be painted red.
F. All new building fire alarm systems are to be tied into the existing Honeywell EBI network through fiber optic communication pathways.
G. HVAC systems must be tied into the Biohazard Shutdown System utilizing a control module (Honeywell part #TC810R1024) as is typical through the airport.
H. Permits are required for fire warning system wiring. Electrical permits are required for all systems and wiring related to the fire alarm system.
I. Any communications equipment outside of the immediate lease space, such as in equipment room, telephone room, IDF, on roof, etc., shall be clearly marked with the equipment usage, tenant owner.
J. A verification report is to be issued upon successful completion of the verification. The report is not to be issued to the P&D Office and the Airport Project Manager until the system is clear of all deficiencies. The report is to be signed by the supervising technician.
K. The installing Contractor is to issue a certificate (or letter) stating that they installed the system (materials and methods) in accordance with the applicable requirements, and in accordance with the applicable Electrical Code.
L. The System Design Engineer shall provide periodic inspections and final site review and shall provide a letter confirming that the installation has been completed in general conformance with the Construction Documents.

M. Where the Boone County Building Department has approved a phased occupancy/use, all devices within the specified phase are required to be verified in accordance with all applicable codes and regulations, prior to issuance of an Occupancy/Use Permit. Upon completion of all subsequent phases, the entire fire alarm work within all phases is required to be re-verified in accordance with all applicable codes and regulations.
N. Permits for low voltage wiring shall include the following.
   1. Electrical permits are required for raceways enclosing low voltage (telephone, television cable, data cable, access control, CCTV, etc.) wiring.
   2. Any request for an exception to permitting requirements must be accompanied by a letter from the AHJ stating a permit is not required.
O. Verification—New Systems
   1. New fire alarm systems shall be tested in coordination with the Airport Fire Department to ensure the system is in conformance with the current standards ensure satisfactory operation after completed.
P. Verification—Modifications to Existing Systems
   1. Prior to commencement of any fire alarm work, the existing fire alarm system, within the Place of Work, is required to be reviewed by a Professional Engineer to determine the existing condition, design basis and scope of the Work.
   2. Modifications to fire alarm systems shall be tested in conformance with the applicable requirements of all applicable codes, laws, and standards to ensure satisfactory operation.
   3. An operational test of all devices connected to the affected data communication link shall be performed or, in lieu of this operational test, a comparison of the “before” and “after” software utilizing mediums such as a printout or compare programs to confirm the correct sequence may be considered. A comparison must be accompanied by a letter of explanation from the Engineer of Record for the project.

End of Section

End of Division 28 – Electronic Safety and Security

Division 32 – Exterior Improvements

Section 32 12 16 – Asphalt Paving

Part 1 – General / Design Requirements

TBD.

Part 2 – Product Requirements

TBD.

Part 3 – Execution Requirements

TBD.

End of Section

Section 32 31 13 – Chain Link Fences and Gates

Part 1 – General / Design Requirements

AOA Fence:

A. Any permanent perimeter / security fences to be constructed and connected to the existing perimeter / security fence shall be approved by the Airport Security Coordinator via the Planning & Development Project Manager.
B. KCAB Standards Fence Details are used in conjunction with FAA Standards Drawings F163 (Appendix item 323113-A F163 Wildlife Deterrent Fence Details) & F164 (Appendix item 323113-B F164 Wildlife Exclusion Fence Details) to create the perimeter / security fence requirements for safety and wildlife deterrence.
C. In no case shall wooden posts or woven wire fence be allowed for the construction of the AOA fences. CVG requires fencing near terminals, concourses, tenant buildings and other various structures to be 10-feet tall with 6-strand barb wire in a “V” shape. Upon review and approval by the Airport Security Coordinator, designated remote areas of the airport may be 7-feet tall with 6-strand bard wire, in a “V” shape.
D. In situations where the existing adjoining fences line does not meet this height requirement, the Airport Security Coordinator may approve an alternative design which must be submitted and approval prior to installation.
E. AOA Access Gates:
    1. The Tenant’s contractor shall not remove any existing security fence until all new secure doors, fences and/or gates, if applicable, are inspected and approved by CVG Security.
    2. All gates that provide access to the secure areas of the CVG are considered ULD 325, Class IV and shall be constructed per Door & Access Systems Manufacturers Association International, Technical Data Sheets, including 353 & 370, or current.

Part 2 – Product Requirements

A. Basis-of-Design Operator: Lift Master SL595UL**.**
B. Model “T” for a standard door height.
C. Model “J” (HIGH LIFT) for a door height up to 144 sq feet.
D. Model “GH” for a door height of 144 sq feet or taller.
    1. Chain drive.

Part 3 – Execution Requirements

TBD.

End of Section

Section 32 92 00 – Turfs and Grasses

Part 1 – General / Design Requirements

A. Where grade exceeds 4%, turf and grasses and areas where these are not recommended to be installed. The use of stone or gravel shall be allowed.
B. Concrete continuous curbs shall be designed so that 6-foot curb cuts occur every 500 linear feet, to provide access to mowing equipment.

Part 2 – Product Requirements

A. Grass Seed Mix on CVG property within the CVG Operations Area:
    1. 80% Kentucky 31 Tall Fescue, with endophyte (Festuca arundinacea).
    2. 20% Italian Ryegrass (Lolium multiflorum).
        a. No other form of ryegrass may be used.
    3. The application tolerance may fluctuate up to, but no more than 5%. Any other mixtures should be approved by CVG Project Manager and USDA representative.
B. Grass Seed Mix on CVG property outside of the CVG Operations Area:
    1. Tall Fescue composed of the following (at a minimum):
        a. 27.84% Rhambler 2 Tall Fescue.
        b. 27.70% Sungrazer Tall Fescue.
        c. 23.39% Reunion Tall Fescue.
        d. 19.49% Prosport 4 Perennial Ryegrass.
C. Commercial Fertilizer.

Part 3 – Execution Requirements

A. Grass seed should be applied through hydro seeding, drilling, or as sod.
    1. The preferred method of seeding is drill seeding covered with hydro seed.
B. Loose mulching (straw, peat, etc.) is strictly prohibited.
C. Initial Fertilizer: Commercial fertilizer applied according to manufacturer's recommendations.

End of Section

Section 32 93 00 – Plants

Part 1 – General / Design Requirements

A. Landscape installations for non-aviation development will be subject to Boone County Planning and Zoning requirements and may require special approval from both Boone County and CVG.

B. Avoid planting trees in a manner that would attract wildlife to roosting areas for, specifically, European Starlings (Sturnus vulgaris). Large flocks of these birds are attracted to certain varieties and layouts of landscape in the fall and winter and pose a significant risk to aircraft flying in and out of CVG. Other species of concern are Canada geese (Branta canadensis) and mourning doves (Zenaida macroura). These species are specifically attracted to grass seed and ground cover. To provide a safe environment for passengers and aircraft the following guidelines should be used for all new planting of landscape, tree species and grass.
   1. Tree spacing is important in the preplanning process and is a great technique to reduce habitat for European starlings (Sturnus vulgaris) and other black birds. Blackbirds like to roost in areas with a “constant canopy.” This is easily avoided by planting trees at distances of the maximum width of the tree at twenty years, divided by two. For example, if a Red Maple (Acer rubrum) is expected to be 20 Ft. wide at 20 years, then the trees should be planted no less than 10 feet apart (Spread at 20 Years / 2). This spacing is not the same for trees that are to be planted next to structures. See item ‘3’ below.
   2. In line with spacing, “wind blocks” should also be taken into account when planting trees. Trees should not be planted in areas where the wind is significantly blocked on more than one side. Blackbirds will tend to roost in trees of any species when a significant wind block is present. Wind blocks can include structures, berms, fences, or any other significant object that provides protection to the trees from wind.
   3. The location of the tree species is almost as important as the species itself. Trees of any species planted adjacent to a building or structure can be very attractive to roosting blackbirds. Significant spacing between structures and any tree species should be taken into account when planting.

C. Fruit producing trees will not be permitted to be planted on KCAB property.

D. Nut and Seed producing trees should be planted in minimal numbers and should only be considered when other species are not suitable for a location.

E. Any species that do not appear on the approved plant list for the KCAB can be added if approved by the KCAB. A form will be provided with all required information for submitting a species for addition to the approved list. Once approved, the species will be added to the permanent list.

F. Any tree species that have been approved, planted, and begin to attract an unsafe amount of wildlife should be removed or replaced immediately.

Part 2 – Product Requirements

A. The following species of trees, plants, and shrubs are approved by KCAB:
   1. Large Shade Trees:

Red Maple	Acer rubrum
Katsuratree	Cercidiphyllum japonicum
Ginko (Maidenhair tree, male only)	Ginko biloba
Panicled Goldenraintree	Koelreuteria paniculata (Is considered by some to be an invasive species in Kenton County. See https://www.invasiveplantatlas.org/subject.html?sub=14083
Common Baldcypress	Taxodium distichum
Japanese Zelkova	Zelkova serrata
Dawn Redwood	Dawn Redwood
October Glory Red Maple	Acer rubrum 'October Glory'
Marshall's Seedless Green Ash	Fraxinus pennsylvanica 'Marshall's Seedless' Marshall Seedless Ash is susceptible to Emerald Ash Borer attack. See https://nfs.unl.edu/eab-faq
Tulip Poplar	Liriodendron tulipifera
Moraine Seedless Honey Locust	Gleditsia triacanthos var. 'Moraine Thornless'
Village Green Zelkova	Zelkova serrata 'Village Green'

2. Ornamental:

Trident Maple	Acer buergerianum
Amur Maple	Acer ginnala
Chinese Redbud	Cercis chinensis
Common Smoketree 'Velvet Cloak'	Cotinus coggygria
Eastern Redbud	Cercis canadensis
Glossy Abelia	Abelia x grandiflora 'Compacta'
Border Forsythia	Forsythia x intermedia 'Densiflora'
Smooth Hydrangea	Hydrangea arborescens
Panicle Hydrangea	Hydrangea paniculata 'Tardiva'
Showy Jasmine	Jasminum floridum
Dahurian Juniper	Juniperus davurica 'Parsonii'
Chastetree	Vitex negundo
Edward Goucher Abelia	Abelia x grandiflora 'Edward Goucher'
Parson's Juniper	Juniperus davur expansa
Sky Rocket Juniper	Juniperus scopulorum
Carissa Holly	Ilex cornuta 'Carrisa'
Chinese Pistache	Pistacia chinensis
Japanese Crape Myrtle	Lagerstroemia fauriei

3. Shrubs:

Part 3 – Execution Requirements

None.

End of Section

Section 32 00 00 – Underground Storage Tanks

CVGAA desires to utilize above ground storage tanks whenever possible. If an above ground storage tank is not possible, the type and installation of the tank must meet all local codes, and standards.

Oil Water Separators

OWS should be designed based on areas where contamination will be generated. The treatment area should include any areas where contamination can occur through accidental spills of oils, greases, fuels, or other petroleum hydrocarbon products onto the ground may occur.

The OWS size and location should be selected utilizing the treatment flow rate, Potential spill capacity, and applicable codes and regulations.

End of Section

End of Division 32 – Exterior Improvements

Appendix

Item	Title
00	New Facility Fire Safety Information Packet
093013-A	ASTM D5957-98(2013): Standard Guide for Flood Testing Horizontal Waterproofing Installations
093013-B	Hydro Ban Data Sheet
104116-A	Knox Box Order Form
323113-A	F163 Wildlife Deterrent Fence Details
323113-B	F164 Wildlife Exclusion Fence Details
	Airport Identification and Labeling Standards example
	Architectural column covers CVG column Wrap Information
	Standard Guide for Flood Testing Horizontal Waterproofing Installation
	Architectural Acoustics Design Criteria
017300	AKYSNGZ Horz&Vert Control Plan Active

Appendix 1 New Facility Fire Safety Information Packet

Cincinnati/Northern Kentucky International Airport Fire Department

New Facility Fire/Safety Information Packet

Cincinnati/Northern Kentucky International Airport Fire Department

NEW FACILITY SPECIFICATIONS

Listed in this document are the specifications and safety requirements for new or rehab construction for the Cincinnati/Northern Kentucky International Airport Fire Department

Hydrant Specifications

Hydrant Placement

- Every 300 feet and within 30 feet of the Fire Department Connection (FDC) for the building.
- Depth of Bury – Four Feet
- Bolt Pattern – 3 Bolt
- Exterior Finish – Red Alkyd – Gloss Enamel on Bonnet, Caps and Barrel
- M & H Fire Hydrant Style 129/ Above ground
- M & H Fire Hydrant Style 229/ Below ground
  - Operating Nut – Right Clockwise, 1" Square Tapered
  - Drain Holes Plugged
  - Opening Sizes – 2 – 2-1/2" and 1 – 4-1/2"
  - Thread Style – Cincinnati Combo Threads on 2-1/2 inch outlets, National Standard on 4-1/2 outlet
- Contact: M & H Valve Company
  - (256) 237-3521
  - mh-valve.com
- Hydrants should be visible and have a unobstructed 3'6" radius from center of Hydrant

Hydra-Storz Adapter

- A 5" Hydra-Storz adapter will be installed on each hydrant. This is a self-closing butterfly valve assembly with a protective cap.
  - Adapter Part Number HYST-5.0-4.5 NH-NS
  - Hydra-Snap Protective Cap
- Contact: Hydra-Shield Manufacturing

- (800)676-0911
- hydra-shield.com
- sales@hydra-shield.com

Fire Department Connection

- An aluminum 30 degree, 5" Storz connection will be installed on every Fire Department Connection. The connection should be 36in to 42in above level ground.

Knox Box

- A Knox Box Security Key box shall be installed at the main entrance of each main facility (# 3270 or # 3265). Contact the Airport Fire Department for an authorization letter or visit knoxbox.com and select Cincinnati/No KY Intl Airport Fire Dept. From here you can select your product and the fire department will approve the purchase via an online portal.

Airport Fire Alarm System Specification

- The Airport has a Proprietary Fire Alarm Monitoring and Control System manufactured by Honeywell. If new construction intends to have monitoring performed by the Airport AOC, the fire alarm and evacuation systems must be compatible with the existing Honeywell Proprietary System and provide identical operational characteristics and hardware as typically used throughout the airport. If a non-Honeywell system is to be installed, the monitoring company used must be set up to call the Airport AOC. This will be tested prior to final inspection.

Fire Lanes

- Fire lanes should be constructed and approved by the Airport Fire Department. Follow NFPA 1 (3-5).

Flammable Liquids

- All flammable liquid tanks used on the job sites must be contained in a pan or properly diked to hold the full contents of the tank. Also, tanks must be

placarded on all four sides for proper identification (NFPA 30, 2-9, 2-3.3.2)

Hood System

- Any facility operating a hood system must have that system inspected and cleaned at a minimum quarterly by an outside contractor. Filters will be cleaned as needed, which may require daily cleaning by tenant personnel. The fire department will inspect hood systems on a frequent basis. Facilities containing hood-extinguishing systems shall be tested and tagged annually by an outside contractor. Any cleaning or testing of hood systems that may affect the fire alarm system will need to be coordinated with the fire department and then performed after normal business hours.

Fire Extinguisher

- Each facility shall be equipped with a minimum of a 5-pound ABC extinguisher that is tested and tagged on an annual basis by an outside contractor. Any facility containing a kitchen shall be equipped with a Class "K" extinguisher.

Other

- Any structural changes made to your facility after the initial construction must be approved by the Planning and Development Department of the Cincinnati/Northern Kentucky International Airport (this includes adding doors, removing walls, changing electric, etc.).

- During demolition, all items that could create a future hazard will be removed (such as old steel studs, ceiling wires, support systems, etc.).

- No internal combustion engine equipment use within airport buildings, such as cut-off saws, tampers, etc.

- All storage must be kept a minimum of 36 inches from electric panels and 18 inches from the ceiling (24 inches from the ceiling in non-sprinkled areas).

- Call the Airport Fire Department to obtain burn permits for any type of welding, cutting, grinding, or open burning. You must contact the airport fire department ***24 hours in advance*** to obtain a burn permit. Also contact the Airport Fire Department prior to conducting any operations that create excessive amounts of dust to ensure that it will not affect the fire alarm system.

- For any confined space construction please follow standards set forth by the Kentucky Occupational Safety and Health Organization. This includes proper monitoring, ventilation, and use of self-contained breathing apparatus. Please submit a confined space plan to the Airport Fire Department prior to any confined space entry utilized during the construction process.

- All natural gas lines installed and/or maintained in buildings or spaces will be labeled and painted yellow.

- Please provide the Airport Fire Department with an evacuation plan and a set of construction blueprints within 7 days of your notice to proceed. Also submit proper plans and apply for permits through the Kentucky Housing, Building and Construction Department, and the local Boone County Building Department.

- Smoking is not permitted except in areas approved by the Airport Fire Chief.

- No propane tanks will be used for heating purposes. Only U.L. Listed heating devices shall be used for heating purposes.

- The Airport Fire Department is available 24 hours a day and provides Advanced Life Support, Basic Life Support, Fire Suppression and Fire Prevention Services.

Contact Numbers are:

Airport Fire Department	(859) 767-3112
Airport Police Department	(859) 767-3123
Emergencies:	911, 9-911, 767-3111, or 767-3123

Thanks for your cooperation,

Cincinnati/Northern Kentucky International
Airport Fire Department Inspection Bureau
(859) 767-3223.

Appendix 2 ASTM D5957-98(2013): Standard Guide for Flood Testing Horizontal Waterproofing Installations

ASTM D5957-98(2013): Standard Guide for Flood Testing Horizontal Waterproofing Installations

Scope: ASTM D5957-98(2013) illustrates a method for testing the water-tightness of waterproofing installations applied to horizontal surfaces having a slope of no greater than 20 mm/m (2% slope) (1/4" per ft).

Applicable Products: Applies for fully adhered or bonded sheet membranes, liquid or fluid applied membranes or loose laid sheet membranes of waterproofing installed on parking garages and plaza deck types over habitable spaces or on elevated structures. This standard is not intended for use on building roofing systems.

Test Procedure: Waterproofing membrane and flashings should be inspected and deficiencies repaired. Testing should occur prior to the installation of drainage layer, protection layer, pavers or overburden. If a protection layer is required for flood tested, the recommended practice is that a temporary protection layer be loose laid and removed prior to testing of the waterproofing system.

A containment assembly is constructed to be nondestructive, non-penetrating of the waterproofing installation and easily removable. Containment assemblies are composed of a sacrificial sheet or a polyethylene sheet adhered to the surface of the waterproofing membrane using a watertight seal (duct tape). Overflows are provided in the containment assemblies, when needed, at 5 inches above low point on the test surface so as not to exceed the structural capacity of the substrate. Water loss is monitored via tape marked in 1/8" increments or using other scale instrumentation in at least two locations. Test area is flooded with water to achieve a minimum cover of 1 inch but not exceed a maximum depth of 4 inches at the lowest point. Water height is maintained so as not to exceed a minimum level of 2 inches below the edge of flashings. Testing is performed for a minimum of 24 hours and maximum of 72 hours when rainfall is not forecasted to occur. If leakage is detected during the test period, water is immediately drained from the test area. The location of leakage is determined and appropriate repairs are made to the system in accordance with the system manufacturer's recommendation for procedures and materials. Following the completion of the repairs and curing of materials, the area is retested under the same conditions as the initial flood test.

End Result: Flood testing is considered to be completed if no leaks are identified to have occurred during the test period and the membrane and flashings are intact. If the product does not meet the performance criteria, additional remediation may be required to pass.

Appendix 3 - Hydro Ban Data Sheet

HYDRO BAN®

DS-663.0-0515

Globally Proven Construction Solutions

1. PRODUCT NAME
HYDRO BAN®

2. MANUFACTURER
LATICRETE International, Inc.
1 LATICRETE Park North
Bethany, CT 06524-3423 USA
Telephone: +1.203.393.0010, ext. 235
Toll Free: 1.800.243.4788, ext. 235
Fax: +1.203.393.1684
Internet: **www.laticrete.com**

3. PRODUCT DESCRIPTION
HYDRO BAN is a thin, load bearing waterproofing/crack isolation membrane that DOES NOT require the use of fabric in the field, coves or corners. HYRO BAN is a single component self-curing liquid rubber polymer that forms a flexible, seamless waterproofing membrane. HYDRO BAN bonds directly to a wide variety of substrates.

Uses
- Interior and exterior
- Swimming pools, fountains and water features
- Shower pans, stalls and tub surrounds
- Industrial, commercial and residential bathrooms and laundries
- Spas and hot tubs
- Kitchens and food processing areas
- Terraces and balconies over unoccupied spaces
- Countertops and facades
- Steam rooms (when used in conjunction with a vapor barrier)

Advantages
- Allow for flood testing in 2 hours at 70°F (21°C) or higher¥
- Does not require the use of fabric^
- Bonds directly to metal, PVC and ABS plumbing fixtures only
- Thin; only 0.020–0.030" (0.5–0.8 mm) thick when cured
- Changes in color from a light sage to an olive green when cured
- Anti-fracture protection of up to 1/8" (3 mm) over shrinkage and other non-structural cracks
- "Extra Heavy Service" rating per TCNA performance levels (RE: ASTM C627 Robinson Floor Test)
- Exceeds ANSI A118.10 and A118.12
- IAPMO approved
- Equipped with anti-microbial technology
- Rapid drying for a faster time to tile
- Lighter color for ease of inspection
- Safe—no solvents and non-flammable
- Install tile, brick and stone directly onto membrane

^ For gaps 1/8" (3 mm) or less see DS 663.5 for complete instructions
¥ Refer to cautions section for more information on curing

Suitable Substrates
- Concrete
- Concrete & Brick Masonry
- Cement Mortar Beds
- Cement Plaster
- Gypsum Wallboard*
- Exterior Glue Plywood*
- Ceramic Tile & Stone**
- Cement Terrazzo**
- Cement Backer Board***
- Poured Gypsum Underlayment†

* Interior applications only.
** If skim coated with a Latex Thin-Set Mortar.
***Consult cement backer board manufacturer for specific installation recommendations and to verify acceptability for exterior use.
† Interior use only. Follow TCNA Guidelines/ Methods: F200, RH111, RH122, F180

Packaging
Commercial Unit: 5 gal (18.9 L) pail liquid (36 commercial units/pallet)
Mini Unit: 4 x 1 gal (3.8 L) pails of liquid packed in a carton (30 cartons/pallet)

Approximate Coverage
Commercial Unit: 250 ft^2 (23.2 m^2)
Mini Unit: 50 ft^2 (4.6 m^2)

Shelf Life
Factory sealed containers of this product are guaranteed to be of first quality for two (2) years* if stored at temperatures >32°F (0°C) and <110°F (43°C).

Limitations

- DO NOT bond to OSB, particle board, interior glue plywood, luan, Masonite® or hardwood surfaces.
- Adhesives/mastics, mortars and grouts for ceramic tile, pavers, brick and stone are not replacements for waterproofing membranes. When a waterproofing membrane is required, use HYDRO BAN®.
- Do not use as a primary roofing membrane over occupied space. For more information in installation of tile over wood decks, or, over occupied or finished spaces please refer to TDS 157 "Exterior Installation of Tile and Stone Over Occupied Space."
- Do not use over dynamic expansion joints, structural cracks or cracks with vertical differential movement (See HYDRO BAN Installation Instructions, DS 663.5 for complete instructions).
- The installation of Waterproofing Membranes in submerged applications must be installed in a manner that creates a continuous "waterproof pan effect" without voids or interruptions. Therefore, applying waterproofing membranes in limited areas (e.g. solely at the waterline) in submerged applications is not recommended.
- Do not use over cracks >1/8" (3 mm) in width.
- Do not use as a vapor barrier (especially in steam rooms).
- Do not expose unprotected membrane to sun or weather for more than 30 days.
- Do not expose to negative hydrostatic pressure, excessive vapor transmission, rubber solvents or ketones.
- Must be covered with ceramic tile, stone, brick, dry pack thick bed mortar beds, terrazzo or other traffic-bearing finish. Use protection board for temporary cover.
- Obtain approval by local building code authority before using product in shower pan applications.
- Do not install directly over single layer wood floors, plywood tubs/showers/fountains or similar constructs.
- Not for use beneath cement or other plaster finishes. Consult with plaster manufacturer for their recommendations when waterproofing membrane is required under plaster finishes.
- Not for use under self-leveling underlayments or decorative wear surfaces.

Note: Surfaces must be structurally sound, stable and rigid enough to support ceramic/stone tile, thin brick and similar finishes. Substrate deflection under all live, dead and impact loads, including concentrated loads, must not exceed L/360 for thin bed ceramic tile/brick installations or L/480 for thin bed stone installations and L/600 for all exterior veneer applications where L=span length.

Cautions

Consult SDS for more safety information.

- Allow membrane to cure fully (typically 24 hours at 50°F – 69°F (10°C – 21°C) and 70% RH and 2 hours at 70°F (21°C) or higher and 50% RH before flood testing); flood test prior to applying tile or stone.
- Maximum amount of moisture in the concrete/mortar bed substrate should not exceed 5 lbs/1,000 ft² (283 µg/s m²)/ 24 hrs per ASTM F-1869 or 75% relative humidity as measured with moisture probes.
- During cold weather, protect finished work from traffic until fully cured.
- For white and light-colored marbles, use a white Latex Portland Cement Thin Set Mortar.
- For green and moisture sensitive marble, agglomerates and resin backed tile and stone use LATAPOXY® 300 Adhesive (refer to DS 633.0).
- Wet coat thickness is 0.015 to 0.022" (0.4 to 0.6 mm) per coat. Use a wet film thickness gauge to check thickness.
- Allow wet mortars to cure for 72 hours at 70°F (21°C) prior to installing HYDRO BAN. Allow HYDRO BAN a minimum 2 hours cure at 70°F (21°C) prior to flood testing in these conditions.
- Protect from exposure to traffic or water until fully cured.
- HYDRO BAN will go from a light sage green to a darker olive green when fully cured. The second coat should not be applied until the first coat is fully cured. All flood test times should be after the second coat is fully cured with no light sage areas showing.

4. TECHNICAL DATA

Approval

- ICC Evaluation Service Report ESR-2417
- IAPMO/Uniform Plumbing Code File No.3524
- Los Angeles Board of Building and Safety Commissioners File Number: M-070162
- City of Philadelphia Plumbing Advisory Board Case Number: 4624
- City of Tampa Construction Services Division

VOC/LEED Product Information

This product has been certified for Low Chemical Emissions (ULCOM/GG UL2818) under the UL GREENGUARD Certification Program. For Chemical Emissions. For Building Materials, Finishes and Furnishings (UL 2818 Standard) by UL Environment.

Applicable Standard

ANSI A118.10 and A118.12

Specifications are subject to change without notification. Technical data shown in LATICRETE product data sheets and technical data sheets are typical but reflect laboratory test procedures conducted in laboratory conditions. Actual field performance and test results will depend on installation methods and site conditions. Field test results will vary due to critical job site factors

Physical Properties

Physical Property	Test Method	HYDRO BAN®
7-day Hydrostatic Test	ANSI A118.10	Pass
7-day Breaking Strength	ANSI A118.10	265–300 psi (1.8–2.1 MPa)
7-day Water Immersion	ANSI A118.10	95–120 psi (0.7–0.8 MPa)
7-day Shear Bond	ANSI A118.10	200–275 psi (1.4–1.9 MPa)
28-day Shear Strength	ANSI A118.10	214–343 psi (1.5–2.3 MPa)
System Crack Resistance Test	ANSI A118.12.5.4	Pass (High)
Water Vapor Transmission	ASTM E 96–00^{E1} Procedure B	0.515 grains/h • ft^2 (0.3602 g/h • m^2)
Water Vapor Permeance	ASTM E 96–00^{E1} Procedure B	1.247 perms 71.21 (ng/Pa • s • m^2)
System Performance	ANSI A118.10; ASTM C627; TCA Rating	cycles 1–14 "Extra Heavy"
Potability of Water Applicable to Waterproofing Systems	NBR 12170:2009 (Technical Norm from Brazil)	Pass
Tensile Strength for Elongation		250%
Thickness (Dried)		20–30 mils (0.5–0.8 mm)

The data in the above table shall be used by the Project Design Professional to determine suitability, placement, building code conformance and over-all construct appropriateness of a given installation assembly.

Time to Tile

Substrate	Time to Tile (min.)****
Concrete	50
Cement Board	30
Fiber Cement Underlayment	15

****After second coat is applied at 70°F (21°C) and 50% RH. The time to tile will vary depending on substrate, temperature and relative humidity.

Working Properties

HYDRO BAN® can be applied using a paint brush, roller or trowel. All areas must have two coats to ensure waterproofing capabilities. When using a paint roller, substrate will not show through HYDRO BAN if coated with 0.020 – 0.030" (0.5 – 0.8 mm) of dried membrane. Color changes from a light sage to olive green **when fully cured.**

5. INSTALLATION

Refer to DS 663.5 for complete installation instructions prior to using product

Surface Preparation

Surface temperature must be 50 – 90°F (10 – 32°C) during application and for 24 hours after installation. All substrates must be structurally sound, clean and free of dirt, oil, grease, paint, laitance, efflorescence, concrete sealers or curing compounds. Make rough or uneven concrete smooth to a wood float or better finish with a underlayment. Do not level with asphalt based products. Maximum deviation in plane must not exceed 1/4" in 10 ft (6 mm in 3 m) with no more than 1/16" in 1 ft (1.5 mm in 0.3 m) variation between high spots. Dampen hot, dry surfaces and sweep off excess water—installation may be made on a damp surface. See DS 663.5 for information on installation over concrete.

1. Surfaces must be structurally sound, stable and rigid enough to support ceramic/stone tile, think brick and similar finishes. Installer must verify that deflection under all live, dead and impact loads of interior plywood floors does not exceed industry standards of L/360 for ceramic tile and brick or L/480 for stone installations and L/600 for all exterior veneer applications where L=span length.

2. Minimum construction for interior plywood floors.
   SUBFLOOR: 5/8" (15 mm) thick exterior glue plywood, either plain with all sheet edges blocked or tongue and groove, over bridged joints spaced 16" (400 mm) o.c. maximum; fasten plywood 6" (150 mm) o.c. along sheet ends and 8" (200 mm) o.c. along intermediate supports with 8d ring-shank, coated or hot dip galvanized nails (or screws); allow 1/8" (3 mm) between sheet ends and 1/4" (6 mm) between sheets edges; all sheet ends must be supported by a framing member; glue sheets to joints with construction adhesive.
   UNDERLAYMENT: 5/8" (15 mm) thick exterior glue plywood fastened 6" (150 mm) o.c. along sheet ends and 8" (200 mm) o.c. in the panel field (both directions) with 8d ring-shank, coated or hot dip galvanized nails (or screws); allow 1/8" (3 mm) to 1/4" (6 mm) between sheets and 1/4" (6 mm) between sheet edges and any abutting surfaces; offset underlayment joints from joints in subfloor and stagger joints between sheet ends; glue underlayment to subfloor with construction adhesive. Refer to Technical Data Sheet 152 “Bonding Ceramic Tile, Stone or Brick Over Wood Floors” for complete details.

Bonding to TCNA Compliant Poured Gypsum Underlayment

Poured gypsum-based underlayments must meet TCNA requirements for compressive strength and the performance requirements of ASTM C627 for the anticipated service level designated by the design professional. Poured gypsum underlayment thickness and application varies, consult the manufacturer for specific recommendations. The underlayment must be dry and properly cured following the manufacturer's recommendations to achieve a permanent installation. Surfaces to be covered must be clean, structurally sound and meet the maximum allowable deflection standard of L/360 for ceramic tile and L/480 for stone under total anticipated load. Expansion joints must be installed in accordance with ANSI/TCNA guidelines. Prime all surfaces to receive HYDRO BAN with properly applied manufacturer's sealer or with a primer coat of HYDRO BAN, consisting of 1 part HYDRO BAN, diluted with 4 parts clean, cool tap water. In a clean pail, mix at low speed to obtain a homogeneous solution. The primer can be brushed, rolled or sprayed to achieve an even coat. Apply the primer coat to the floor at a rate of 250 to 300 ft2/gallon (6.1 to 7.5 M2/L) of diluted HYDRO BAN. Allow the primer coat to dry completely (approximately 24 hrs., depending on substrate and air temperature and humidity). When dry apply two full coats of HYDRO BAN® to the primed area following the guidelines in this data sheet and DS 663.5 HYDRO BAN Installation Instructions.

Pre-Treat Cracks & Joints
Fill all substrate cracks, cold joints, and control joints to a smooth finish using a Latex Fortified Thin-Set. Alternatively, a liberal coat^^ of HYDRO BAN applied with a paint brush or trowel may be used to fill in non-structural joints and cracks. Apply a liberal coat^^ of HYDRO BAN approximately 8" (200 mm) wide over substrate cracks, cold joints, and control joints using a paint brush or roller (heavy napped roller cover). 6" (150 mm) Waterproofing/Anti-Fracture Fabric can be used to pretreat cracks, joints, curves, corners, drains and penetrations with HYDRO BAN.

Pre-Treat Coves and Floor/Wall Transitions
Fill all substrate coves and floor/wall transitions to a smooth finish and changes in plane using a latex fortified thin-set mortar. Alternatively, a liberal coat^^ of HYDRO BAN applied with a paint brush or trowel may be used to fill in cove joints and floor/wall transitions <1/8" (3 mm). Apply a liberal coat^^ of HYDRO BAN approximately 8" (200 mm) wide over substrate coves and floor/wall transitions using a paint brush or roller (heavy napped roller cover).

Pre-Treat Drains
Drains must be of the bonding flange or clamping ring type, with weepers and as per ASME A112.6.3. Apply a liberal coat^^ of HYDRO BAN Waterproofing Membrane liquid around and over the bonding flange or the bottom half of drain clamping ring. Cover with a second coat^^ of HYDRO BAN. When dry, apply a LATASIL™ bead where the HYDRO BAN meets the drain throat. Install top half of drain clamping ring.

Pre-Treat Penetrations
Allow for a minimum 1/8" (3 mm) space between drains, pipes, lights or other penetrations and surrounding ceramic tile, stone or brick. Pack any gaps around pipes, lights or other penetrations with a Latex fortified thin-set mortar. Apply a liberal coat^^ of HYDRO BAN liquid around penetration opening. Cover with a second coat^^ of HYDRO BAN. Bring HYDRO BAN up to level of tile or stone. When dry, seal flashing with LATASIL.

Crack Isolation (Partial Coverage) Crack suppression must be applied a minimum of 3 times the width of the tile or stone being installed. The tile installed over the crack cannot be in contact with the concrete.

Follow TCNA Method F125 for the treatment of hairline cracks, shrinkage cracks, and saw cut or control joints: Apply a liberal coat^^ of HYDRO BAN to a minimum of three (3) times the width of the tile using a paint roller or paint brush and allow to dry. After the first coat has dried to the touch, install a second liberal coat^^ of HYDRO BAN over the first coat.

As an alternative; Apply a liberal coat^^ of HYDRO BAN liquid, 3 times the width of the tile over the crack using a paint roller or paint brush and immediately apply the 6" (150mm) wide Waterproofing/Anti-Fracture Fabric into the wet liquid over the crack. Press firmly with brush or roller to allow complete “bleed through” of liquid. Immediately apply another liberal coat^^ of HYDRO BAN liquid over the fabric and allow to dry. When the first treatment has dried, apply a liberal coat^^ of HYDRO BAN to over the first wide coat, using a paint roller or paint brush, and allow to dry. Treat closest joint to the crack, saw cut, or cold joint in the tile or stone installation with LATASIL.

Main Application
Allow any pre-treated areas to dry to the touch. Apply a liberal coat^^ of HYDRO BAN with brush or roller over substrate including pre-treated areas. Apply another liberal coat^^ of HYDRO BAN over the first coat of HYDRO BAN. Let topcoat dry to the touch, approximately 1–2 hours at 70°F (21°C) and 50% RH. When last coat has dried to the touch, inspect final surface for pinholes, voids, thin spots or other defects. HYDRO BAN will dry to an olive green color when it's dry to touch. Use additional HYDRO BAN to seal defects.

Movement Joints
See HYDRO BAN Installation Instructions DS 663.5.

Note: Apply a liberal coat^^ of HYDRO BAN, approximately 8" (200 mm) wide over the areas. Then embed and loop the 6" (150 mm) wide Waterproofing/Anti-Fracture Fabric and allow to bleed through. Then top coat with a second coat^^ of HYDRO BAN.

Protection
Provide protection for newly installed membrane, even if covered with a thin bed ceramic tile, stone or brick installation, against exposure to rain or other water for a minimum of 2 hours at 70°F (21°C) and 50% RH.

Flood Testing
Allow membrane to cure fully before flood testing, typically 2 hours after final cure at 70°F (21°C) and 50% RH. Cold and/or wet conditions will require a longer curing time. For temperatures 50 – 69°F (10 – 21°C) allow 24 hours after final cure prior to flood testing.

Installing Finishes
Once HYDRO BAN has dried to the touch, ceramic tile, stone or brick may be installed by the thin bed method with a Latex Thin-Set Mortar. Allow HYDRO BAN to cure 2 hours at 70°F (21°C) and 50% RH before covering with, thick bed mortar, epoxy adhesives, terrazzo or moisture sensitive resilient or wood flooring. Do not use solvent-based adhesives directly on HYDRO BAN.

Drains & Penetrations
Use LATASIL and foam backer rod to seal space between drain or penetration and finish. Do not use a grout or joint filler mortar.

Control Joints
Ceramic tile, stone and brick installations must include sealant- filled joints over any control joints in the substrate. However, the sealant-filled joints can be offset horizontally by as much as one tile width from the substrate control joint location to coincide with the grout joint pattern.

Movement Joints
Ceramic tile, stone and thin brick installations must include expansion at coves, corners, other changes in substrate plane and over any expansion joints in the substrate. Expansion joints in ceramic tile, stone or brickwork are also required at perimeters, at restraining surfaces, at penetrations and at the intervals described in the Tile Council of North America, Inc. (TCNA) Handbook Installation Method EJ171. Use LATASIL and backer rod.

^^ Wet coat thickness is 15 – 22 mils (0.4 – 0.6 mm) consumption per coat is -0.01/gal/ft² (-0.4 ℓ/m²); coverage per coat is – 100 ft²/gal (-2.5m²/ℓ). Use wet film gauge to check thickness.

Spray Application of HYDRO BAN®
Follow all installation and surface preparation requirements outlined in this document and DS 663.5 and TDS 410.

The sprayer being used for the application of HYDRO BAN® should be capable of producing a maximum of 3300 psi (22.8 MPa) with a flow rate of 0.95 to 1.6 GPM (3.6 to 6.0 LPM) using a 0.521 or a 0.631 reversible tip. Keep the unit filled with HYDRO BAN to ensure continuous application of liquid. The hose length should not exceed 100' (30 m) in length and 3/8" (9 mm) in diameter.

Apply a continuous HYDRO BAN film with an overlapping spray^^. The wet film has a sage green appearance and dries to a darker olive green color. When the first coat has dried to a uniform olive green color, approximately 45 to 90 minutes at 70°F (21°C), visually inspect the coating for any voids or pinholes. Fill any defects with additional material and apply the second coat^^ at right angles to the first. The wet film thickness should be checked periodically using a wet film gauge. Each wet coat should be 0.015 – 0.022 inches (0.4 – 0.6 mm) thick. The combined dried coating should be 0.020 – 0.030 inches (0.5 – 0.8 mm) thick.

Check application thickness with a wet film gauge periodically as the HYDRO BAN is being dispensed to ensure that the appropriate thickness and coverage is achieved. Bounce back and overspray will consume more product. To achieve the required film thickness, the coating must be free from pinholes and air bubbles. Do not back roll the spray applied coating. Allow the HYDRO BAN to cure in accord with the instructions in this document, DS 663.5 and TDS 410 prior to the installation of the tile or stone finish.

It is important to note that areas not scheduled to receive the HYDRO BAN should be taped off and protected from any potential overspray. Expansion and movement joints should be honored and treated as outlined in this document, DS 663.5 and TDS 410.

^^ Wet coat thickness is 15 – 22 mils (0.4 – 0.6 mm) consumption per coat is -0.01/gal/ft² (-0.4 ℓ/m²); coverage per coat is – 100 ft²/gal (-2.5m²/ℓ). Use wet film gauge to check thickness.

Cleaning
While wet, HYDRO BAN can be washed from tools with water.

6. AVAILABILITY AND COST

Availability
LATICRETE® and LATAPOXY® materials are available worldwide.

For Distributor Information, Call:
Toll Free: 1.800.243.4788, ext. 235
Telephone: +1.203.393.0010
For on-line Distributor Information, visit LATICRETE at **www.laticrete.com.**

Cost
Contact a LATICRETE Distributor in your area.

7. WARRANTY

See 10. FILING SYSTEM.
DS 230.13: LATICRETE Product Warranty
A component of:
DS 230.05: LATICRETE 5 Year System Warranty (United States and Canada)
DS 230.15: LATICRETE 15 Year System Warranty for Steel or Wood Framed Exterior Facades (United States and Canada)
DS 025.0: LATICRETE 25 Year System Warranty (United States and Canada)
DS 230.99: LATICRETE Lifetime System Warranty (United States and Canada)

8. MAINTENANCE

Non-finish LATICRETE and LATAPOXY installation materials require no maintenance but installation performance and durability may depend on properly maintaining products supplied by other manufacturers.

9. TECHNICAL SERVICES

Technical Assistance
Information is available by calling the LATICRETE Technical Service Hotline:
Toll Free: 1.800.243.4788, ext. 235
Telephone: +1.203.393.0010, ext. 235
Fax: +1.203.393.1948

Technical and Safety Literature
To acquire technical and safety literature, please visit our website at **www.laticrete.com.**

10. FILING SYSTEM

Additional product information is available on our website at **www.laticrete.com**. The following is a list of related documents:
DS 230.13: LATICRETE Product Warranty
DS 230.05: LATICRETE 5 Year System Warranty (United States and Canada)
DS 230.15: LATICRETE 15 Year System Warranty for Steel or Wood Framed Exterior Facades (United States and Canada)
DS 025.0: LATICRETE 25 Year System Warranty (United States and Canada)
DS 230.99: LATICRETE Lifetime System Warranty (United States and Canada)
DS 633.0: LATAPOXY 300 Adhesive
DS 663.5: HYDRO BAN Installation Instructions
DS 6200.1: LATASIL™
TDS 152: "Bonding Ceramic Tile, Stone or Brick Over Wood Floors"
TDS 410: Spraying HYDRO BAN
TDS 157 "Exterior Installation of Tile and Stone Over Occupied Space."

LATICRETE International, Inc.
One LATICRETE Park North, Bethany, CT 06524-3423 USA • 1.800.243.4788 • +1.203.393.0010 • www.laticrete.com

Appendix 4 - Knox Box Order Form

Fire • EMS • Law Enforcement • Government

KNOX® AUTHORIZATION ORDER FORM

When seconds matter™

800.552.5669 • 623.687.2300 • Fax: 623.687.2290 • **knoxbox.com**

EFFECTIVE FEBRUARY 2020

20- 0017463

SECTION 1 ORDERED BY: ☐ CONTRACTOR ☐ PROPERTY OWNER ☐ GOVERNMENT | MILITARY

COMPANY / AGENCY

DATE ORDERED

STREET

SUITE / BUILDING

CITY, STATE, ZIP CODE

CONTACT NAME

P.O. NUMBER (GOV. AGENCIES ONLY)

PHONE NUMBER

E-MAIL ADDRESS

PRODUCT FOR: (Select one)

- ☐ Commercial Property
- ☐ Campus | Schools
- ☐ Government
- ☐ Hospitality | Hotels
- ☐ Military
- ☐ Healthcare
- ☐ Residential
- ☐ Other

SECTION 2 ORDER WILL NOT BE PROCESSED Without Authorized Signature

SIGNATURE REQUIRED 377

Cincinnati/No KY Intl Airport Fire Dept
PO Box 752000
Cincinnati, OH 45275-2000

Authorized Agency Signature and Date

Print Name Clearly

PS-37-0403-03-98
System Code

IMPORTANT NOTE: Knox Master Keys are provided to authorized agencies or other registered entities on an as-needed basis solely for use with the Knox Rapid Access System. No other use of the Knox Master Keys or their associated codes is authorized or permitted. Knox Master Keys and Key Codes associated with the Knox Master Keys and Keyways remain the exclusive property of the Knox Company. Key Codes associated with the Knox Master Keys and Keyways are maintained by the Knox Company in Phoenix, Arizona. For questions regarding this policy, contact Knox at 800-552-5669.

For Sub-Master Items: Signature Required by Authorizing Agency

☐ **Check here to Sub-Master**
Sub-master fee $7.00 per keyed item.

Authorized Agency Signature

SECTION 3 PRE-PAYMENT INFORMATION REQUIRED

☐ Check or Money Order made payable to:
KNOX COMPANY Federal I.D. #95-3617858

VISA MasterCard DISCOVER AMERICAN EXPRESS

EXP. DATE (MM / YY)

CARD NUMBER

Credit Card Orders can be FAXED or scanned and emailed to: **orders@knoxbox.com**

NAME ON CARD

Cardholder Signature

SECTION 4 ORDER PRODUCT HERE – USE ATTACHED PRODUCT SHEET

Quantity	Model #	Weight Ea.	Price Ea.	Extended Price
			$	$
			$	$
			$	$

Sub-Master Fee (if required, $7.00 ea.) $

Shipping and Handling $

Subtotal $

OH TAX Required **Sales Tax** $

Pre-Payment Total $

GROUND SHIPPING & HANDLING

1 lb.	to	7 lbs.	$16.00
8 lbs.	to	16 lbs.	$29.00
17 lbs.	to	30 lbs.	$43.00
31 lbs.	to	50 lbs.	$52.00
51 lbs.	to	75 lbs.	$62.00

Please call Knox for quote: 75 lbs.+ and/or Alaska, Hawaii, Canada

SECTION 5 INSTALLATION ADDRESS - REQUIRED BY AUTHORIZED AGENCY

☐ NEW CONSTRUCTION ☐ RETROFIT

BUILDING NAME (WHERE ITEM WILL BE INSTALLED) - PLEASE TYPE ADDITIONAL INSTALLATION ADDRESSES ON A SEPARATE SHEET (REQUIRED BY FIRE DEPT.)

STREET ADDRESS (NO P.O. BOXES)

CITY, STATE, ZIP CODE

SECTION 6 SHIP TO ADDRESS IS REQUIRED ☐ SAME AS INSTALL ADDRESS

SHIP TO CONTACT NAME

COMPANY NAME

SUITE

STREET ADDRESS (NO P.O. BOXES)

CITY, STATE, ZIP CODE

RUSH? Call for Rates and Check Box: ☐ Next Day Air ☐ 2nd Day Air

OFFICE USE ONLY

O/N

REC'D

Send this form with payment to:

KNOX COMPANY
1601 W. Deer Valley Road
Phoenix, AZ 85027

RAPID ACCESS SOLUTIONS

1 BUILDING ACCESS

KNOXBOX® 3200 / KNOXVAULT® 4400

The high-security KnoxBox/ KnoxVault holds keys and access cards critical to providing rapid access in an emergency.

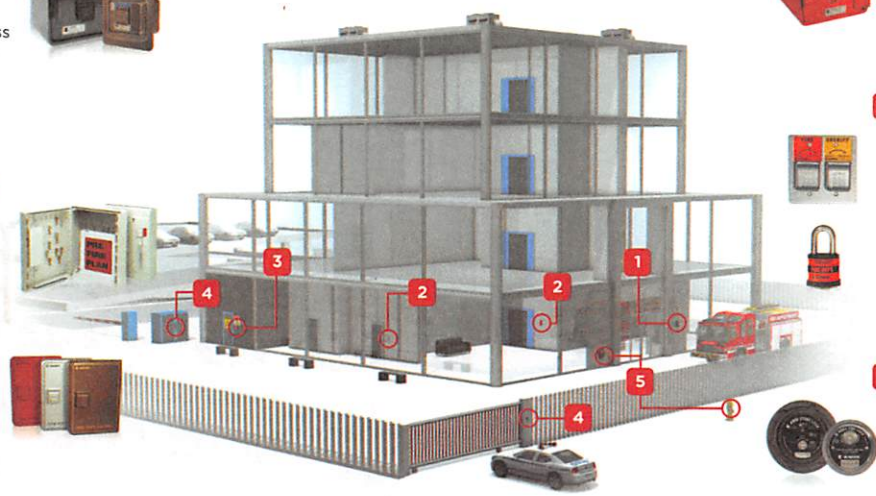
2 INTERIOR ACCESS

KNOX DOCUMENT CABINET™

Houses vital emergency documents including Haz-Mat and emergency response plans along with interior keys and access cards.

KNOX ELEVATOR BOX™

Designed for the elevator bank, elevator override and drop keys are stored to save first responders time locating the right elevator drop key to open landing doors during a rescue mission.



3 POWER CONTROL

KNOX REMOTE POWER BOX™

Remotely operate a shunt trip breaker to remove power from a building or equipment. Tamper Alert models connect to an alarm system.

4 PERIMETER ACCESS

KNOX GATE & KEY SWITCH™

Provides emergency access to electric gates in residential communities, parking garages and industrial areas.

KNOX PADLOCK™

Provides rapid entry into multi-family and gated communities; vehicle and pedestrian gates and fenced areas.

5 FDC PROTECTION

KNOX FDC LOCK™

Locking caps protect fire sprinkler systems against debris, theft and vandalism and ensures ready and reliable connections.

KNOXBOX.COM

ORDER TERMS AND CONDITIONS

NOTICE: When you provide a check as payment, you authorize us either to use information from your check to make a one-time electronic fund transfer from your account or to process the payment as a check transaction.

As used in this Order Terms and Conditions (the "Agreement"), the words "you," "your," and "customer" each mean the person or entity named on the face of this form as the Customer or Buyer. The words "we," "our," and "Knox" each mean Knox Associates, Inc. d/b/a The Knox Company, an Arizona corporation, with a place of business located at 1601 W. Deer Valley Road, Phoenix, Arizona 85027. The words "Equipment" or "Product" mean the products ordered under this agreement.

1. This Order is based upon these terms and conditions of this Agreement. **Knox rejects any and all other terms and conditions of sale proposed or discussed by the parties in connection with this Order or the resulting transaction. This Agreement shall constitute the entire and exclusive contract of sale between you and Knox, and any additional or different terms in any purchase order, counteroffers, or where ever contained are objected to and rejected.**

2. All orders for Products are subject to availability. We reserve the right to reject any order for any reason. We will use all reasonable efforts to deliver Products by a requested delivery date. However, delivery dates are approximate and we are not liable for delays in delivery for any reason.

3. Subject to payment in full, title to purchased Products will pass to you, FOB our shipping dock.

4. Before shipping Products to you, we will perform our standard factory inspection and acceptance tests on the unit, and satisfactory completion of inspection will constitute your acceptance of the unit. At your request, we will certify in writing our completion of inspection tests.

5. You shall pay all amounts due according to the payment terms on the face of this form, in United States dollars, delivered to us at the address stated on the invoice or as otherwise required by us. If you fail to pay any charges when due, in addition to such overdue amounts you shall pay a late-payment charge on the unpaid balance equal to the lesser of 1.5 percent per month or the lawful maximum. You have no set-off rights.

6. We warrant that Products ordered and subsequently sold to you under this Agreement will conform to our then-current published specifications for the Product and limited to the warranty period specified by Knox for that Product on the date of your order. We reserve the right to make changes to our products and have no obligation to alter previously purchased products. Our sole obligation to you and your exclusive remedy under this warranty is as follows: a) We will repair or replace without charge Products found to be defective so long as you return the Products to us, freight prepaid, to our service center in Phoenix, Arizona. b) We will not be required to ship a replacement until we have confirmed through our examination that your item is in fact defective. We will pay freight costs to ship any repaired or replacement unit to you. If we are unable within a reasonable time to repair or replace your item, then you will be entitled to the refund of your purchase price. c) This warranty does not apply to any unit which we determine has been subjected by you or another party to (1) operating or environmental conditions in excess of our written specifications or recommendations; (2) damage, misuse or neglect; (3) improper installation, repair, modification or alteration; or (4) use for which it was not intended or designed. This warranty also excludes expendable items, such as lamps, fuses, or other parts which fail from normal use. This is our only warranty for Products. **KNOX EXPRESSLY DISCLAIMS ALL OTHER WARRANTIES, GUARANTEES OR REMEDIES – WHETHER EXPRESS, IMPLIED, OR STATUTORY – INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.** We also disclaim any implied warranty arising out of trade usage or out of a course of dealing or course of performance. And in no event shall our liability to you exceed the limitations specified in Section 12.

7. You agree that the Knox Product ordered will be used only with the Knox Master Key issued to the Authorized Agency designated on this Order Form.

8. You acknowledge that the lock code and lock core in the Knox Product as delivered by the Knox Company may not be modified or altered in any manner except with the express authorization of the Knox Company.

9. You acknowledge that if you or any party on whose behalf you are acting alters, modifies or tampers with the Product or takes any action that compromises the Product's ability to be accessed with the Authorized Agency's Master Key, the Knox Company may have the right to demand that the Product be removed from use, and that you indemnify and hold the Knox Company harmless from any claims or losses resulting from the such alteration or modification of the Product.

10. You acknowledge that all right, title and interest in all patents, copyrights, trademarks, trade dress, trade secrets and other intellectual property embodied within, covering or in any way regarding the Products is owned exclusively by Knox, or its licensor(s), and all rights with regard to such intellectual property are reserved. You represent, warrant and covenant that you will not claim any right, title or interest in, or use, any such intellectual property, including any and all codes to keys, keyways and keywrenches all of which remain exclusively the property of Knox or its licensor(s), and that you will not bring any suit or proceeding in an attempt to invalidate or claim any such intellectual property rights.

11. Neither Knox nor you will be liable to the other for any delay or failure to perform if that delay or failure results from a cause beyond its reasonable control.

12. Your exclusive remedies concerning our performance or nonperformance are those expressly stated in this Agreement. **Under no circumstances will Knox be liable for reprocurement costs, lost revenue or profits, loss of data, or for any other special, incidental or consequential damages, even if they were foreseeable or you have informed us of their potential.** And we will not be liable for any damages claimed by you based upon any third party claim. **Our total liability to you for your damages under this Agreement will not exceed the price you paid to us for the unit of Products at issue in your claim.** This limitation will apply regardless of the form of action (i.e., whether the lawsuit is in contract or in tort, including negligence.) **Because some states do not allow exclusion or limitation of liability for consequential or incidental damages, in such states Knox's entire liability is limited to the full extent permitted by law.**

13. You shall indemnify and save Knox harmless from all claims, losses, damages, expenses (including reasonable legal fees) and liability resulting from or in any way connected, directly or indirectly, with a breach of your obligations under this Agreement, third party claims, or with the possession, handling, sale or use of the Products or goods made from the Products delivered hereunder.

14. You will be invoiced and will pay all sales, use, excise, and other taxes on Products unless exempt under law or you furnish us with a valid resale or exemption certificate. The reporting and payment of all taxes for Products is your sole responsibility. You will also be responsible for all transportation costs, insurance charges, customs duties, and loss or damage settlements. Our prices for Products do not include such taxes or charges; where applicable, they will be added to your total invoice amount. You will not be responsible, however, for taxes levied against us based upon our net income or net worth (franchise taxes).

15. If for any reason we are unable to supply the total demand for Products specified herein, we may in our sole discretion distribute our available supply of Products among our customers, and we shall have no obligation to purchase supplies of the goods from third parties to enable us to perform our obligations to you under this Agreement.

16. This Agreement shall be governed by and construed in accordance with the laws of the State of Arizona without resort to conflict of laws rules. Each party irrevocably agrees that any action, suit or other legal proceeding against them shall be brought in a court of the State of Arizona or in the United States District Court for the State of Arizona. By execution and delivery of this Agreement, each party irrevocably submits to and accepts the jurisdiction of each of such courts and waives any objection (including any objection to venue, enforcement, or grounds of forum non conveniens) which might be asserted against the bringing of any such action, suit or other legal proceeding in such courts. In the event any proceedings are commenced to enforce or construe this invoice or the goods or services related thereto, then the prevailing party in such proceedings shall be entitled to its reasonable attorney fees thereby incurred. In the event a judgment is entered in such proceedings, it is agreed that said judgment shall provide that the prevailing party shall be entitled to recover all attorney fees reasonably incurred in enforcing said judgment.

17. This Agreement represents the entire agreement between us regarding this Order and Products we are to sell to you under it. The parties specifically disclaim the application of the United Nations Convention on Contracts for the International Sale of Goods. It also supersedes all previous oral or written communications between us regarding its subject matter, and it may not be modified or waived except in writing and signed by an officer or other authorized representative of each party. If any provision is held invalid, all other provisions shall remain valid, unless such invalidity would frustrate the purpose of our Agreement.

MECHANICAL PRODUCT SHEET

KNOX
When seconds matter™

PRICES (U.S. DOLLARS) EFFECTIVE FEBRUARY 2020

Pricing and availability subject to change without notice. Shipping and handling not included.

The Knox Rapid Access System is the premier first responder system, offering secure master key access to support safety and reduce property damage.

BUILDING ACCESS

KNOXVAULT® 4400

Shipping Weight: 29 lb

Available in both a single and dual lock model, this high capacity box provides additional storage for building documentation and other items.

Lock Type	Mount Type	Tamper Alert	Color	Model #	Price
SINGLE LOCK	Surface	✔	Aluminum	4410	$662.00
		✔	Black	4402	$630.00
		✔	Dark Bronze	4414	$662.00
			Aluminum	4409	$650.00
			Black	4401	$620.00
			Dark Bronze	4413	$650.00
	Recess	✔	Aluminum	4440	$726.00
		✔	Black	4431	$693.00
		✔	Dark Bronze	4444	$726.00
			Aluminum	4439	$714.00
			Black	4430	$681.00
			Dark Bronze	4443	$714.00
DUAL LOCK	Surface	✔	Aluminum	4412	$738.00
		✔	Black	4404	$705.00
		✔	Dark Bronze	4416	$738.00
			Aluminum	4411	$727.00
			Black	4403	$695.00
			Dark Bronze	4415	$727.00
	Recess	✔	Aluminum	4442	$802.00
		✔	Black	4433	$767.00
		✔	Dark Bronze	4446	$802.00
			Aluminum	4441	$791.00
			Black	4432	$756.00
			Dark Bronze	4445	$791.00

KnoxVault Accessories and Options		
Knox FDC Wrench/Card Holder	4472	$16.00
Multipurpose Electrical Switch	4471	$33.00
Recess Mounting Kit *(for new concrete or masonry construction)*	4470	$131.00

KNOXBOX® 3200

Shipping Weight: 10 lb

Accommodates up to ten keys/access cards. For added security the tamper alert feature connects to an existing alarm system.

Type	Mount Type	Tamper Alert	Color	Model #	Price
HINGED	Surface	✔	Aluminum	3264	$414.00
		✔	Black	3262	$391.00
		✔	Dark Bronze	3266	$414.00
			Aluminum	3263	$407.00
			Black	3261	$383.00
			Dark Bronze	3265	$407.00
	Recess	✔	Aluminum	3273	$466.00
		✔	Black	3271	$440.00
		✔	Dark Bronze	3275	$466.00
			Aluminum	3272	$459.00
			Black	3270	$432.00
			Dark Bronze	3274	$459.00

KnoxBox Accessories and Options		
Multipurpose Electrical Switch	3291	$33.00
Recess Mounting Kit *(for new concrete or masonry construction)*	3290	$114.00

INTERIOR ACCESS

KNOX ELEVATOR BOX™

Provides quick access to two elevator door drop keys and accommodates from 18 to 30 additional keys. *Shipping Weight: 14 lb*


(Model #1442)

Type	Tamper Alert	Color	Model #	Price
	✔	Aluminum	1434	$422.00
	✔	Dark Bronze	1438	$422.00
	✔	Red	1404	$407.00
	✔	Red	1442	$407.00
		Aluminum	1433	$376.00
		Dark Bronze	1437	$376.00
		Red	1403	$363.00
		Red	1441	$363.00

Elevator Box Accessories/Options

Expansion panels for increased capacity are quoted upon request

FDC PROTECTION

KNOX FDC LOCK™

Shipping Weight: 1.5": 2 lb / 2.5": 4 lb

Locking caps protect fire sprinkler systems against debris, theft and vandalism and ensures ready and reliable connections.

Type	Model #	Price
2.5" Male Locking Cap with **Swivel-Guard™** Enhanced Protection, stainless steel	varies	$249.00
2.5" Male Locking Cap, stainless steel	varies	$199.00
1.5" NH Male Locking Cap, stainless steel	varies	$169.00

KNOX STANDPIPE LOCK™

Shipping Weight: 8 lb

Locking caps protect standpipes and wall hydrants to ensure critical connections are ready for firefighters.

Type	Model #	Price
2.5" NH Female Locking Cap, stainless steel exterior with solid brass threads	varies	$375.00

KNOX STORZ LOCK™ KITS

Kit includes Storz Lock Cap and Adapter. *Shipping Weight: 16 lb*

Adapter Type	Adapter Size	Face Type	Model #	Price
Knox Storz Lock + 30° Elbow	5" Storz x 6" NPT Female Rigid	Gasket	5046	$763.00
		Metal Face	5047	$763.00
	5" Storz x 4" NPT Female Rigid	Gasket	5042	$697.00
		Metal Face	5043	$697.00
	4" Storz x 4" NPT Female Rigid	Gasket	5022	$623.00
		Metal Face	5023	$623.00
Knox Storz Lock + Straight	5" Storz x 6" NPT Female Rigid	Gasket	5044	$688.00
		Metal Face	5045	$688.00
	5" Storz x 4" NPT Female Rigid	Gasket	5040	$620.00
		Metal Face	5041	$620.00
	4" Storz x 4" NPT Female Rigid	Gasket	5020	$502.00
		Metal Face	5021	$502.00
Hydrant Steamer Kit – 5" Storz to 4.5" NH Metal Face			5049	$626.00

PERIMETER ACCESS

KNOX GATE & KEY SWITCH™

Provides emergency access to electric gates in residential communities, parking garages and industrial areas. Also, serves as an electric override switch to open motorized and roll-up doors. *Shipping Weight: 1 lb*

Type (includes stainless steel dust cover)	Model #	Price
Double Key Switch on Mounting Plate	3503	$204.00
Key Switch on Mounting Plate	3502	$126.00
Key Switch	3501	$103.00

KNOX PADLOCK™

Provides rapid entry into multi-family and gated communities; vehicle and pedestrian gates and fenced areas. Shackles are thicker than most standard padlocks and built to resist pull attacks. *Shipping Weight: 2 lb*

Type	Model #	Price
Exterior Use, Shrouded - All Weather Conditions 1-1/8" H shackle clearance, 7/16" diameter stainless steel shackle	3784	$122.00
Exterior Use - All Weather Conditions 3-7/8" H shackle clearance, 7/16" diameter stainless steel shackle	3781	$107.00
Exterior Use - All Weather Conditions 2-3/8" H shackle clearance, 7/16" diameter stainless steel shackle	3782	$103.00
Exterior Use - All Weather Conditions 1-1/4" H shackle clearance, 7/16" diameter stainless steel shackle	3783	$101.00
Interior Use - Light Duty 2-3/8" H shackle clearance, 5/16" diameter stainless steel shackle	3771	$78.00
Interior Use - Light Duty 1-1/8" H shackle clearance, 5/16" diameter stainless steel shackle	3774	$78.00

KNOX STORZ LOCK™

Shipping Weight: 4": 6 lb / 5": 9 lb

Storz locking caps protect large diameter FDC's and hydrants from vandalism.

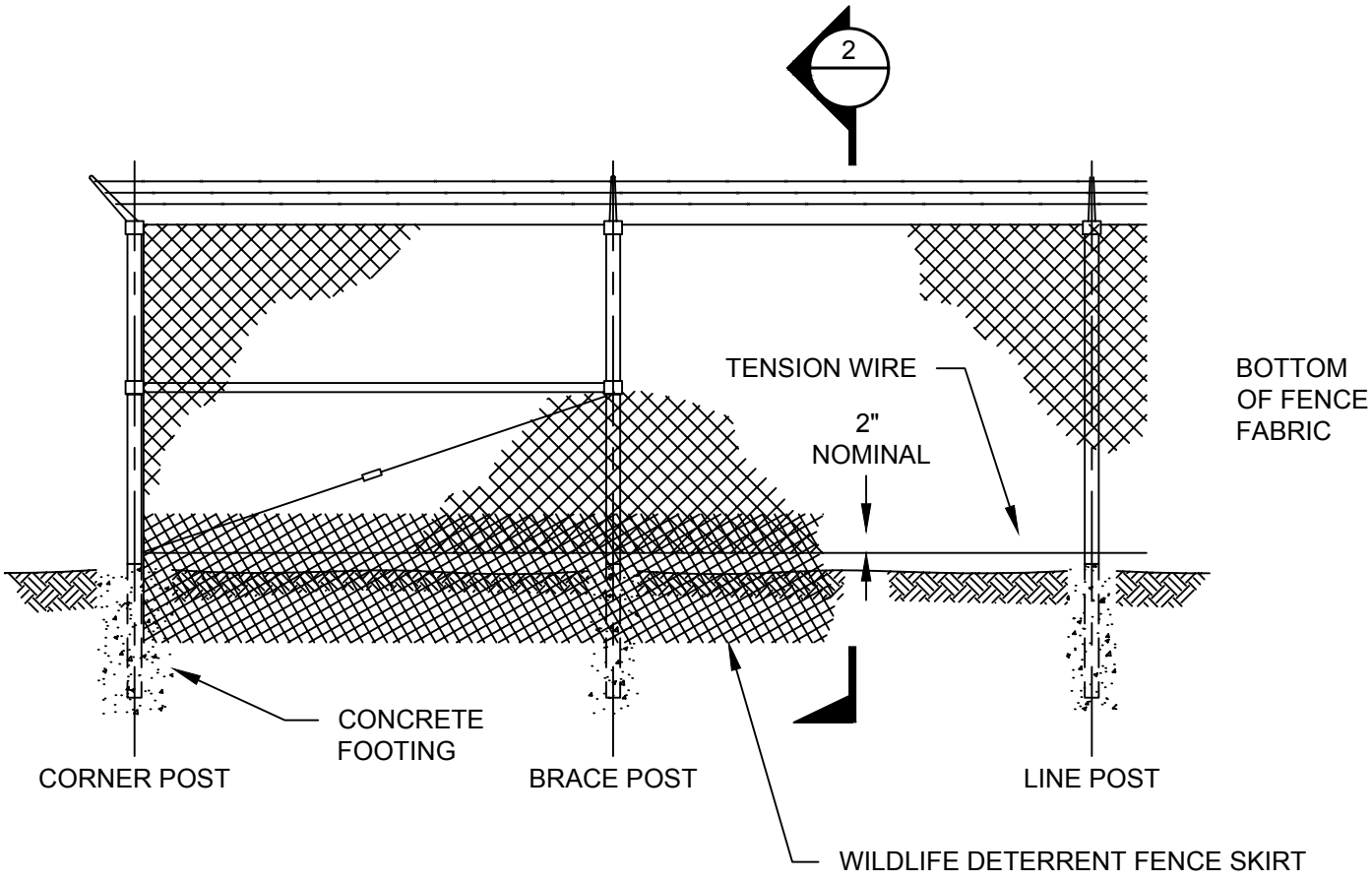
Type	Model #	Price
5" Locking Cap - Dark, Hard Anodized Aluminum	5002	$376.00
4" Locking Cap - Dark, Hard Anodized Aluminum	5001	$352.00

KNOX STORZ LOCK™ ADAPTERS ONLY

Increases safety to firefighters when working with large connections. *Shipping Weight: 8 lb*

Adapter Type	Adapter Size	Face Type	Model #	Price
30° Elbow	5" Storz x 6" NPT Female Rigid	Gasket	5086	$388.00
		Metal Face	5087	$388.00
	5" Storz x 4" NPT Female Rigid	Gasket	5082	$322.00
		Metal Face	5083	$322.00
	4" Storz x 4" NPT Female Rigid	Gasket	5062	$271.00
		Metal Face	5063	$271.00
Straight	5" Storz x 6" NPT Female Rigid	Gasket	5084	$312.00
		Metal Face	5085	$312.00
	5" Storz x 4" NPT Female Rigid	Gasket	5080	$245.00
		Metal Face	5081	$245.00
	4" Storz x 4" NPT Female Rigid	Gasket	5060	$150.00
		Metal Face	5061	$150.00
Hydrant Steamer Adapter – 5" Storz to 4.5" NH Metal Face			5089	$253.00

Appendix 5 - F163 Wildlife Deterrent Fence Details



EXISTING SECURITY FENCE WITH WILDLIFE DETERRENT FENCE SKIRT

TYPICAL ELEVATION

NOT TO SCALE

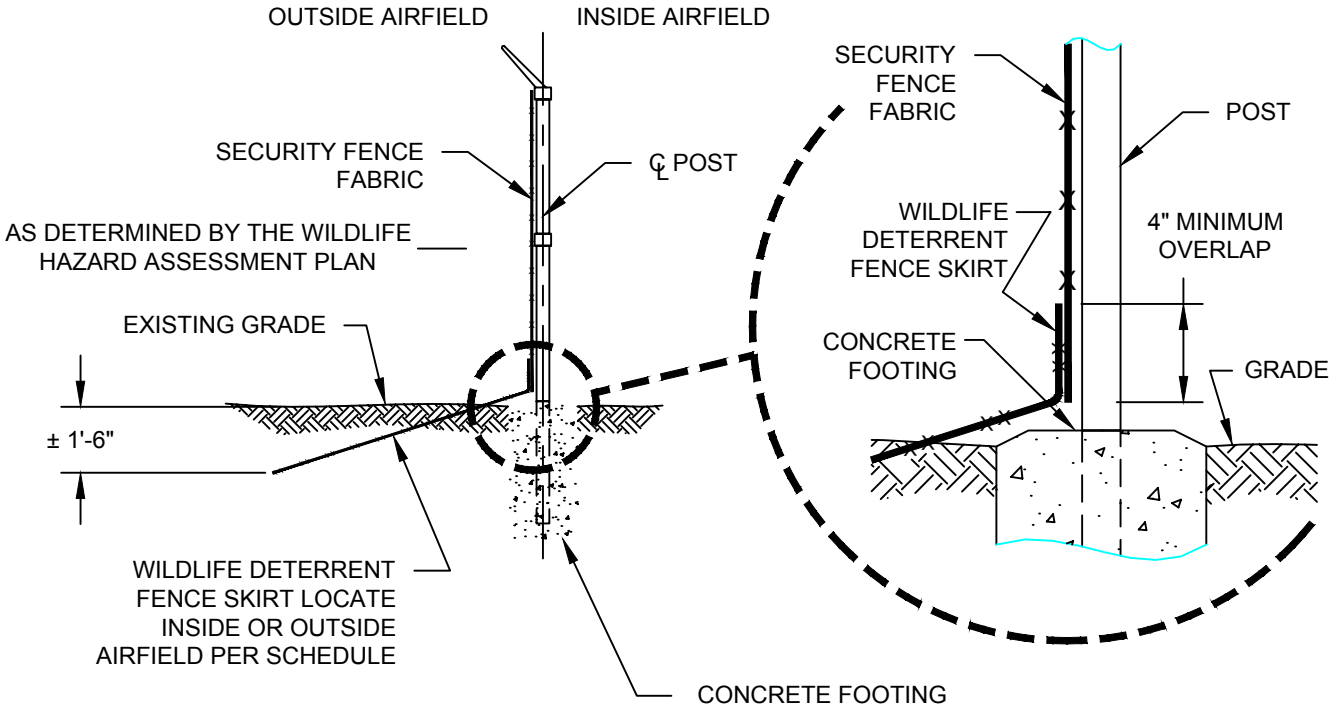
NOTES:

1. MAINTAIN SECURITY FENCE INTEGRITY AT ALL TIMES. DO NOT LEAVE EXCAVATION UNDER FENCE FABRIC WHICH WOULD PERMIT ACCESS.

2. DEPTH OF EXCAVATION SHALL BE INSPECTED AND APPROVED BY THE ENGINEER PRIOR TO PLACEMENT OF THE CHAIN LINK FENCE FABRIC.

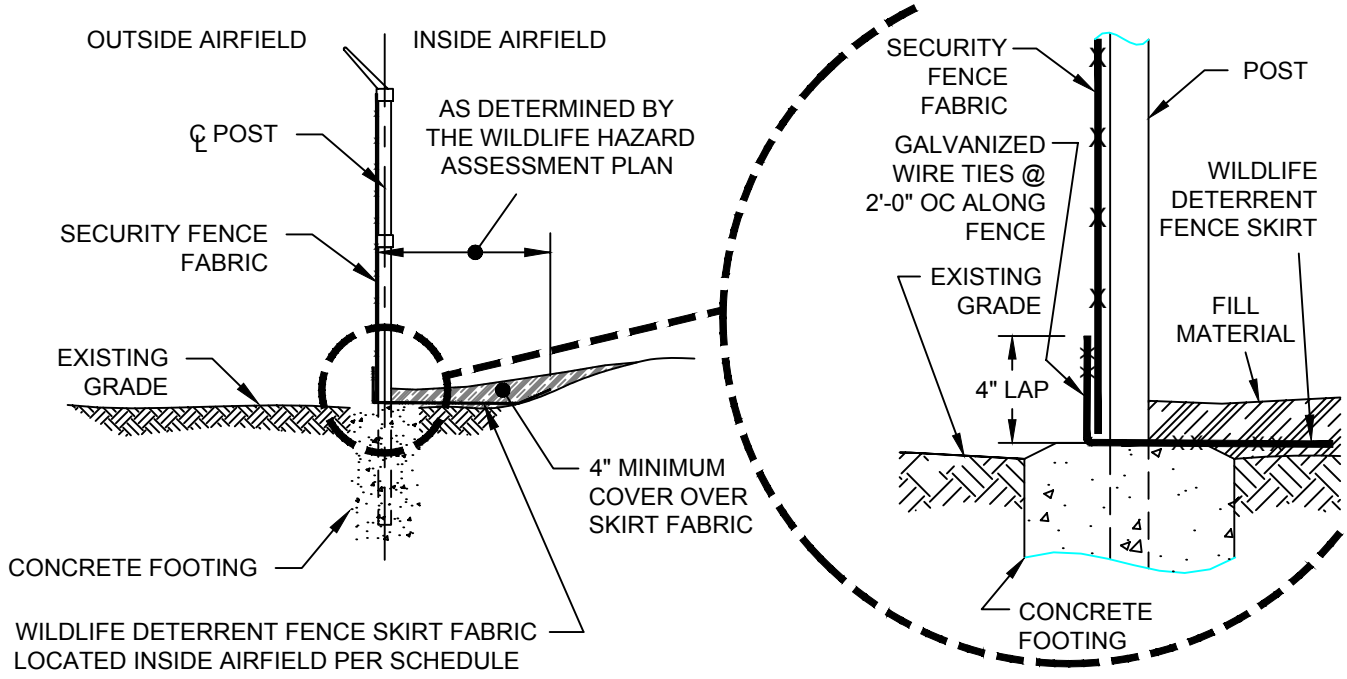
3. END JOINTS BETWEEN ADJACENT SECTIONS OF THE WIRE FABRIC SHALL BE LAPPED 4" AND TIED WITH GALVANIZED WIRE TIES AT 2'-0" ON CENTER AND AT EDGES.

NOTE: REFER TO F-163 WILDLIFE DETERRENT FENCE SKIRT FOR SPECIFICATIONS.



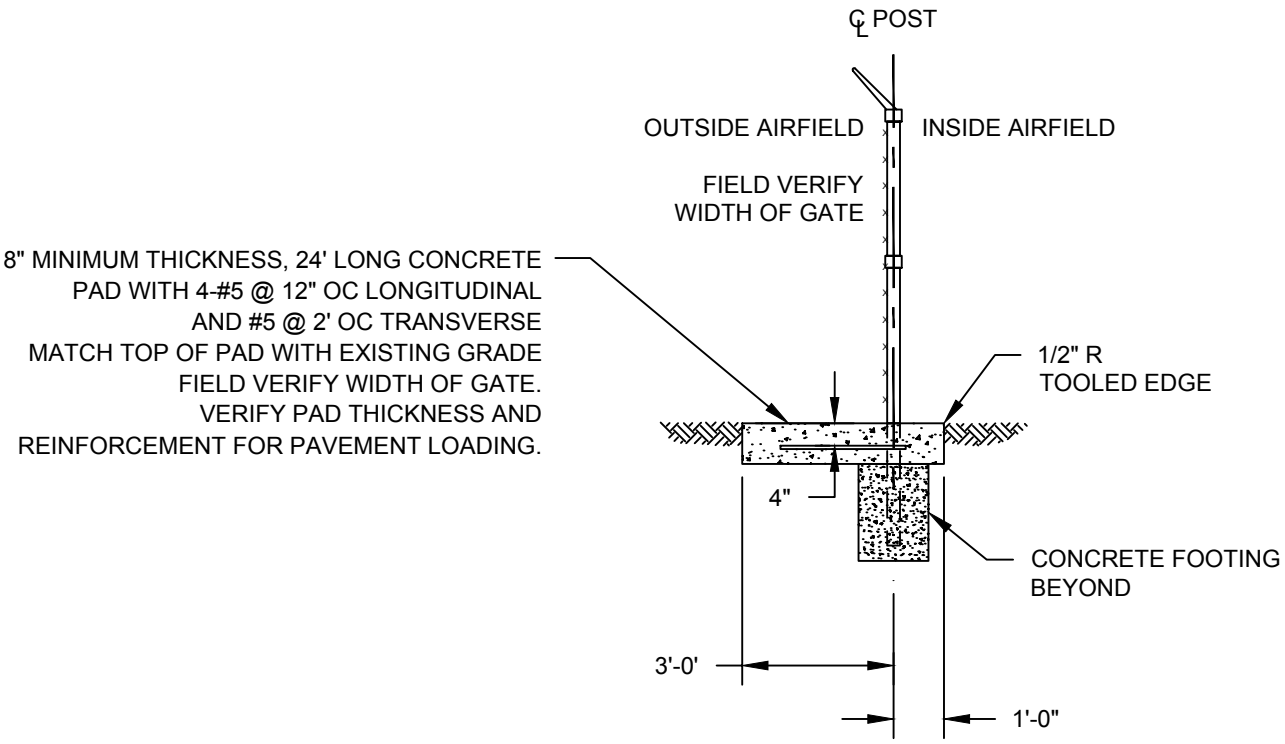
EXISTING SECURITY FENCE WITH DETERRENT FENCE SKIRT
(TYPICAL EXCEPT AS SHOWN ON SECTION 2A)

2 TYPICAL SECTION
NOT TO SCALE



EXISTING SECURITY FENCE WITH WILDLIFE DETERRENT FENCE SKIRT

2A SECTION
NOT TO SCALE

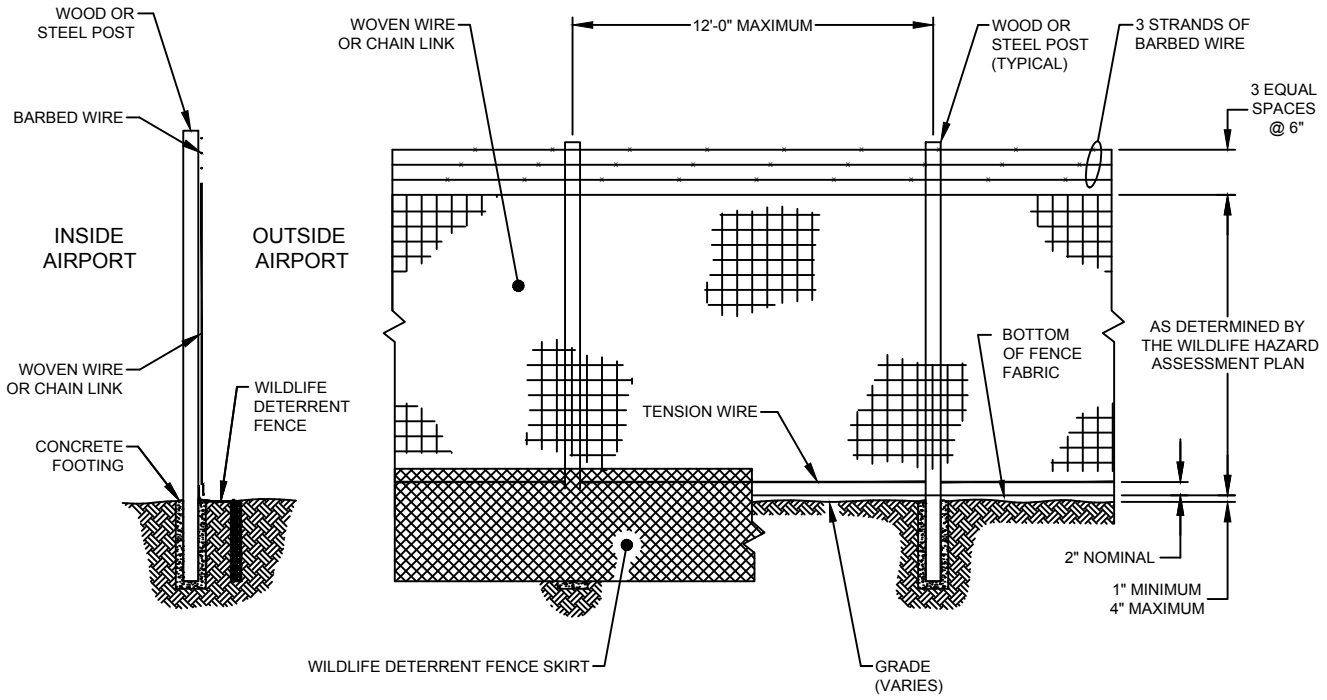


CONCRETE PAD AT GATE

3 GATE DETAIL

NOT TO SCALE

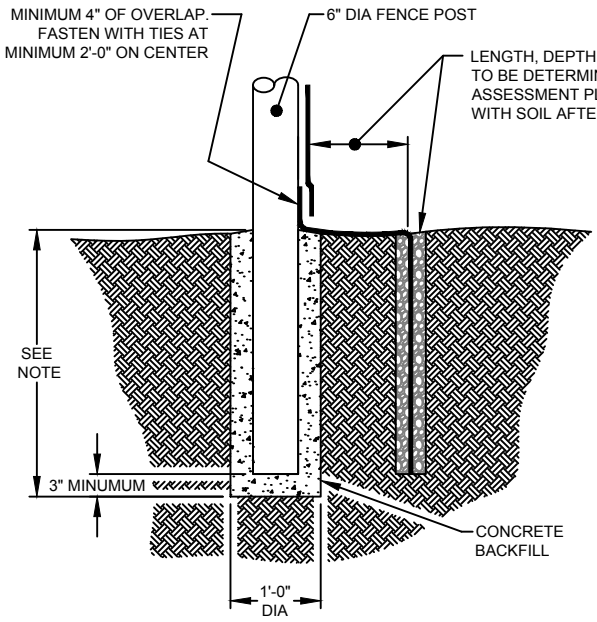
Appendix 6 - F164 Wildlife Exclusion Fence Details



WILDLIFE EXCLUSION FENCE

SOME ITEMS OMITTED FOR CLARITY

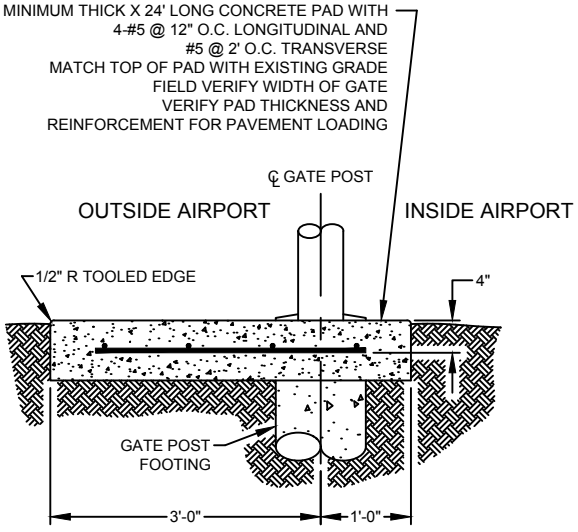
NOT TO SCALE



NOTE: NOMINAL DEPTH OF FENCE POST FOOTING IS 30". AT BRACES, GATES, CORNER PULL AND ENDS INCREASE DEPTH TO 36".

STANDARD WOVEN WIRE FENCE WITH WILDLIFE DETERRENT FENCE SKIRT FOOTING AND INSTALLATION DETAILS

NOT TO SCALE

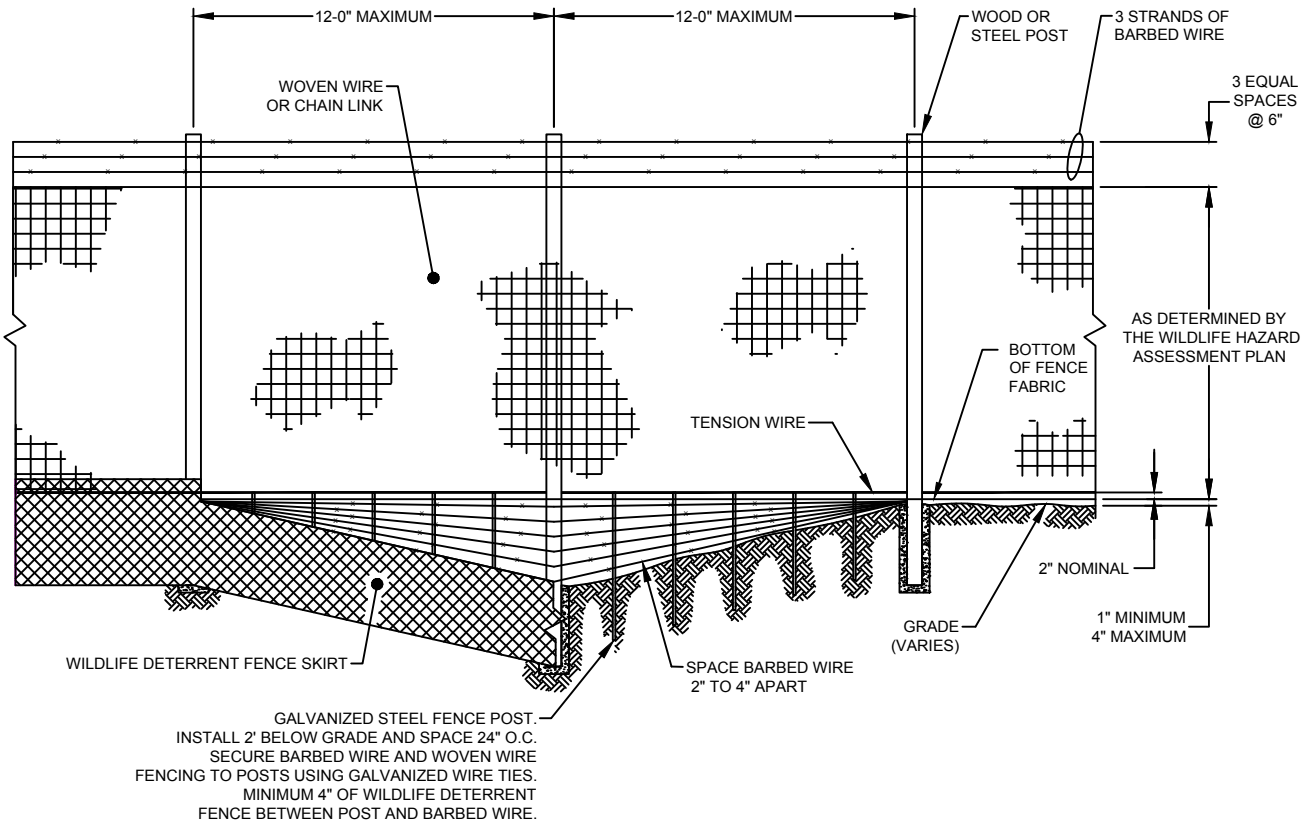


GATE CONCRETE PAD DETAIL

SOME ITEMS OMITTED FOR CLARITY

NOT TO SCALE

NOTE: REFER TO F-164 WILDLIFE EXCLUSION FENCE FOR SPECIFICATIONS.



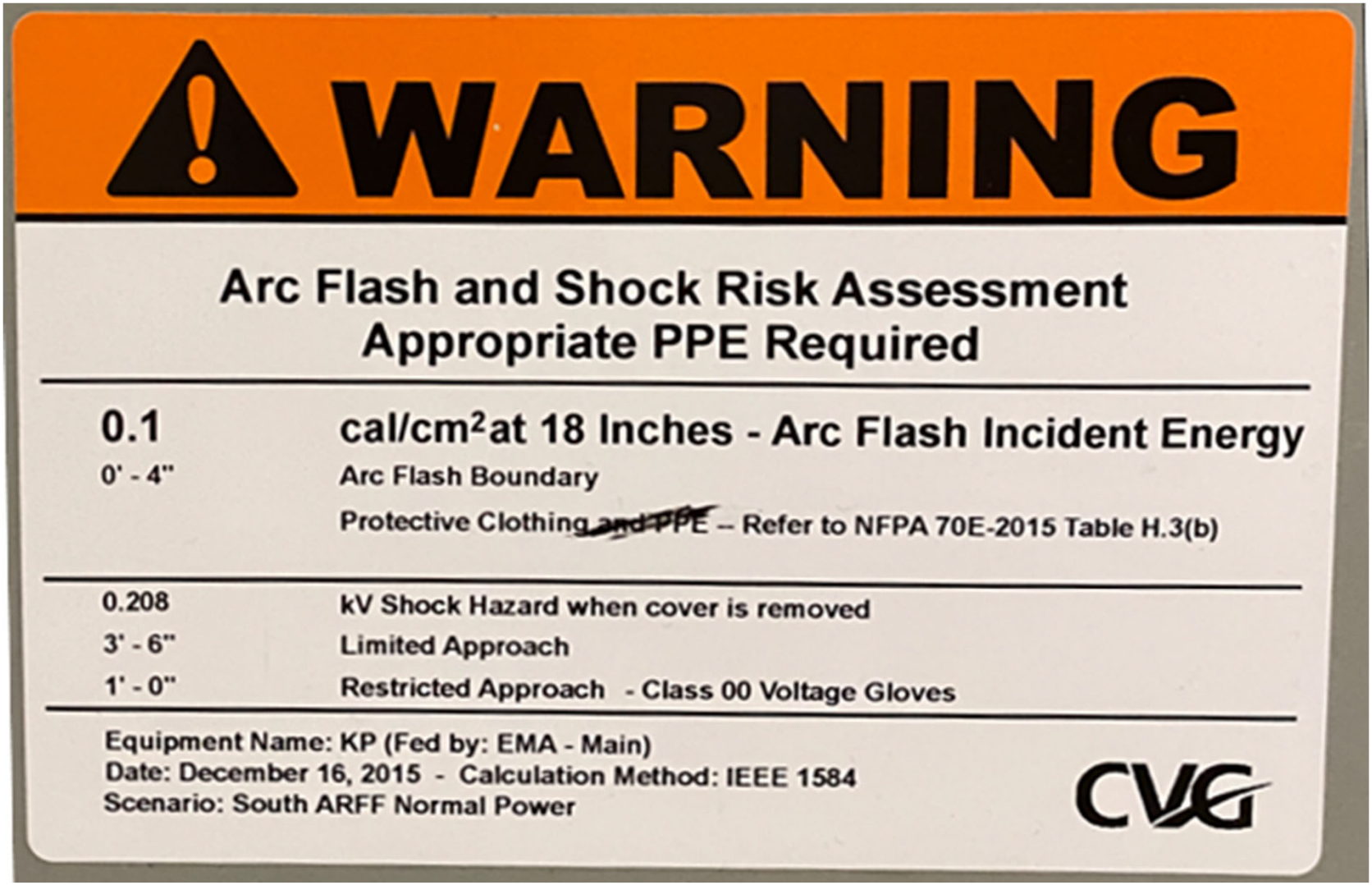
WILDLIFE EXCLUSION FENCE DITCH CROSSING

SOME ITEMS OMITTED FOR CLARITY

NOT TO SCALE

NOTE: REFER TO F-164 WILDLIFE EXCLUSION FENCE FOR SPECIFICATIONS.

Appendix 7- Airport Identification and Labeling Standards example



WARNING

Arc Flash and Shock Risk Assessment
Appropriate PPE Required

0.1	**cal/cm²at 18 Inches - Arc Flash Incident Energy**
0' - 4"	Arc Flash Boundary
	Protective Clothing ~~and PPE~~ -- Refer to NFPA 70E-2015 Table H.3(b)
0.208	kV Shock Hazard when cover is removed
3' - 6"	Limited Approach
1' - 0"	Restricted Approach - Class 00 Voltage Gloves

Equipment Name: KP (Fed by: EMA - Main)
Date: December 16, 2015 - Calculation Method: IEEE 1584
Scenario: South ARFF Normal Power

CVG

Appendix 8- Architectural Column Covers

COLUMN COVERS

GORDON
ARCHITECTURAL + ENGINEERED SOLUTIONS

COLUMN ENCLOSURES, BEAM WRAPS, & COLUMN SURROUNDS

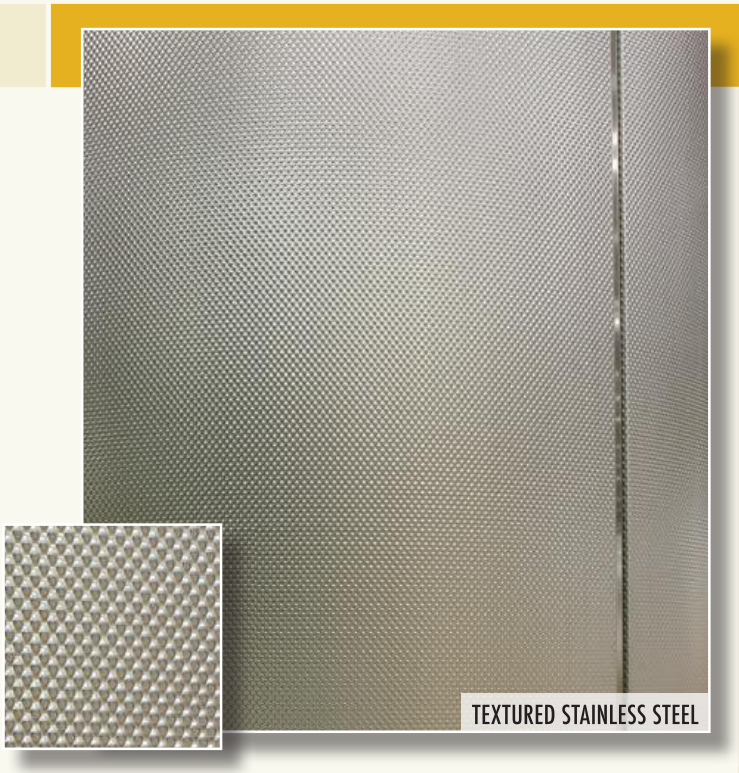
NWM OFFICE BUILDING
Milwaukee, WI

RIVER SPIRIT CASINO RESORT
Tulsa, OK

COLUMN COVERS

Gordon is recognized as a premier manufacturer of column covers (column enclosures, beam wraps, & column surrounds for the interior and exterior construction specialty market.

Gordon Column Covers are competitively priced, easy to install, and fabricated with the highest quality materials, making Gordon the best choice for your column enclosure needs.



TEXTURED STAINLESS STEEL

MATERIALS

Gordon offers many different metal options to meet your design criteria.

MILLENNIUM® - .063" aluminum or 18 ga. steel

ALUMINUM - .090" or .125" thickness

- Smooth
- Mechanical

GALVANIZED STEEL - 16 or 14 gauge
(18 gauge for Tape & Float Columns)

MECHANICAL & TEXTURED STAINLESS STEEL - 16 or 14 gauge

- #4 Directional Brushed
- #6 Directional Brushed
- #8 Mirror
- Random Orbital
- Random Anti-Graffiti

CeramicSteel PORCELAIN ENAMEL

Contact us for other material types and thicknesses. Consider MILLENNIUM for backlighting applications.

FIRST GUARANTY BANK
Ponchatoula, LA

DESIGN

Configurations:

- Quarter Round
- Half Round
- Full Round
- Oval (Elliptical)
- Oblong
- Square
- Faceted
- Conical
- Custom

Minimum Diameter:

- 14" Aluminum
- 18" Steel & Stainless Steel

Maximum Height Before Stacking: 12'0"

Reveals:

- Horizontal
- Vertical
- Combination of reveals

GORDON
ARCHITECTURAL+ENGINEERED SOLUTIONS

HARPER COLLEGE
Palatine, IL

CAPSTAR AT COMPASS PLAZA
Austin, TX

PHOENIX SKY HARBOR
CAR RENTAL FACILITY
Phoenix, AZ

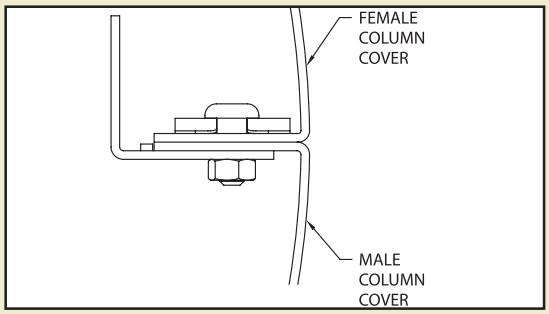
LOU RUVO CENTER FOR BRAIN HEALTH
Las Vegas, NV

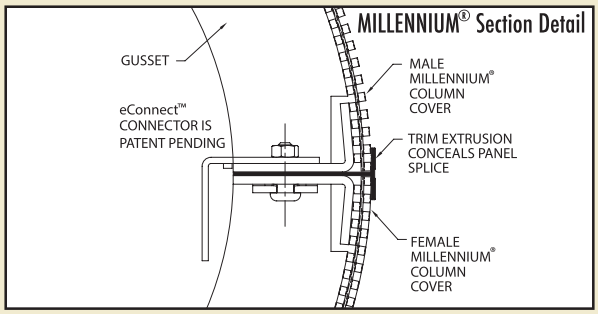
ARCHBISHOP HANNON HIGH SCHOOL
Covington, LA

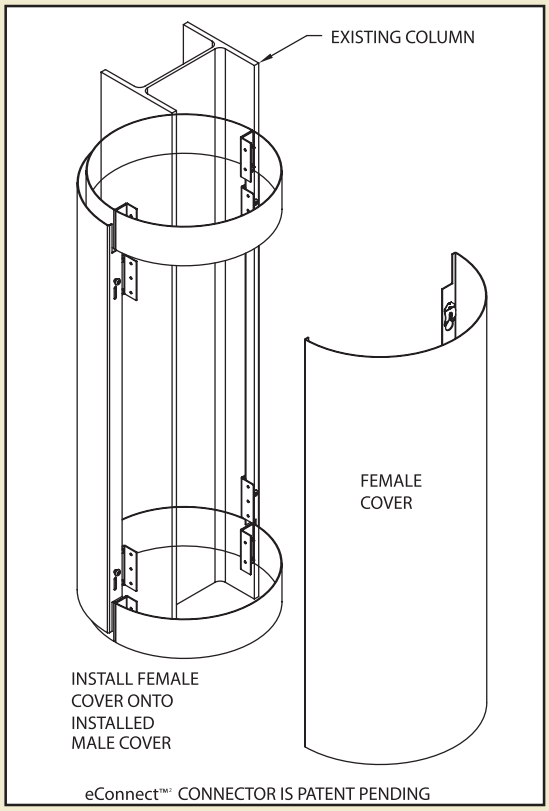
COLUMN COVERS

DETAILS

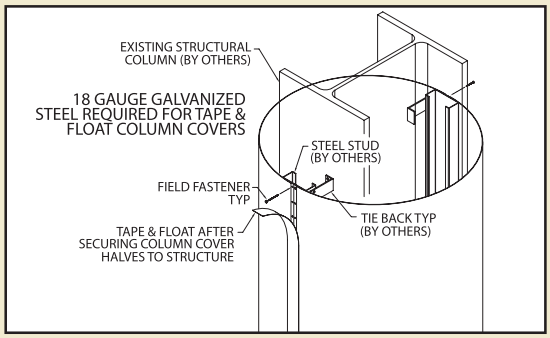
The eConnect™ connection system offers quick reliable installation and accessibility.



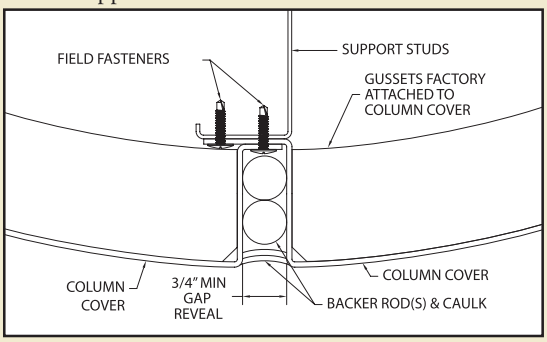




The Tape & Float connection system creates a seamless column.



The Caulked Reveal Joint is primarily used in exterior applications.



ACCESSORIES / OPTIONS

- Access Doors
- Column Collars /Rings
- Guard Rails / Hand Rails
- Inclusion of Fire Protection Equipment or Warning Lights
- Penetrations
- Perforations
- Polycarbonate Light Diffusers
- Signage
- Sound Deadening Tape
- Speaker Panels
- Studs and Tiebacks
- Top Caps


COLUMN COLLARS / RINGS

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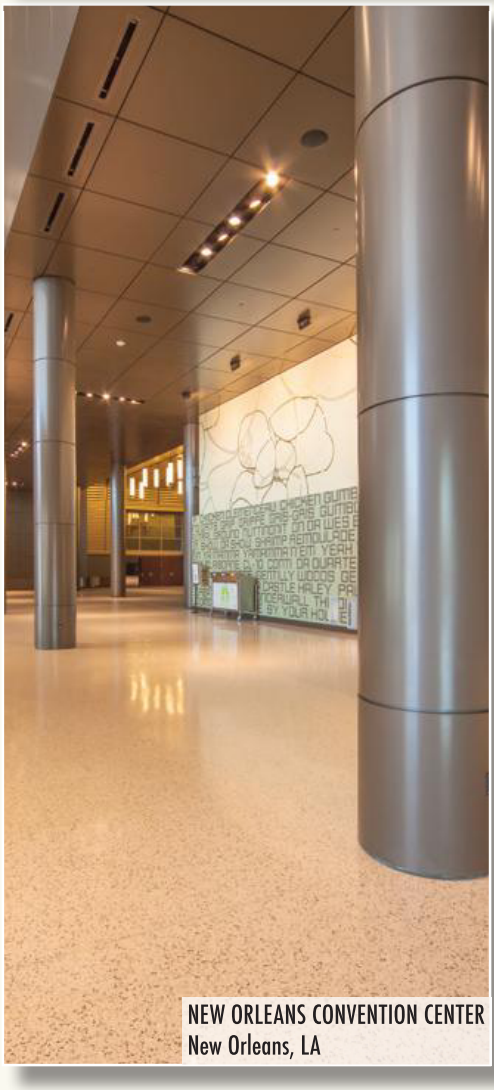
U.S. FEDERAL COURTHOUSE
Jackson, MS

BELAMAR HOTEL
Manhattan Beach, CA

LOS ANGELES INTERNATIONAL AIRPORT,
TERMINAL 1 BAGGAGE CLAIM
Los Angeles, CA



NEW ORLEANS CONVENTION CENTER
New Orleans, LA

COLUMN COVERS

EAST BATON ROUGE PARISH LIBRARY
Baton Rouge, LA

SAN ANTONIO INTERNATIONAL AIRPORT,
TERMINAL B BAGGAGE CLAIM
San Antonio, TX

BRIGHAM & WOMEN'S HOSPITAL
Boston, MA

CUSTOM CAPABILITIES

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The column covers on this page feature some of Gordon's many specialty and custom fabrication capabilities. Unique shapes, multiple finishes within a single column cover, integrated handrails and bumper rails, perforations for air distribution, communication systems, mechanical and electrical supply, and access doors are available.

GEORGE BUSH INTERCONTINENTAL AIRPORT, TERMINAL C TICKETING
Houston, TX

ATLANTA HARTSFIELD INTERNATIONAL AIRPORT, CONRAC
Atlanta, GA

MCCARRAN INTERNATIONAL AIRPORT, TERMINAL BAGGAGE CLAIM
Las Vegas, NV

SAN ANTONIO INTERNATIONAL AIRPORT,
TERMINAL 2 TICKETING
San Antonio, TX

BUSH INTERCONTINENTAL AIRPORT,
TERMINAL C NORTH
Houston, TX

FINISHES

- Powder Coat - Durable Painted Finishes
  - AAMA 2604
  - AAMA 2605
  - AAMA 2604 Antimicrobial
  - AAMA 2605 Antimicrobial
  - Therapeutic
  - Motif Finishes
- Wood Look Finishes
- Mechanical & Textured Stainless Steel
- CeramaSteel Porcelain Enamel

GREEN BY DESIGN

- Products contribute to LEED®[1] certification
- In-House Finishes
  - Biodegradable pre-treatment (No phosphates)
  - No hazardous waste
  - No VOCs
  - No heavy metals
- Reference our sustainable products brochure and website for more information. Recycled content values are subject to change. Contact us for accurate values or job specific requirements.

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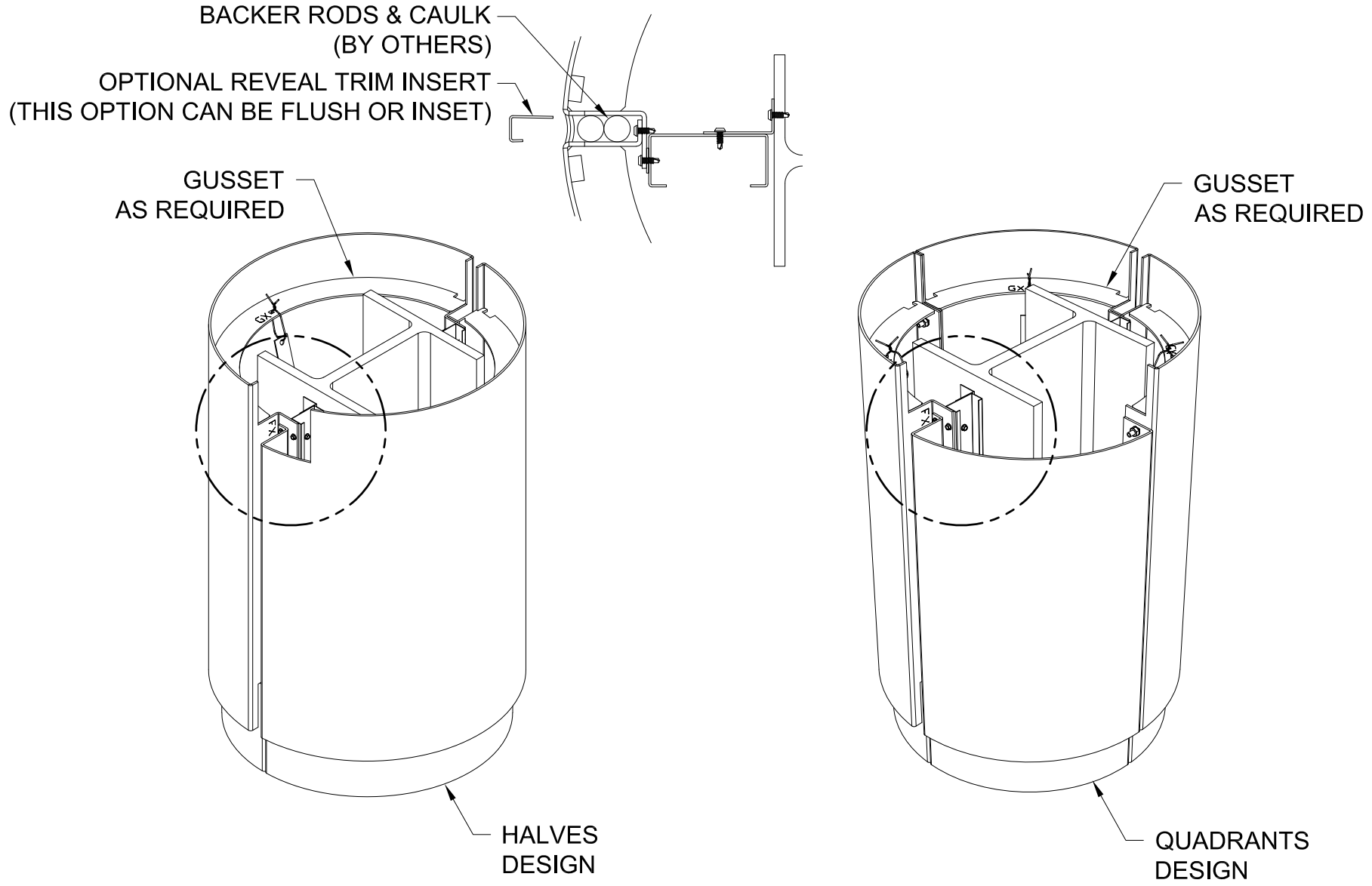
SALES@GORDON-INC.COM

[1] LEED is a registered trademark of the U.S. Green Building Council.



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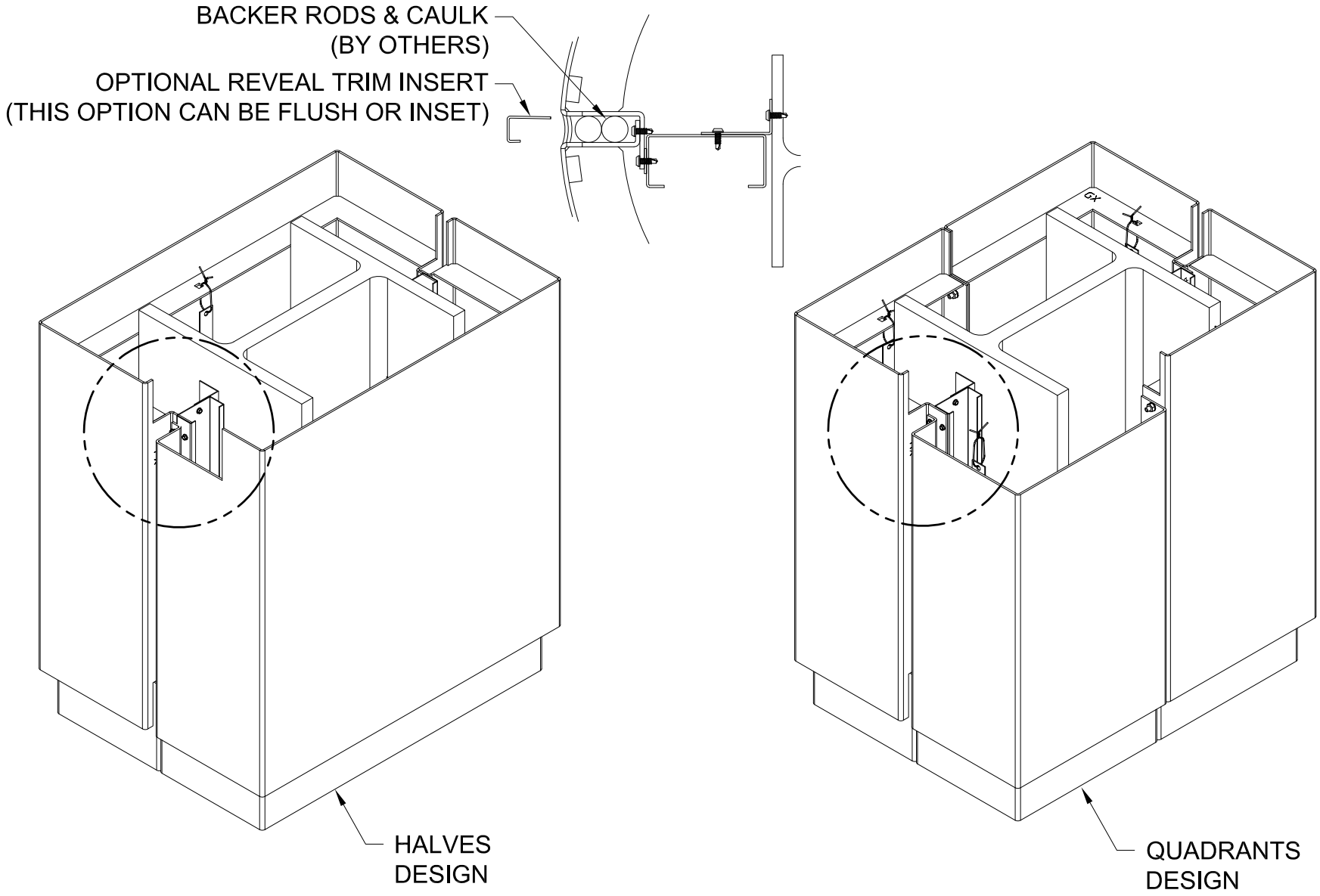
COLUMN COVERS
REVEAL-JOINT
ROUND COLUMN ISOMETRIC



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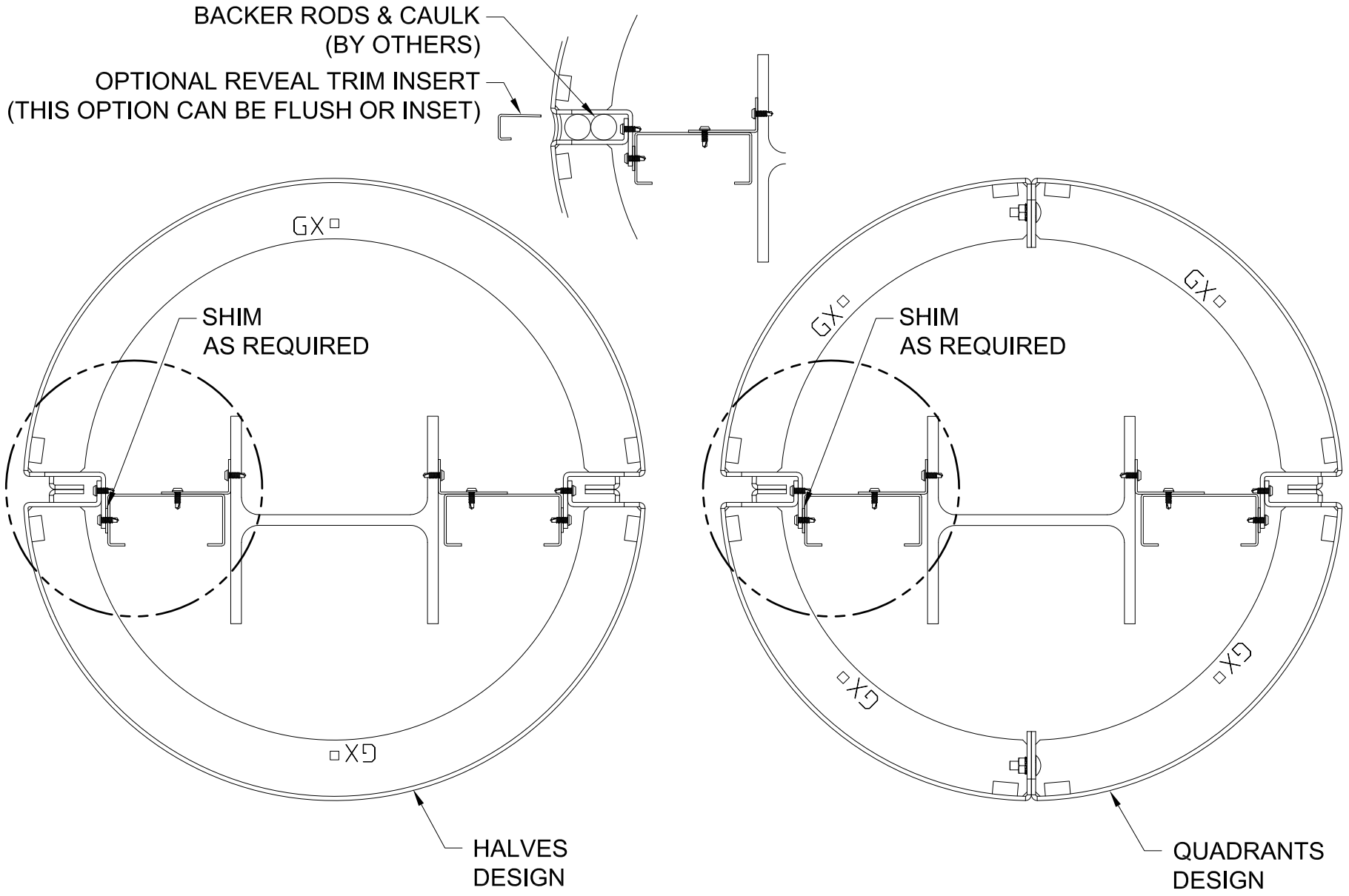
COLUMN COVERS
REVEAL-JOINT
RECTANGLE COLUMN ISOMETRIC



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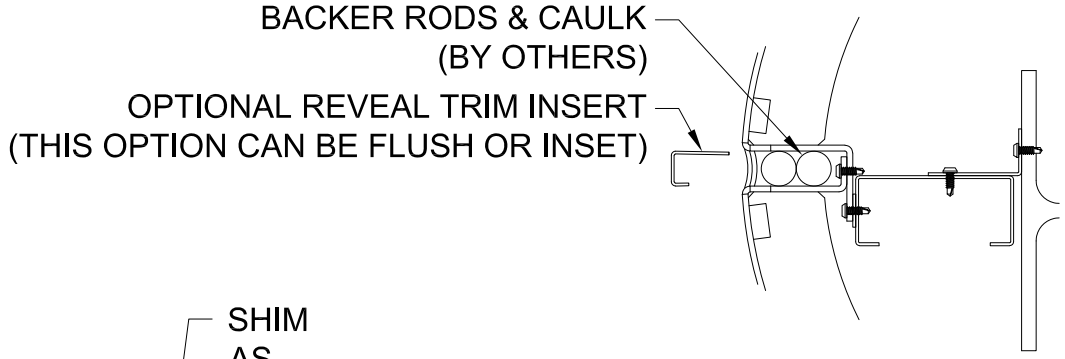
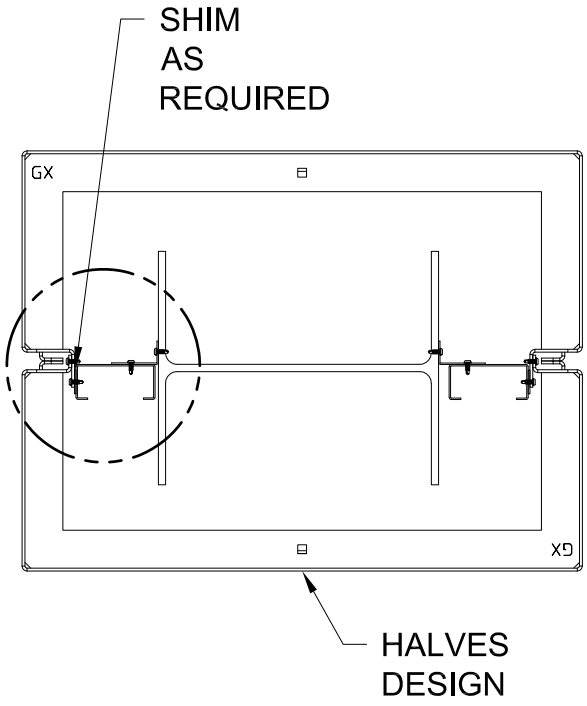
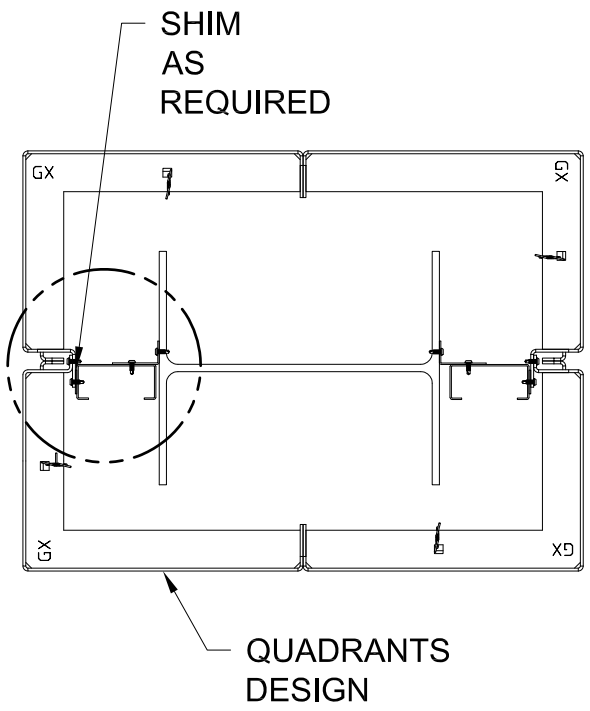
COLUMN COVERS
REVEAL-JOINT
ROUND COLUMN CROSS SECTION







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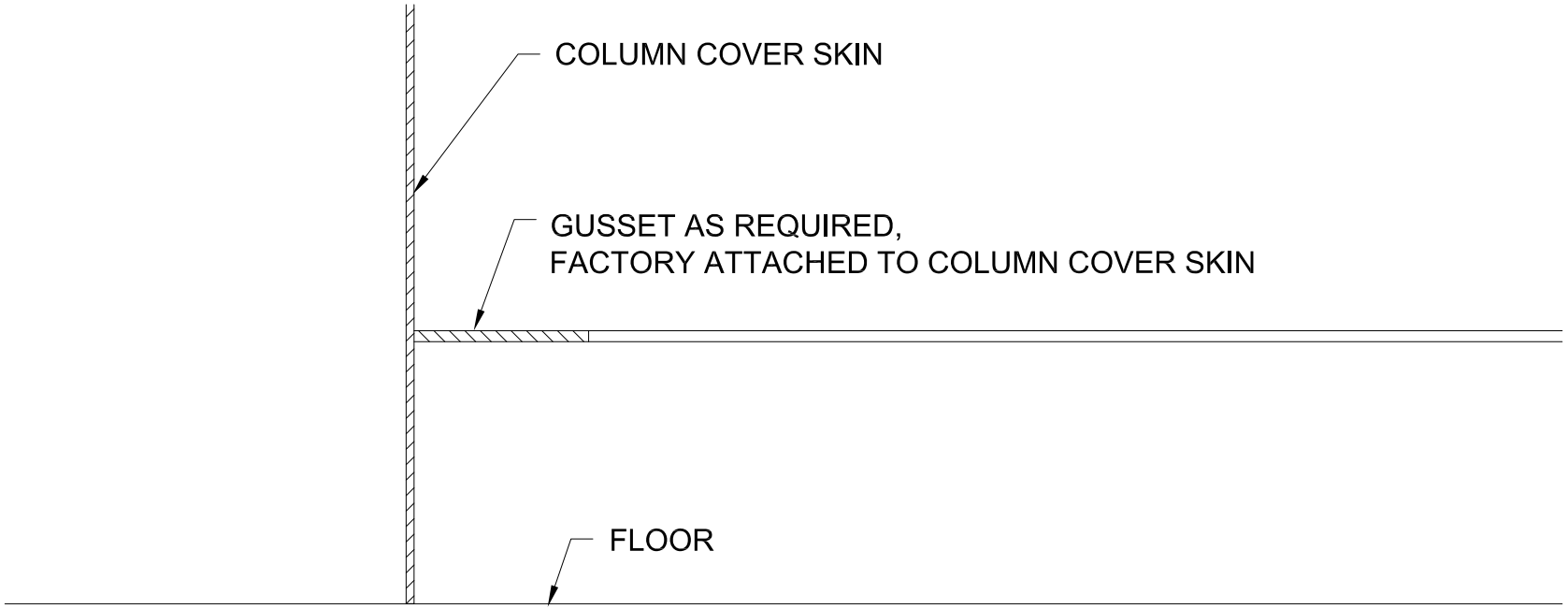
COLUMN COVERS
REVEAL-JOINT
RECTANGLE COLUMN CROSS SECTION



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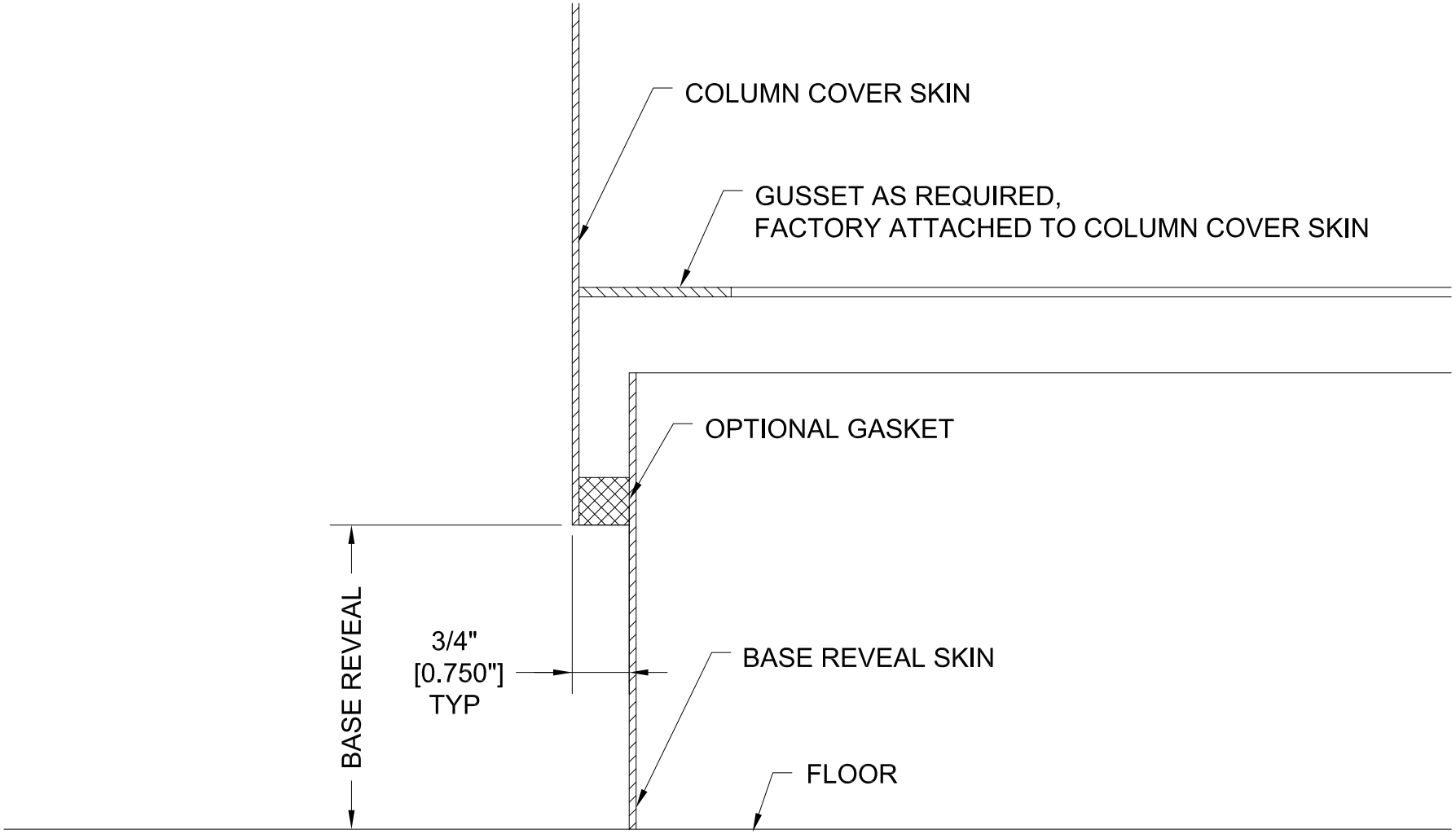
COLUMN COVERS
REVEAL-JOINT
BASE SECTION



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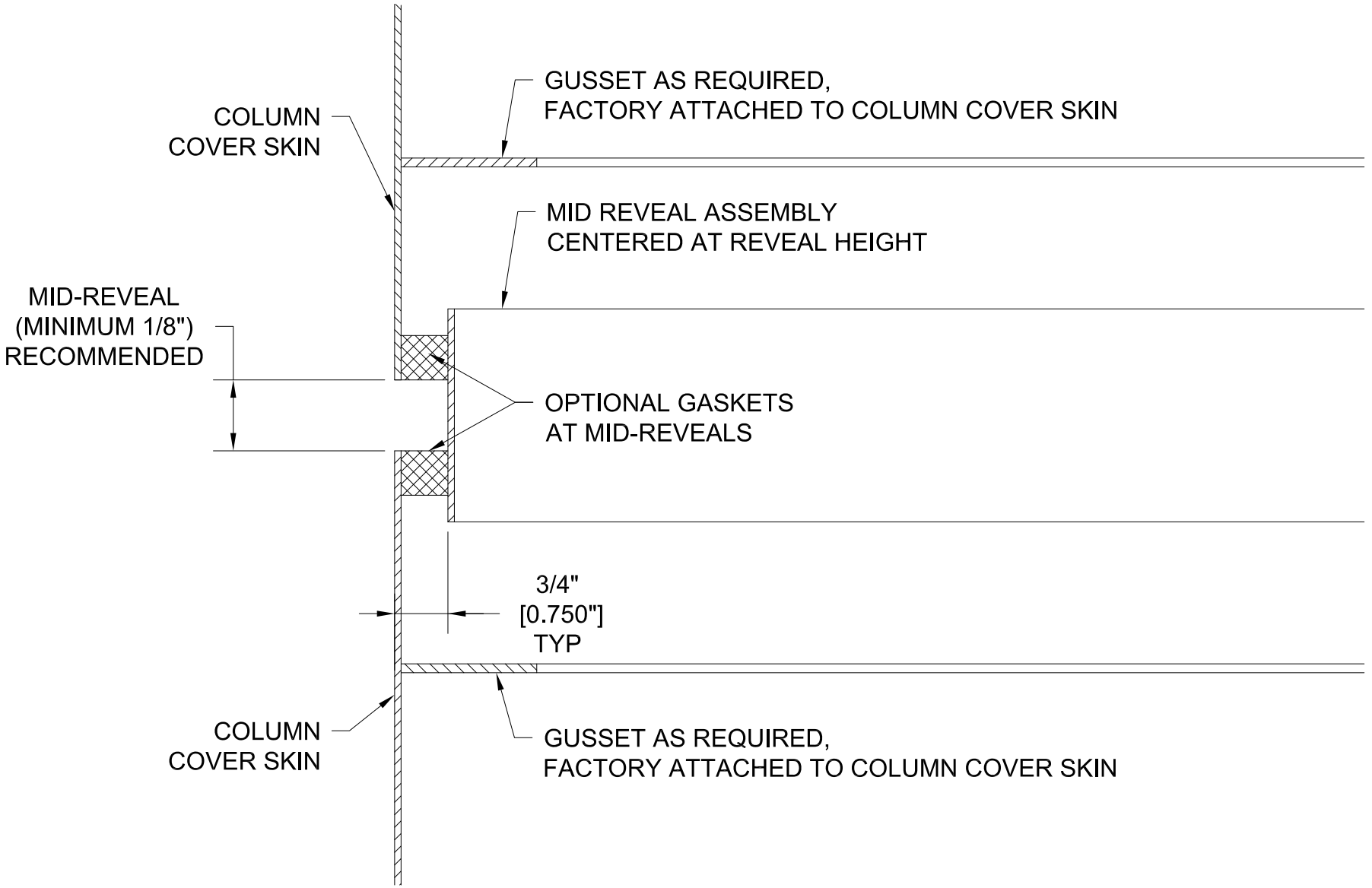
COLUMN COVERS
REVEAL-JOINT
BASE REVEAL SECTION



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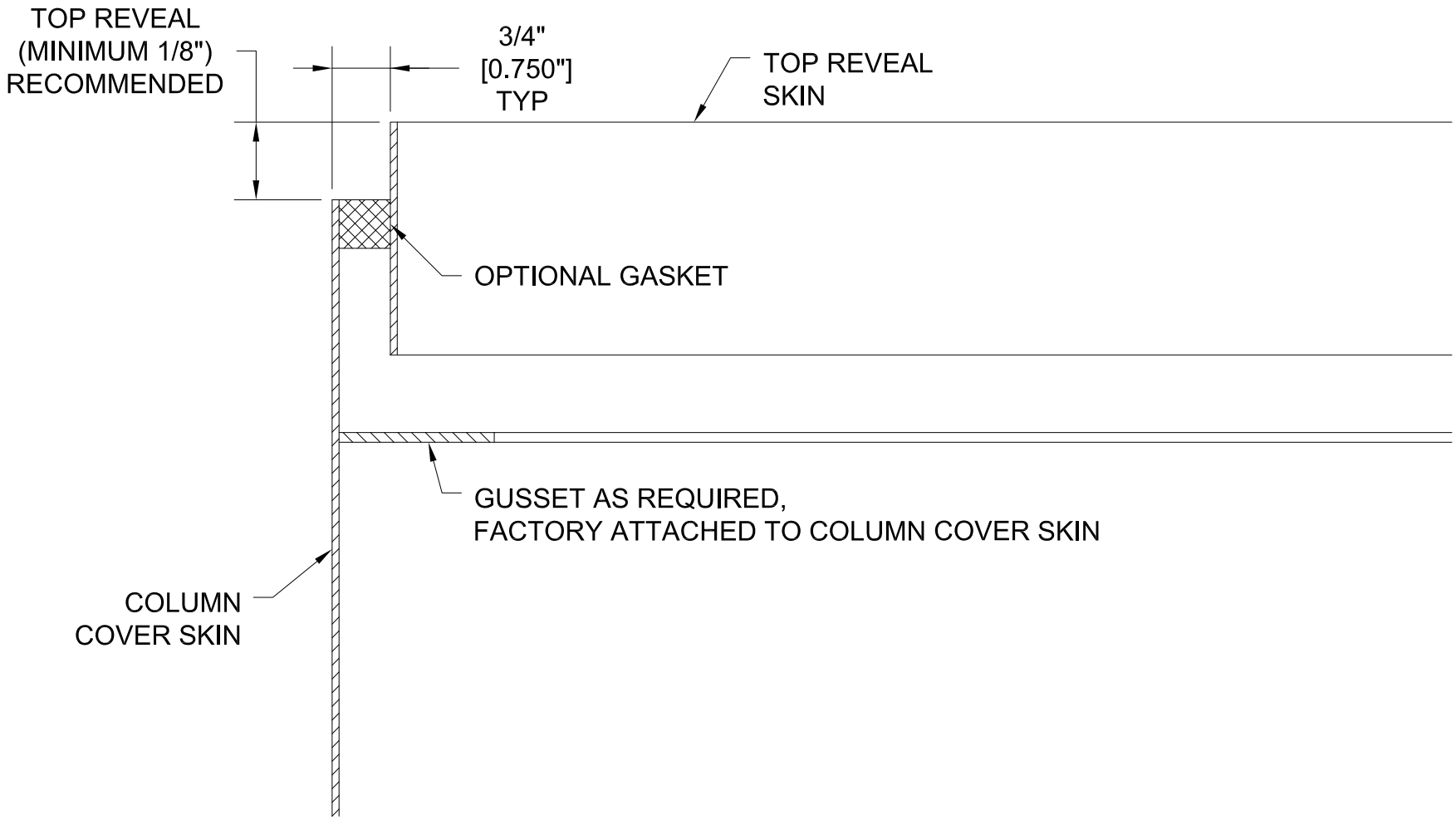
COLUMN COVERS
REVEAL-JOINT
STACK REVEAL SECTION



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COLUMN COVERS
REVEAL-JOINT
TOP REVEAL SECTION

FOR SUBMITTAL

FRY REGLET
ARCHITECTURAL METALS

Alpharetta, Ga - Santa Fe Springs, Ca.

Formed Metal Shapes

Transmittal

Project Name: **CVG**
Quote Number: **FMS101917MB**
Today's Date: **11/20/2017**
Revision Number: **1-Submittal**

Prepared For:

Name: **NEXGEN BUILDING SUPPLY**
Address: **3274 SPRING GROVE AVE**
City, State, Zip: **CINCINNATI, OH 45225**
Phone: **513-723-1150**
Attention: **SLY PAOLO**

Submitted By:

Name: **Fry Reglet Corporation**
Address: **1377 Stonefield Court**
City, State, Zip: **Alpharetta, Ga. 30004**
Phone: **800-955-2343**
Fax: **800-200-4379**
Attention: **Lindsey Harrison**
Department: **Project Manager**
Email: **LINDSEYHARRISON@FRYREGLET.COM**

No. Copies	Drawing or Document No.	Description
1 ea	CS - A1	For Submittal

ATTACHED YOU WILL FIND THE SHOP SUBMITTAL DRAWINGS FOR THE PROJECT ABOVE.
WE WILL REQUIRE ONE (1) COMPLETE SET OF SIGNED AND APPROVED DRAWINGS RETURNED TO OUR FACILITY WITH VERIFIED DIMENSIONS, QUANTITIES, FINISHES AND/OR COLORS PRIOR TO SECURING MATERIALS OR GENERATING A SHOP PACKAGE. SHOULD YOU HAVE ANY QUESTIONS, WE CAN BE REACHED BY PHONE, FAX, OR E-MAIL BETWEEN THE HOURS OF 9:00 A.M. AND 5:00 P.M. E.S.T. MONDAY THROUGH FRIDAY.

NOTE:
QUOTED LEAD TIMES DO NOT START UNTIL FRY REGLET IS IN RECEIPT OF FINAL APPROVED DRAWINGS WITH FIELD VERIFIED DIMENSIONS

☐ Approved w/o Changes
☐ Approved as noted with modifications

Approval Signature: _____ Date: _____

c.c. Lindsey Harrison

SYSTEM DESCRIPTION

FRY REGLET COLUMN COVER TYPE "**R**" AS MANUFACTURED
BY FRY REGLET CORPORATION-ALPHARETTA, GEORGIA

MATERIAL TYPE: .125 MILLED ALUMINIUM
SEAM TYPE: 1/2" REVEAL (BLACK)
TOP REVEAL: NONE
MID REVEAL: NONE
BASE REVEAL: YES
STACK JOINT: N/A
POSTS: INCLUDED - EXTRUDED ALUMINUM POST W/ FOOT TOP & BASE

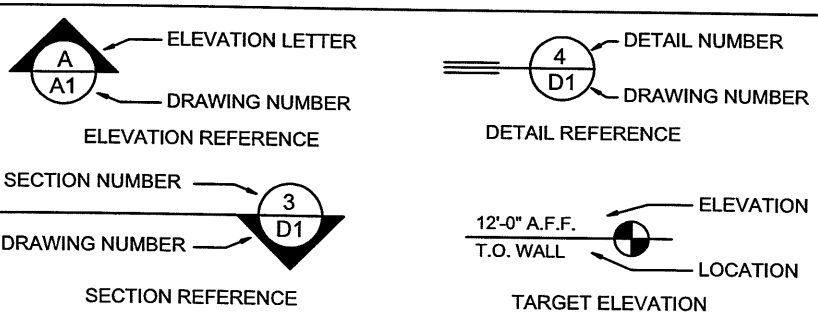
FINISH FOR FRY REGLET COLUMN COVER TYPE "**R**"

SKIN FINISH: STANDARD POWDER COAT
SKIN COLOR: PRIMER
REVEAL FINISH: STANDARD POWDER COAT
REVEAL COLOR: PRIMER

RING/COLLAR: NO
DUCT LINER: NO

QUOTE LINE 1
ITEM 1 OF 1

SYMBOL LEGEND



PART LEGEND

TC	TOP CAP	EXP	EXPANSION JOINT
R	HORIZ. REVEAL	Z	ATTACH. ZEE
S	COLUMN SKIN	AA	ATTACH. ANGLE
P/N:	PART NUMBER	P	ATTACH. POST
SA	SKIN ANGLE	PF	ATTACH. POST FOOT
RA	REVEAL ANGLE	PS	ATTACH. POST SPLICE

ABBREVIATIONS

N.B.F.R.	*NOT BY FRY REGLET*
O.S.	OUTSIDE
I.S.	INSIDE
EXT.	EXTERIOR
INT.	INTERIOR
T.O.	TOP OF
B.O.	BOTTOM OF
A.F.F.	ABOVE FINISH FLOOR
ELEV.	ELEVATION
GA.	GAUGE
S.S.	STAINLESS STEEL
ALUM.	ALUMINUM
ANOD.	ANODIZED
P.L.	PAINTLOCK
GALV.	GALVANIZED
C.M.U.	CONCRETE MASONRY UNIT
E.J.	EXPANSION JOINT
W/	WITH
INSUL.	INSULATION
GYP.	GYPSUM
NEO.	NEOPRENE
T.S.	TUBE STEEL
MAT'L	MATERIAL
T.B.D.	TO BE DETERMINED

GENERAL NOTES

1. DO NOT SCALE SHOP DRAWINGS.
2. ALL SEALANTS AND BACKER ROD N.B.F.R.
3. ALL FASTENERS N.B.F.R.
4. ALL STRUCTURAL FRAMING FROM VERTICAL ATTACHMENT POSTS BACK TO EXISTING STRUCTURE N.B.F.R.
5. CUSTOMER TO VERIFY ALL DIMENSIONS, ANGLES, QUANTITIES, FINISHES, AND COLORS. FRY REGLET REQUIRES ONE (1) SIGNED AND RETURNED SET OF DRAWINGS PRIOR TO MANUFACTURE.
6. SHOP DRAWINGS BASED ON INFORMATION SUPPLIED TO FRY REGLET FROM CUSTOMER.
7. ALL LINEAR DIMENSIONS ±1/32" NOM.
8. ALL ANGULAR DIMENSIONS ±1° NOM.
9. GRAIN DIRECTION IS VERTICAL UNLESS OTHERWISE INDICATED BY THE CUSTOMER

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ARCHITECTURAL METALS
Alpharetta, Ga - Santa Fe Springs, Ca
www.FryReglet.com

FMS
Formed Metal Shapes

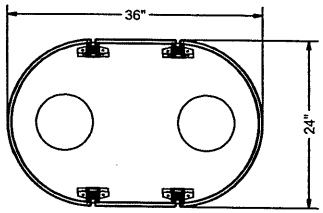
CUSTOMER NAME: NEXGEN BUILDING SUPPLY
QUOTE#: FMS101917MB_V2
PROJECT NAME: CVG
PROJECT LOCATION: CIN OH
ESTIMATOR: LINDSEY HARRISON

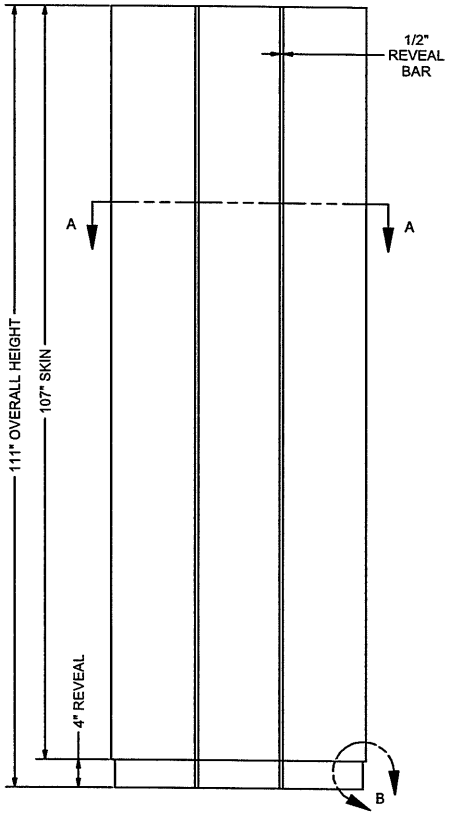
DATE: 11/20/17
REV: 1 FOR APPROVAL
DRAWN BY: ZB
SCALE: NONE

DRAWING NUMBER

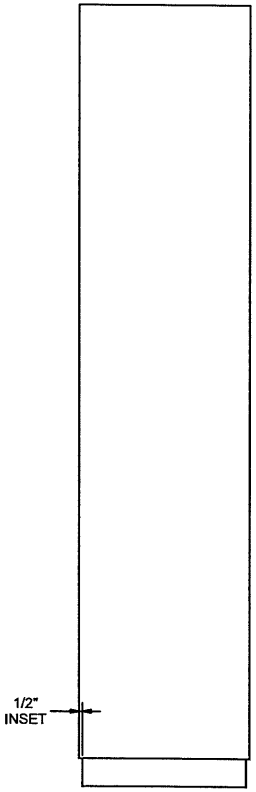
CS

F:\FMS\Engineering\Awarded Jobs\CVG\ENG\CVG.idw

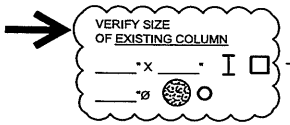


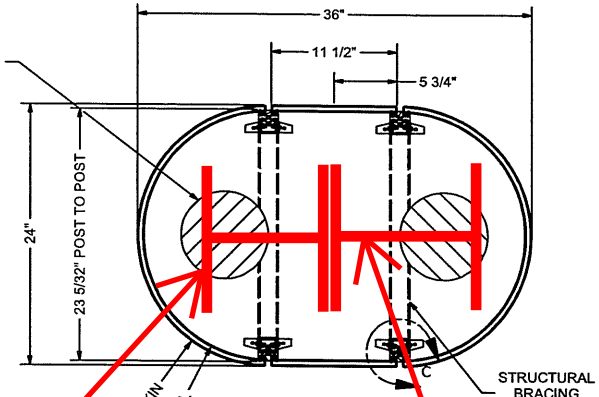


ELEVATION - 1 REQ'D

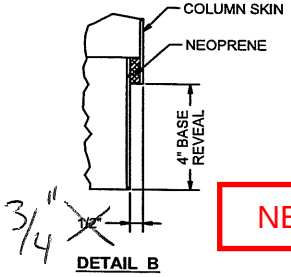


SIDE ELEVATION





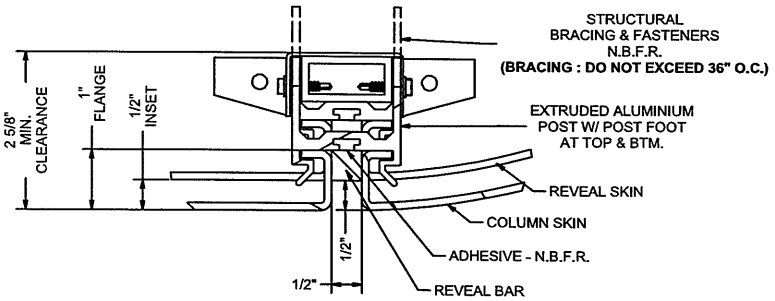
SECTION A-A



DETAIL B

NEW W12X53

EXISTING W14



DETAIL C

QUOTE LINE 1
ITEM 1 OF 1

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FMS
Formed Metal Shapes

CUSTOMER NAME: NEXGEN BUILDING SUPPLY	DATE: 11/20/17	DRAWING NUMBER
QUOTE#: FMS101917MB_V2	REV: 1 FOR APPROVAL	
PROJECT NAME: CVG	DRAWN BY: ZB	A1
PROJECT LOCATION: CIN OH	SCALE: NONE	
CAD FILE: F:\FMS\Engineering\Awarded Jobs\CVG\ENG\CVG.idw	ESTIMATOR: LINDSEY HARRISON	

Appendix 9 - Standard Guide for Flood Testing Horizontal Waterproofing Installation

Standard Guide for Flood Testing Horizontal Waterproofing Installations

5.1 This guide describes the techniques used to test for watertightness of waterproofing installations on horizontal services having a slope not greater than 20 mm/m (2 % slope) (1/4 in./ft). See also ACI 515.

5.2 The structural capacity of the substrate to which the waterproofing system is to be installed should be reviewed by a licensed structural engineer to verify that the loads associated with the use of procedures described in this guide do not exceed code and design restrictions. Lateral loads will be imposed on curbs or walls used for containment of the water during the test procedures and their effect should be accounted for. The effects of equipment, planters, or other movable objects present within the test area should be considered.

NOTE 1: Potable water weighs approximately 1000 kg/cubic m (62.3 lb per cubic ft) at 22 °C (71.6 °F) or 1 g/cm^2/cm depth (5.19 lb/ft^2 per in. depth).

5.3 This guide describes a procedure to test for watertightness of waterproofing installations under ponded water with a short-term hydrostatic head measuring not more than 100 mm (4 in.).

NOTE 2: Increasing the amount of water forming a hydrostatic head beyond 100 mm (4 in.) of water may be considered provided the impact of increased loads on the substrate has been reviewed and approved by a licensed structural engineer.

5.4 For the purposes of this guide, the installation of the waterproofing membrane and flashing should be completed and the materials fully cured. Manufacturers should specify a minimum time period for materials to cure prior to performing flood test, however, no testing should be performed during the first 24 h following installation of system materials (48 h min if materials are installed at a time when ambient temperatures are below 10 °C (50 °F)).

5.5 The additional loads imposed upon the structure during the test period will affect the deflection of structural items. The effects shall be analyzed by a licensed structural engineer prior to placement of additional loads. Critical locations shall be monitored during the duration of the test period.

5.6 This guide is not recommended to be used if freezing temperatures are expected to occur during the test period. Ponded water can freeze and become adhered to the waterproofing system, resulting in pulling or tearing of the flashings away from the substrate or may break interior corners.

5.7 The intent of this guide is to provide a measure of confidence of the waterproofing installation to remain watertight for the service life of the system, based upon the observed performance of the system under ponded water for a limited period of time.

Scope

1.1 This guide provides the user with a method for testing the watertightness of waterproofing installations applied to horizontal surfaces having a slope not greater than 20 mm/m (2 % slope) (1/4 in. per ft).

1.2 This guide is intended for waterproofing installation on parking garages and plaza deck type applications over habitable spaces or on elevated structures, but is not intended for use on building roofing systems. Applicable waterproofing membrane installations that may be tested using this guide are fully adhered or bonded sheet membranes, liquid or fluid-applied membranes, or loose-laid sheet membranes.

1.3 The procedures presented here are not intended for use on those waterproofing installation applications that are for long-term water storage or continuously submerged environments, such as swimming pools, fountains, tank liners with hydrostatic pressure, or water storage units (storage period greater than 48 h).

1.4 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.5 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.6 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

Appendix 10- Architectural Acoustics Design Criteria

1.0 Room Acoustics

Summary of Mid-Frequency Reverberation Time (RT60) Criteria for Project Areas

Room	RT60 (Seconds)
Circulation Areas (e.g., concourse)	1.5
Concession Areas	1.0
Gate Areas	1.0

Note: An acoustic ceiling is generally required to achieve appropriate reverberation conditions.

2.0 Interior Sound / Impact Isolation

Room Separation Partition Criteria – Minimum Sound Transmission Class (STC)

Room Adjacencies	Circulation (e.g., concourse)	Concession Area	Gate Area	BOH (not acoustically sensitive)	BOH (acoustically sensitive)	Electrical / Mechanical Room
Circulation Area	NA	NA	NA	50	60	50
Concession Area	NA	NA	50	50	60	50
Gate Area	NA	50	NA	50	60	55
BOH Space (not acoustically sensitive)	50	50	50	45	55	50
BOH Space (acoustically sensitive)	60	60	60	55	55	60
Electrical / Mechanical Room	50	50	55	50	60	NA

Room Separation Partition Criteria – Minimum Impact Insulation Class (IIC)

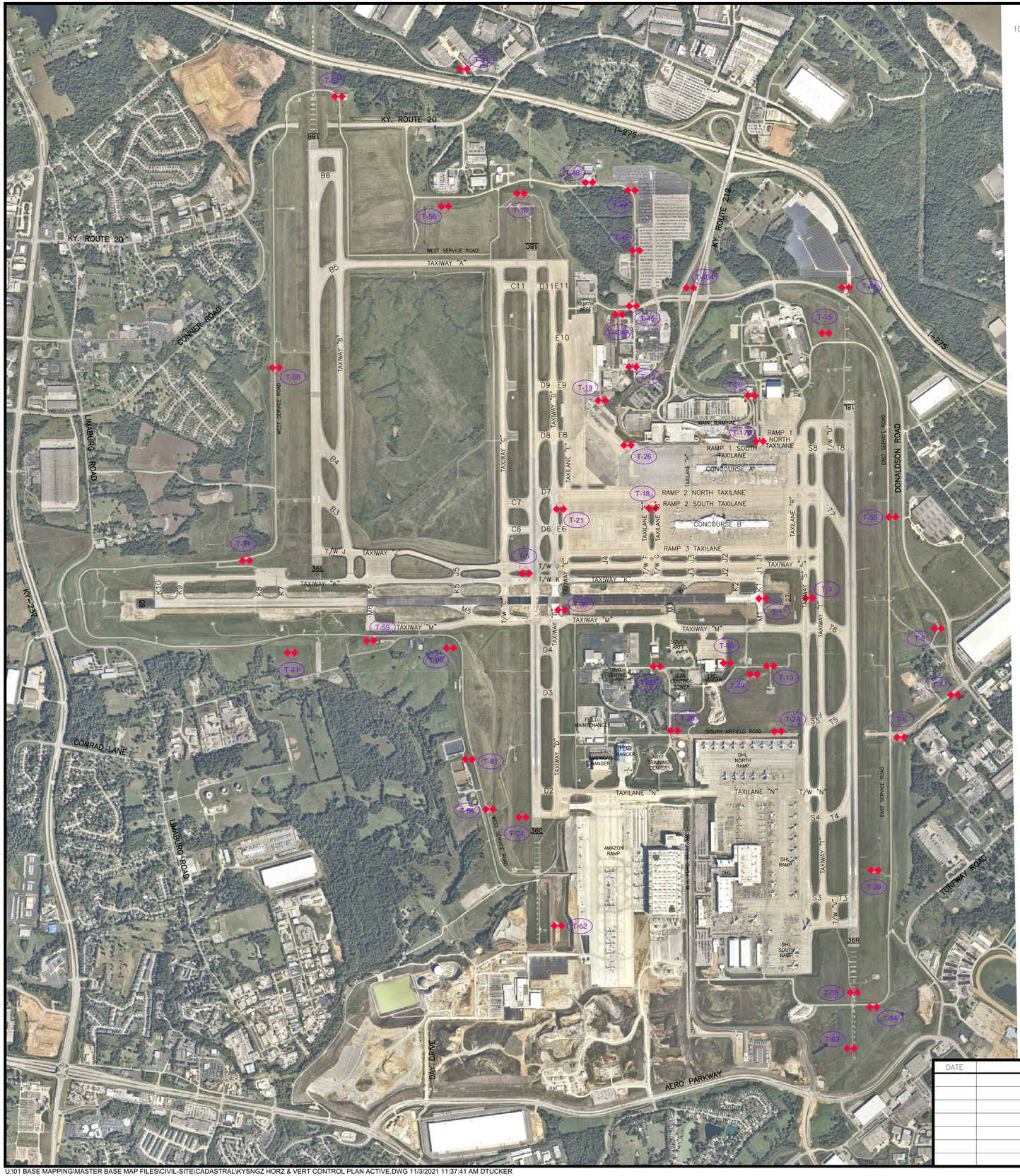
Room Adjacencies	Circulation (e.g., concourse)	Concession Area	Gate Area	BOH (not acoustically sensitive)	BOH (acoustically sensitive)
Circulation Area	NA	50	NA	50	60
Concession Area	50	50	NA	50	60
Gate Area	NA	NA	NA	50	60
BOH Space (not acoustically sensitive)	50	50	50	50	60
BOH Space (acoustically sensitive)	60	60	60	60	60

3.0 Building Systems Noise Control

Summary of Background Noise Level Limits (Continuous Noise from MEP Systems)

Room	Noise Criteria (NC)
Circulation Area (e.g., concourse)	45
Concession Area	40
Gate Area	40

Appendix 11- AKYSNGZ Horz&Vert Control Plan Active



GRAPHIC SCALE

1000 0 500 1000 2000

(In Feet)
1 inch = 1000 ft.

NORTH

COORDINATE SYSTEM: GRID

HORIZONTAL DATUM: NAD 83 (2011)
VERTICAL DATUM: NAVD88
ZONE: Kentucky Single Zone
GEOID MODEL: GEOID 12B
UNITS: US Survey Feet

Name	Northing	Easting	Elevation	Latitude	Longitude	Ellipsoid	Condition
T-1	4270559.217	5232892.941	874.881	39°02'46.54300"	-84°39'10.25523"	763.144	GOOD
T-2A	4267932.698	5233196.222	863.578	39°02'20.55202"	-84°39'06.80351"	751.860	GOOD
T-3	4270566.985	5233818.944	882.369	39°02'46.51201"	-84°38'58.51905"	770.633	GOOD
T-5	4271057.308	5228212.664	862.532	39°02'52.00492"	-84°40'09.49435"	750.785	GOOD
T-6	4267815.998	5235624.838	896.859	39°02'19.11524"	-84°38'36.04684"	785.145	GOOD
T-7	4268655.187	5236685.953	911.246	39°02'27.28369"	-84°38'22.47446"	799.526	GOOD
T-8 (FAA CVG 0)	4269965.283	5236356.026	926.408	39°02'40.26906"	-84°38'26.45789"	814.679	GOOD
T-10	4278573.482	5228112.161	869.489	39°04'06.29216"	-84°40'09.66498"	757.710	GOOD
T-12	4275138.395	5230326.386	844.464	39°03'32.09205"	-84°39'42.10387"	732.701	GOOD
T-13	4269222.389	5233045.461	902.144	39°02'33.31451"	-84°39'08.52166"	790.416	GOOD
T-14	4276711.440	5234530.828	877.567	39°03'47.14914"	-84°38'48.57698"	765.795	GOOD
T-15	4275806.472	5234134.289	891.997	39°03'38.25247"	-84°38'53.73882"	780.231	GOOD
T-17A	4273668.614	5232836.877	877.817	39°03'17.27700"	-84°39'10.50246"	766.062	GOOD
T-18	4272347.479	5230715.604	871.277	39°03'04.46698"	-84°39'37.58357"	759.527	GOOD
T-19	4274477.067	5229718.026	865.763	39°03'25.62677"	-84°39'49.91239"	754.002	GOOD
T-20	4274571.904	5232671.729	871.760	39°03'26.22260"	-84°39'12.46107"	760.000	GOOD
T-21	4272328.873	5228892.158	863.960	39°03'04.49289"	-84°40'00.69605"	752.208	GOOD
~~T-22~~	~~4274294.831~~	~~5230617.335~~	~~863.942~~	~~39°03'23.72230"~~	~~-84°39'38.54090"~~	~~752.182~~	REMOVED
T-24	4266234.682	5228147.857	834.809	39°02'04.35414"	-84°40'11.02318"	723.087	GOOD
T-26 (Greater AZ MK Reset)	4273592.430	5230227.416	868.021	39°03'16.82604"	-84°39'43.58674"	756.264	GOOD
T-28	4267945.384	5231145.432	860.464	39°02'20.91508"	-84°39'32.78828"	748.740	GOOD
T-31	4271310.831	5222685.907	885.574	39°02'55.13710"	-84°41'19.49893"	773.815	GOOD
~~T-32~~	~~4271177.118~~	~~5222370.997~~	~~887.422~~	~~39°02'53.85110"~~	~~-84°41'23.50912"~~	~~775.663~~	REMOVED
T-36	4270333.183	5228919.626	855.497	39°02'44.76799"	-84°40'00.64150"	743.755	GOOD
T-38	4262769.643	5234701.686	899.961	39°01'29.35403"	-84°38'48.50045"	788.280	GOOD
T-39	4265185.139	5235108.680	889.056	39°01'53.17697"	-84°38'42.98195"	777.360	GOOD
T-41	4269487.990	5223573.571	864.046	39°02'37.02351"	-84°41'08.51283"	752.297	GOOD
T-44	4281030.131	5226984.067	827.831	39°04'30.69775"	-84°40'23.60610"	716.040	GOOD
T-45	4276342.861	5230331.361	836.177	39°03'43.99412"	-84°39'41.86275"	724.409	GOOD
T-46	4277443.015	5230396.204	850.531	39°03'54.85846"	-84°39'40.87814"	738.757	GOOD
T-47	4278632.461	5230300.157	856.764	39°04'06.62372"	-84°39'41.91980"	744.985	GOOD
T-48	4278788.632	5229466.101	833.338	39°04'08.26300"	-84°39'52.46982"	721.558	GOOD
T-49	4269059.049	5232719.087	922.891	39°02'31.73827"	-84°39'12.68183"	811.164	GOOD
T-50	4269215.834	5230802.936	856.871	39°02'33.50946"	-84°39'36.94023"	745.139	GOOD
~~T-52A~~	~~4263653.655~~	~~5231432.948~~	~~893.131~~	~~39°01'38.46996"~~	~~-84°39'29.78123"~~	~~781.437~~	REMOVED
T-54	4262478.051	5235081.223	885.588	39°01'26.42807"	-84°38'43.73581"	773.910	GOOD
T-55 (CVG C FFA)	4272172.100	5235459.022	919.682	39°03'02.18236"	-84°38'37.49359"	807.936	GOOD
T-56	4278315.218	5226615.474	847.706	39°04'03.91084"	-84°40'28.67570"	735.928	GOOD
T-57	4280487.897	5224510.488	846.736	39°04'25.62029"	-84°40'55.04446"	734.947	GOOD
T-58	4275124.388	5223274.722	890.740	39°03'32.75706"	-84°41'11.48596"	778.970	GOOD
T-59	4269727.134	5225136.086	861.874	39°02'39.21021"	-84°40'48.67734"	750.128	GOOD
T-60	4269577.141	5226717.320	875.702	39°02'37.54835"	-84°40'28.66113"	763.960	GOOD
T-61	4267378.999	5227086.988	847.504	39°02'15.78371"	-84°40'24.29792"	735.773	GOOD
T-62	4264087.711	5228849.269	872.200	39°01'43.05689"	-84°40'02.45136"	760.493	GOOD
T-63	4261661.408	5234635.865	915.859	39°01'18.40984"	-84°38'49.50028"	804.186	GOOD
T-404 (404)	4276703.806	5231457.652	851.520	39°03'47.43096"	-84°39'27.53282"	739.751	GOOD
T-404A (404 AZ MK)	4276175.683	5230057.174	857.695	39°03'42.37364"	-84°39'45.36292"	745.927	GOOD
T-64 (CVG E)	4266379.476	5227498.480	818.283	39°02'05.85924"	-84°40'19.23008"	706.558	GOOD
T-65	4269260.067	5232211.655	877.805	39°02'33.78364"	-84°39'19.08216"	766.075	GOOD

BASIS OF SURVEY CONTROL MONUMENTS:

THE HORIZONTAL AND VERTICAL SURVEY CONTROL INFORMATION SHOWN ON THIS DRAWING IS BASED UPON A GPS SURVEY CONDUCTED BY WOOLPERT, INC. IN DECEMBER, 2012, UPDATED IN FEBRUARY, 2017, AND IS CONSISTENT WITH A SECOND ORDER, CLASS I HORIZONTAL SURVEY AND A THIRD ORDER VERTICAL SURVEY. THE LEVELING SURVEY IS CONSISTENT WITH SECOND ORDER, CLASS I SPECIFICATIONS. GEOID 12B WAS USED FOR THE CALCULATION OF ORTHOMETRIC HEIGHTS ON SURVEY DATA.

THE HORIZONTAL AND VERTICAL COORDINATES FOR PRIMARY AIRPORT CONTROL STATION (PACS) FAA CVG 0 (T-8) WERE USED TO ESTABLISH ALL OTHER GPS DERIVED COORDINATES.

ELEVATIONS ARE BASED UPON NAVD88 AND SUPERCEDE ALL PREVIOUS SURVEY CONTROL MONUMENT INFORMATION.

SURVEY CONTROL MONUMENT DRAWINGS PRIOR TO THE 2012 UPDATE HAVE ELEVATIONS BASED UPON NGVD29.

VERTICAL DATUM REFERENCE

BENCHMARK INFORMATION:
A DIFFERENTIAL LEVEL RUN WAS COMPLETED, IN DECEMBER, 2012, THRU THE FOLLOWING MONUMENTS AND SHALL BE USED AS BENCHMARKS FOR VERTICAL REFERENCE.

MONUMENT	ELEVATION	
T-8	926.408	
T-14	877.567	
T-18	871.277	
T-19	865.763	
T-20	871.760	
~~T-22~~	~~863.942~~	Removed 2017
T-28	860.464	
T-50	856.871	
~~T-52A~~	~~893.131~~	Removed 2019
T-54	885.588	

DATE	REVISION	BY	AUTH

KENTON COUNTY AIRPORT BOARD

CVG
CINCINNATI/NORTHERN KENTUCKY
INTERNATIONAL AIRPORT

SURVEY CONTROL MONUMENTATION
2021 UPDATE - KY SINGLE ZONE

HORIZONTAL & VERTICAL
CONTROL PLAN

PROJ.NO: PD-003	CHK.BY: DFT	SHEET NO:
DATE: 11/03/2021	APPR.BY: DFT	1 of 1
DWN.BY: DFT	SCALE: 1" = 1000'	
CAD NO: KYSNGZ Horz & Vert Control Plan ACTIVE.dwg		

U:\01 BASE MAPPING\MASTER BASE MAP FILES\CIVIL-SITE\CADASTRAL\KYSNGZ HORZ & VERT CONTROL PLAN ACTIVE.DWG 11/3/2021 11:37:41 AM DTUCKER