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DIVISION 10 - SPECIALTIES

DIVISION 11 - EQUIPMENT

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BID CATEGORY #01 – SITE WORK & SITE UTILITIES

1. SCOPE OF WORK:
    a. Except for the items specifically noted below to be excluded, the work of this Bid Category shall include all labor, materials, equipment to complete work as identified below and per Contract and Division 1 General Requirements as listed in Construction Documents. Should any conflict exist between this written Scope of Work and the scope of work inferred by the Division 1 General Requirements or the Specification Sections listed below, the work required by this Bid Category description shall govern. Work of this Bid Category shall include the following Specification Sections:

DIVISION 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS
DIVISION 01 - GENERAL REQUIREMENTS
31 10 00 Site Clearing
31 20 00 Earth Moving
31 23 00 Foundation Excavating and Backfilling
31 25 00 Erosion Control
32 11 23 Aggregate Base Courses
32 13 13 Concrete Paving
32 17 23 Pavement Markings
33 31 00 Sanitary Sewer Systems
33 41 00 Storm Utility Drainage Piping
Asphalt Patching
Underpinning (As applicable to this bid category)

2. GENERAL REQUIREMENTS INCLUDED BUT NOT LIMITED TO:
    a. Provide project manager and qualified onsite supervisor (changes to personnel will require CM approval)
    b. Daily coordination with other trades whose work is interfaced with the work of this Bid Category and as required for the completion of the work of all Bid Categories.
    c. Any and all layout, grades, elevations, dimensioning and engineering required to complete the work of this Bid Category and as further described in Division 1 requirements.
    d. Verify all existing elevations and dimensions relative to work of this Bid Category prior to start of the work.
    e. All labor, materials, equipment, tools, incidental hardware required to receive, unload, store, protect and install all the work of this Bid Category as well as installation of materials supplied by other Bid Categories that are required to be installed by this Bid Category. If unloading of equipment/materials is required to be done by the construction manager with their rough terrain forklift this will be billed to the bid category subcontractor at $150 per hour with a one-hour minimum charge (this cost includes the operator).
    f. Bid category contractor will be provided pdf file of the construction documents, it is the responsibility of the sub-contractor to print their own copies for use.
    g. Bid Category Contractor is responsible to verify that any previous work completed that has a direct effect on the work of this category is complete and acceptable prior to commencing with work. Contractor will notify the Construction Manager of any discrepancies immediately for correction by responsible Contractor.
    h. Bid category contractor work will require multiple mobilizations, no additional mobilization cost will be accepted.
    i. Provide daily clean up and trash removal of all debris as a result of this Bid Categories work. All work areas are to be maintained in a safe and accessible manner at all times.
    j. Bid Category Contractor is aware of delivery requirements of the Project Schedule included in the Construction Documents and assumes responsibility to complete all work of this Bid Category to meet the Project Schedule requirements. This contractor will, within seven (7) days of Notice of Award, submit a preliminary schedule detailing work of this Bid Category to comply with the time requirements of Project Schedule.
    k. Bid category contractor to include all fees and permit costs that pertain to their scope of work.
    l. Bid category contractor is required to sign the construction managers subcontract agreement included in the project manual (no modifications to the contract permitted).

m. At completion of work, restore any site areas disturbed by construction activity of this Bid Category to originally graded condition as was provided to this contractor at the start of work.
n. Submit to Construction Manager written requests for clarification or interpretation of the meaning and/or intent of the Construction Documents at either time of bidding or during construction.
o. Provide a project specific Safety Program to Construction Manager.
p. By submitting a bid for this Bid Category, the Bidding Contractor has implied that he/she has visited the site, is familiar with the project's local conditions and has factored these conditions into the bid submitted. Furthermore, Bidding Contractor warrants that the work can be completed per the Construction Documents based on the site visit observations and has taken into consideration the existing physical conditions that may affect the work of this Bid Category and that all such costs to complete the work of this Bid Category due to existing project site conditions are included in the bid submitted.
q. If weather conditions are a factor in completion of this Bid Categories work, Contractor is to provide documentation substantiating normal weather conditions anticipated and included in submitted bid.
r. Background checks are required for all workers onsite. County will perform background checks at no cost. There is also a zero-tolerance agreement required to be signed for all employees working in the law enforcement center.

3. SPECIFIC ITEMS TO INCLUDE:
   a. All requirements of Specification Sections as noted in Scope of Work above
   b. Excavation, backfill and compaction required to complete work of this Bid Category
   c. Coordination with local utilities
   d. Permits and fees for this work
   e. Provide and remove temporary gravel access drive
   f. Haul and dispose of all excess materials offsite
   g. Associated layout/surveying for this work (Maas Brothers will provide only site boundaries, building corners, and a benchmark elevation)
   h. Removal of existing trees and shrubs, vegetation, paving, foundations, rubble to be disposed of off site
   i. Protection of adjacent work, and salvage of material for reuse as directed by the owner/architect.
   j. Sawcutting and removal of exterior stairwell in Area B.
   k. Tree protection
   l. Street cleaning and traffic control measures for this work
   m. Removal of topsoil for reuse during final grading, store topsoil onsite and provide temporary erosion control and seeding as required
   n. Grade site to final subgrade elevations indicated on the plans
   o. Import or export of material as needed
   p. Placing, maintaining and removal of erosion control measures per plan. Maintenance to be performed throughout the duration of the project
   q. Removal of spoils related to the earth retention system/push piles at the west addition
   r. Conduct DNR Erosion Control site inspections and fill out all necessary reports as required. Supply copies of reports to Maas Brothers within 24 hours of a rain event
   s. Periodic removal of silt from basins as required during construction
   t. Footing/foundation excavation and backfill. Maintain grades around excavation to prevent surface water from entering excavations. Excavations to follow any and all OSHA Regulations.
   u. Crushed aggregate base course for asphalt paving, concrete paving, sidewalks, curbs, concrete site pads, and building slabs on grade to within one tenth of a foot (this contractor will also provide all crushed aggregate for fine grading)
   v. Sawcut & Removal of Asphalt as indicated
   w. Asphalt patching as identified on the plans (sawcut asphalt edge again prior to patching so a clean line is present)
   x. Removal/disposal of existing MIS Building at 402 S. Center Avenue including all local permits and fees for abandonment of all existing utilities (asbestos abatement by owner). Foundation removal and backfill with suitable compactable fill is required
   y. Topsoil placement and final grading ready for seeding and landscaping by others

z. Hand work required to complete this work
aa. Provide and remove concrete wash out area for concrete trucks
bb. All sanitary sewers, storm sewers (Including storm sewers related to downspouts), and associated structures
cc. Site demolition as shown including saw cutting of asphalt/concrete and removal
dd. Assist in the excavation for the indicated underpinning of existing foundations (machine work for removal of soils)
ee. Pumping water from utility trenches
ff. Concrete curb
gg. Performance and payment bond

4. EXCLUDED ITEMS:
    a. Concrete work
    b. Sidewalk, fencing, landscape repairs and restoration work

1. SCOPE OF WORK:
    a. Except for the items specifically noted below to be excluded, the work of this Bid Category shall include all labor, materials, equipment to complete work as identified below and per Contract and Division 1 General Requirements as listed in Construction Documents. Should any conflict exist between this written Scope of Work and the scope of work inferred by the Division 1 General Requirements or the Specification Sections listed below, the work required by this Bid Category description shall govern. Work of this Bid Category shall include the following Specification Sections:

DIVISION 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS
DIVISION 01 - GENERAL REQUIREMENTS
02 41 19 Selective Demolition
05 05 53 Security Metal Fastenings (As applicable to this bid category)
05 73 00 Decorative Metal Railings
06 10 00 Rough Carpentry
06 16 00 Sheathing
06 20 23 Interior Finish Carpentry
06 40 00 Architectural Woodwork
06 42 16 Flush Wood Paneling
07 24 19 Water-Drainage Exterior Insulation and Finish System
07 81 00 Applied Fireproofing
07 81 23 Intumescent Fireproofing
07 84 13 Penetration Firestopping (As applicable to this bid category)
07 84 43 Joint Firestopping (As applicable to this bid category)
07 92 00 Joint Sealants (As applicable to this bid category)
08 11 13 Hollow Metal Doors and Frames
08 12 16 Aluminum Frames
08 14 16 Flush Wood Doors
08 63 00 Metal-Framed Skylights
08 71 00 Door Hardware (As applicable to this bid category)
~~09 67 23 Resinous Flooring~~
10 00 10 Miscellaneous Specialties
10 11 00 Visual Display Surfaces
10 14 00 Signage
10 21 13.13 Metal Toilet Compartments
10 22 13 Wire Mesh Partitions
10 22 39 Folding Panel Partitions
10 28 00 Toilet, Bath, and Laundry Accessories
10 51 13 Metal Lockers
10 51 29 Phenolic Lockers
12 67 23 Benches
14 42 00 Wheelchair Lifts
Micro Piles (Earth Retention System)

2. GENERAL REQUIREMENTS INCLUDED BUT NOT LIMITED TO:
    a. Provide project manager and qualified onsite supervisor (changes to personnel will require CM approval)
    b. Daily coordination with other trades whose work is interfaced with the work of this Bid Category and as required for the completion of the work of all Bid Categories.
    c. Any and all layout, grades, elevations, dimensioning and engineering required to complete the work of this Bid Category and as further described in Division 1 requirements.
    d. Verify all existing elevations and dimensions relative to work of this Bid Category prior to start of the work.
    e. All labor, materials, equipment, tools, incidental hardware required to receive, unload, store, protect and install all the work of this Bid Category as well as installation of materials supplied by other Bid Categories that are required

to be installed by this Bid Category. If unloading of equipment/materials is required to be done by the construction manager with their rough terrain forklift this will be billed to the bid category subcontractor at $150 per hour with a one-hour minimum charge (this cost includes the operator).

f. Bid category contractor will be provided pdf file of the construction documents, it is the responsibility of the sub-contractor to print their own copies for use.
g. Bid Category Contractor is responsible to verify that any previous work completed that has a direct effect on the work of this category is complete and acceptable prior to commencing with work. Contractor will notify the Construction Manager of any discrepancies immediately for correction by responsible Contractor.
h. Bid category contractor work will require multiple mobilizations, no additional mobilization cost will be accepted.
i. Provide daily clean up and trash removal of all debris as a result of this Bid Categories work. All work areas are to be maintained in a safe and accessible manner at all times.
j. Bid Category Contractor is aware of delivery requirements of the Project Schedule included in the Construction Documents and assumes responsibility to complete all work of this Bid Category to meet the Project Schedule requirements. This contractor will, within seven (7) days of Notice of Award, submit a preliminary schedule detailing work of this Bid Category to comply with the time requirements of Project Schedule.
k. Bid category contractor to include all fees and permit costs that pertain to their scope of work.
l. Bid category contractor is required to sign the construction managers subcontract agreement included in the project manual (no modifications to the contract permitted).
m. At completion of work, restore any site areas disturbed by construction activity of this Bid Category to originally graded condition as was provided to this contractor at the start of work.
n. Submit to Construction Manager written requests for clarification or interpretation of the meaning and/or intent of the Construction Documents at either time of bidding or during construction.
o. Provide a project specific Safety Program to Construction Manager.
p. By submitting a bid for this Bid Category, the Bidding Contractor has implied that he/she has visited the site, is familiar with the project's local conditions and has factored these conditions into the bid submitted. Furthermore, Bidding Contractor warrants that the work can be completed per the Construction Documents based on the site visit observations and has taken into consideration the existing physical conditions that may affect the work of this Bid Category and that all such costs to complete the work of this Bid Category due to existing project site conditions are included in the bid submitted.
q. If weather conditions are a factor in completion of this Bid Categories work, Contractor is to provide documentation substantiating normal weather conditions anticipated and included in submitted bid.
r. Background checks are required for all workers onsite. County will perform background checks at no cost. There is also a zero-tolerance agreement required to be signed for all employees working in the law enforcement center.

3. SPECIFIC ITEMS TO INCLUDE:
    a. All requirements of Specification Sections as noted in Scope of Work above.
    b. Safety barricades for this work
    c. Associated layout for this work (Maas Brothers will only provide site boundaries, building corners, and a benchmark elevation one time)
    d. Street cleaning and traffic control measures for this work
    e. Provide project manager and qualified **full time onsite supervisor** (changes to personnel will require CM approval)
    f. Include micro piles/earth retention at area indicated on west addition (design, engineering and installation) on the structural plans, including excavation and footing removal as required (hauling and removal/disposal of spoils by bid package #1)
    g. Demolition of new openings in existing masonry to include any required shoring/needling. Demo in a workmanlike manner to accommodate toothing by masonry contractor
    h. Remove and salvage existing wire mesh partitions as noted on the demolition plan
    i. Remove and reinstall existing fire extinguisher cabinets and provide new as indicated on plan
    j. Removal and reinstallation of existing booking casework as noted at the Jail

k. Removal and reinstallation of existing courtroom gallery seating including modifications to existing (refinishing by BP 13)
l. Removal and reinstallation of existing jury chairs including new jury chairs identified
m. Remove/modify/reinstall existing shelves as indicated at the Judges Chambers
n. New courtroom gallery seating as shown on the plan
o. Furnish and Install all rough carpentry and wood blocking required
p. Metal supports for countertops
q. Removal, relocation and reinstallation of existing granite panels as noted
r. Any engineering work required by the specification
s. Safety barricades for this work
t. Furnish all necessary fasteners, shims, etc. for a complete installation of all items associated with the work of this bid category
u. Coordinate with other trades as necessary
~~v. Provide all security sealants as required including those required by the MEP trades~~
w. Furnish and install all hollow metal doors and frames, wood doors, and door hardware. Coordination of shop drawings/approvals, field measuring, receiving materials on-site, verification of correct material deliveries, coordination of any returns, storage onsite for installation and installation warranty
x. Furnish and install all caulking needed for this bid category
y. Furnish and install firestopping/caulking at rated wall and ceiling junctures. Firestopping/caulking of penetrations installed after wall or ceiling installation will be by the trade making the penetration
z. Furnish and install door hardware/wood doors that are installed in aluminum frames (coordinate with AL contractor)
aa. All selective demolition work other than mechanical, electrical and plumbing
bb. Remove and salvage existing high density file storage as noted
cc. Remove and salvage existing court reporter stations
dd. Remove and reinstall court reporter wall tablets
ee. Include $35,000 allowance for EIFS work
ff. Demolition of existing terrazzo cove base at new openings in main corridors in a workmanlike manner
gg. Supply all dumpsters for demolition including dumpsters for fire protection, plumbing, HVAC and electrical
hh. Performance and payment bond

4. EXCLUDED ITEMS:
   a. Construction Manager will provide temporary heating equipment, gas and electric usage required for winter construction per the base bid construction schedule.
   b. Detention Doors and hardware

1. SCOPE OF WORK:
    a. Except for the items specifically noted below to be excluded, the work of this Bid Category shall include all labor, materials, equipment to complete work as identified below and per Contract and Division 1 General Requirements as listed in Construction Documents. Should any conflict exist between this written Scope of Work and the scope of work inferred by the Division 1 General Requirements or the Specification Sections listed below, the work required by this Bid Category description shall govern. Work of this Bid Category shall include the following Specification Sections:

DIVISION 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS
DIVISION 01 - GENERAL REQUIREMENTS
02 41 19 Selective Demolition
05 05 53 Security Metal Fastenings (As applicable to this bid category)
07 84 13 Penetration Firestopping (As applicable to this bid category)
07 84 43 Joint Firestopping (As applicable to this bid category)
07 92 00 Joint Sealants (As applicable to this bid category)
08 31 13 Access Doors and Frames (As applicable to this bid category)
08 31 13.53 Security Access Doors and Frames (As applicable to this bid category)
22 00 10 Plumbing General Provisions
22 05 00 Common Work Results for Plumbing
22 05 13 Common Motor Requirements for Plumbing Equipment
22 05 16 Expansion Fittings and Loops for Plumbing Piping
22 05 19 Meters and Gauges for Plumbing Piping
22 05 23 General Duty Valves for Plumbing Piping
22 05 29 Hangers and Supports for Plumbing Piping and Equipment
22 05 48 Vibration Controls for Plumbing Piping and Equipment
22 05 53 Identification for Plumbing Piping and Equipment
22 07 00 Plumbing Insulation
22 11 16 Domestic Water Piping
22 11 23 Domestic Water Pumps
22 13 16 Sanitary Waste and Vent Piping
22 13 29 Sanitary Sewerage Pumps
22 14 13 Facility Storm Drainage Piping
22 14 29 Sump Pumps
22 15 16 Facility Natural Gas and Compressed Air Piping
22 15 17 Facility Fuel-Oil Piping
22 31 00 Domestic Water Softeners
22 34 00 Fuel-Fired Domestic Water Heaters
22 40 00 Plumbing Fixtures
22 45 00 Emergency Plumbing Fixtures
22 46 00 Security Plumbing Fixtures
22 47 00 Drinking Fountains and Water Coolers

2. GENERAL REQUIREMENTS INCLUDED BUT NOT LIMITED TO:
    a. Provide project manager and qualified onsite supervisor (changes to personnel will require CM approval)
    b. Daily coordination with other trades whose work is interfaced with the work of this Bid Category and as required for the completion of the work of all Bid Categories.
    c. Any and all layout, grades, elevations, dimensioning and engineering required to complete the work of this Bid Category and as further described in Division 1 requirements.
    d. Verify all existing elevations and dimensions relative to work of this Bid Category prior to start of the work.
    e. All labor, materials, equipment, tools, incidental hardware required to receive, unload, store, protect and install all the work of this Bid Category as well as installation of materials supplied by other Bid Categories that are required to be installed by this Bid Category. If unloading of equipment/materials is required to be done by the construction manager with their rough terrain forklift this will be billed to the bid category subcontractor at $150 per hour with a one-hour minimum charge (this cost includes the operator).

f. Bid category contractor will be provided pdf file of the construction documents, it is the responsibility of the sub-contractor to print their own copies for use.
g. Bid Category Contractor is responsible to verify that any previous work completed that has a direct effect on the work of this category is complete and acceptable prior to commencing with work. Contractor will notify the Construction Manager of any discrepancies immediately for correction by responsible Contractor.
h. Bid category contractor work will require multiple mobilizations, no additional mobilization cost will be accepted.
i. Provide daily clean up and trash removal of all debris as a result of this Bid Categories work. All work areas are to be maintained in a safe and accessible manner at all times.
j. Bid Category Contractor is aware of delivery requirements of the Project Schedule included in the Construction Documents and assumes responsibility to complete all work of this Bid Category to meet the Project Schedule requirements. This contractor will, within seven (7) days of Notice of Award, submit a preliminary schedule detailing work of this Bid Category to comply with the time requirements of Project Schedule.
k. Bid category contractor to include all fees and permit costs that pertain to their scope of work.
l. Bid category contractor is required to sign the construction managers subcontract agreement included in the project manual (no modifications to the contract permitted).
m. At completion of work, restore any site areas disturbed by construction activity of this Bid Category to originally graded condition as was provided to this contractor at the start of work.
n. Submit to Construction Manager written requests for clarification or interpretation of the meaning and/or intent of the Construction Documents at either time of bidding or during construction.
o. Provide a project specific Safety Program to Construction Manager.
p. By submitting a bid for this Bid Category, the Bidding Contractor has implied that he/she has visited the site, is familiar with the project's local conditions and has factored these conditions into the bid submitted. Furthermore, Bidding Contractor warrants that the work can be completed per the Construction Documents based on the site visit observations and has taken into consideration the existing physical conditions that may affect the work of this Bid Category and that all such costs to complete the work of this Bid Category due to existing project site conditions are included in the bid submitted.
q. If weather conditions are a factor in completion of this Bid Categories work, Contractor is to provide documentation substantiating normal weather conditions anticipated and included in submitted bid.
r. Background checks are required for all workers onsite. County will perform background checks at no cost. There is also a zero-tolerance agreement required to be signed for all employees working in the law enforcement center.

3. SPECIFIC ITEMS TO INCLUDE:
   a. All requirements of Specification Sections as noted in Scope of Work above.
   b. Street cleaning and traffic control measures for this work
   c. Furnish and install all underground and above ground plumbing lines including water, sanitary/storm sewer, gas and air piping
   d. Coordination with other trades
   e. Caulking/Firestopping of penetrations thru floors, walls and ceilings
   f. Spoils to be removed from the site unless directed by CM or owner to remain on site
   g. Safety barriers for this work
   h. Removal/disposal of concrete floors as indicated
   i. Cutting and patching
   j. All existing plumbing systems must remain active to serve occupied spaces throughout the various phases of construction work
   k. Patch any openings associated with demolition of existing work to match adjacent surface
   l. Installation of owner supplied air compressor
   m. Remove and reinstall detention plumbing fixtures as noted
   n. Remove and reinstall drinking fountains as noted
   o. Performance and payment bond

4. EXCLUDED ITEMS:
    a. Concrete slab replacement by BP#03

ADVERTISEMENT FOR BIDS

BIDS: AUGUST 16, 2022

FOR THE JEFFERSON COUNTY COURTHOUSE AND SHERIFF'S BUILDING RENOVATION & ADDITIONS

CONSTRUCTION MANAGER:
MAAS BROTHERS CONSTRUCTION
410 WATER TOWER CR
WATERTOWN, WI 53094-0108
(920) 261-1682

ARCHITECT:
POTTER LAWSON, INC.
MADISON, WI

BID OPENING: August 16, 2022 shortly after bid deadline.

BIDS MUST BE RECEIVED BY: AUGUST 16, 2022 at 1:00 PM LOCAL TIME.

Sealed Bids for the project designated above will be received at:

311 SOUTH CENTER AVENUE
ROOM 111
JEFFERSON, WI 53549

All bids will be publicly opened and read at the specified time and date indicated above by the Owner or his designee.

This will be bid in MULTIPLE BID CATEGORIES to be executed under a Construction Manager At Risk. The work will include remodeling County Administrative Departments, Courts, Sheriff's Department, and Jail to improve security, functional efficiencies, and accommodate future growth. This project includes Administrative, Courts, and Law Enforcement Center additions, totaling over 36,000 sf. Renovations cover approximately 105,500 sf, of which 57,600 sf is considered Level 2 remodeling. Extensive mechanical, electrical, plumbing and technology systems are to be replaced or upgraded. A fire protection/sprinkler system will be added to the Courthouse side of the facility. Site work includes updating miscellaneous site utilities including adding a storm water system along S. Center Ave. The current MIS building located at 402 S. Center Ave is to be demolished allowing for the County parking lot just south of the site to be expanded.

All Bids must be on a stipulated lump sum basis.

Electronic copies of the above documents may be requested on or after July 22, 2022 from Maas Brothers Construction by sending an email to mstafford@maasbros.com. The following information must be included in the email; requestor's name, company name, physical address, telephone number and email address.

A Voluntary Pre-Bid Inspection Tour will be held on July 28th, 2022 at 12:00 PM, beginning in Room 202.

Bid Security in the amount of five (5) percent of the Bid must accompany each Bid in accord with the Instructions to Bidders.

The bidding and letting of Contracts herein advertised is subject to compliance with all applicable statutory requirements. The Owner is considered a qualifying exempt entity, therefore Section 77.54(9m), Wis. Stats. sales and use tax exemption will be utilized on this project.

The Owner reserves the right to waive irregularities and to accept any bid, reject any and all bids, and upon acceptance of any bid, to thereafter accept revisions or modifications on such bid.

The Advertisement for Bids is issued by authority of Jefferson County, Wisconsin.

August 4, 2022

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DOCUMENT 003119 - EXISTING CONDITION INFORMATION

1.1 EXISTING CONDITION INFORMATION

A. This Document with its referenced attachments is part of the Procurement and Contracting Requirements for Project. They provide Owner's information for Bidders' convenience and are intended to supplement rather than serve in lieu of the Bidders' own investigations. They are made available for Bidders' convenience and information, but are not a warranty of existing conditions. This Document and its attachments are not part of the Contract Documents.

B. Existing drawings that include information on existing conditions including previous construction at Project site are available for viewing upon request to the Construction Manager.

C. Survey information that includes information on existing conditions, prepared by Point of Beginning, Inc., dated September 22, 2021, is available for viewing as part of Drawings.

D. Photographic model of existing conditions that includes photographic documentation on existing conditions, prepared by Design Engineers is available upon request to the Construction Manager.

E. Asbestos Abatement Plans dated July 25, 2022, prepared by Environmental Management Consulting, Inc., are available upon request from the Construction Manager.

F. Related Requirements:

1. Document 002113 "Instructions to Bidders" for the Bidder's responsibilities for examination of Project site and existing conditions.
2. Document 003132 "Geotechnical Data" for reports and soil-boring data from geotechnical investigations that are made available to bidders.

END OF DOCUMENT 003119

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SECTION 02 41 19 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Demolition and removal of selected portions of building or structure.
2. Demolition and removal of selected site elements.
3. Salvage of existing items to be reused or recycled.

B. Related Requirements:

1. Section 01 10 00 "Summary" for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.
2. Section 01 35 16 "Alteration Project Procedures" for general protection and work procedures for alteration projects.

1.2 DEFINITIONS

A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.

B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.

C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.

D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.

E. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

1.3 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.

1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.4 PREINSTALLATION MEETINGS

A. Predemolition Conference: Conduct conference at Project site.

1. Inspect and discuss condition of construction to be selectively demolished.
2. Review structural load limitations of existing structure.
3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
5. Review areas where existing construction is to remain and requires protection.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For refrigerant recovery technician.

B. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection , for dust control and , for noise control. Indicate proposed locations and construction of barriers.

C. Predemolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by salvage and demolition operations. Comply with Section 01 32 33 "Photographic Documentation." Submit before Work begins.

D. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

1.6 CLOSEOUT SUBMITTALS

A. Inventory: Submit a list of items that have been removed and salvaged.

1.7 QUALITY ASSURANCE

A. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

1.8 FIELD CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

~~D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.~~

~~1. Hazardous materials will be removed by Owner before start of the Work.~~

~~2. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.~~

E. Hazardous Materials: Present in buildings and structures to be selectively demolished. A report on the presence of hazardous materials and remediation plans are on file for review and use. See Section 00 31 19. Examine report to become aware of locations where hazardous materials are present.

1. Hazardous material remediation is ~~specified elsewhere in the Contract Documents~~ contracted separately.
2. Do not disturb hazardous materials or items suspected of containing hazardous materials ~~except under procedures specified elsewhere in the Contract Documents~~.
3. ~~Owner will provide material safety data sheets for suspected hazardous materials that are known to be present in buildings and structures to be selectively demolished because of building operations or processes performed there~~. Coordinate with abatement contractor for sequencing of demolition to allow abatement and demolition to proceed in an orderly process.

a. Abatement will require partial demolition to be started in certain portions of the work in order to reach areas requiring abatement. Coordinate demolition work to expose areas for abatement, and completion of demolition after abatement is complete.

F. Storage or sale of removed items or materials on-site is not permitted.

G. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

1.9 COORDINATION

A. Arrange selective demolition schedule so as not to interfere with Owner's operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI/ASSP A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.

C. Verify that hazardous materials have been remediated before proceeding with building demolition operations.

D. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs or video.

1. Inventory and record the condition of items to be removed and salvaged.

3.2 PREPARATION

A. Refrigerant: Before starting demolition, remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction.

3.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.

1. Arrange to shut off utilities with utility companies.
2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.

3. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.
    a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
    b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
    c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
    d. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.

3.4 PROTECTION

A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
    1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
    2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
    3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
    4. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 01 50 00 "Temporary Facilities and Controls."

B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
    1. Strengthen or add new supports when required during progress of selective demolition.

C. Remove temporary barricades and protections where hazards no longer exist.

3.5 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
    1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
    2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chipping. Temporarily cover openings to remain.
    3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
    4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
    5. Maintain fire watch during and for at least 1 hour after flame-cutting operations.
    6. Maintain adequate ventilation when using cutting torches.
    7. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
    8. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.

9. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
10. Dispose of demolished items and materials promptly. Comply with requirements in Section 01 74 19 "Construction Waste Management and Disposal."

B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

C. Removed and Salvaged Items:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Protect items from damage during transport and storage.

D. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.6 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, and then remove concrete between saw cuts.

B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.

C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.

D. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings." Do not use methods requiring solvent-based adhesive strippers.

E. Roofing: Remove no more existing roofing than what can be covered in one day by new roofing and so that building interior remains watertight and weathertight. See Section 07 53 23 "Ethylene-Propylene-Diene-Monomer (EPDM) Roofing" for new roofing requirements.

1. Remove existing roof membrane, flashings, copings, and roof accessories.
2. Remove existing roofing system down to substrate.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove demolition waste materials from Project site and recycle or dispose of them according to Section 01 74 19 "Construction Waste Management and Disposal."

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

4. Comply with requirements specified in Section 01 74 19 "Construction Waste Management and Disposal."

B. Burning: Do not burn demolished materials.

3.8 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION

SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. All items required for executing and completing the cast-in-place concrete work and related work shown on the drawings or specified herein. Work shall include installation of items furnished in other sections of these specifications.

B. Concrete paving, walks, and curbs are specified in Division 3 or 32.

C. Structural notes indicated on the drawings regarding cast-in-place concrete shall be considered a part of this specification.

1.2 RELATED WORK

A. Pertinent Sections of Division 01.
B. Section 03 10 00 - Concrete Formwork.
C. Section 03 20 00 - Concrete Reinforcement.
D. Section 05 31 00 - Steel Deck.

1.3 REFERENCES

A. Codes and Standards: Comply with the provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified. Where any provision of other pertinent codes and standards conflict with this specification, the more stringent provision shall govern.

1. ACI 117 - Specification for Tolerances for Concrete Construction and Materials.
2. ACI 301 - Specifications for Structural Concrete.
3. ACI 302.1R - Guide to Concrete Floor and Slab Construction.
4. ACI 302.2R - Guide for Concrete Slabs that Received Moisture-Sensitive Flooring Materials.
5. ACI 304R - Guide to Measuring, Mixing, Transporting, and Placing Concrete.
6. ACI 305.1 - Specification for Hot Weather Concreting.
7. ACI 306.1 - Guide to Cold Weather Concreting.
8. ACI 308R - Guide to External Curing of Concrete.
9. ACI 309R - Guide for Consolidation of Concrete.
10. ACI 318 - Building Code Requirements for Structural Concrete.
11. ACI 347R - Guide to Formwork for Concrete.
12. ASTM C31 - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
13. ASTM C33 - Standard Specification for Concrete Aggregates.
14. ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
15. ASTM C42 - Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
16. ASTM C88 - Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.
17. ASTM C94 - Standard Specification for Ready-Mixed Concrete.
18. ASTM C131 - Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

19. ASTM C138 - Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete.
20. ASTM C143 - Standard Test Method for Slump of Hydraulic Cement Concrete.
21. ASTM C150 - Standard Specification for Portland Cement.
22. ASTM C157 - Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete
23. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete.
24. ASTM C172 - Standard Practice for Sampling Freshly Mixed Concrete.
25. ASTM C173 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
26. ASTM C231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
27. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
28. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
29. ASTM C330 – Standard Specification for Lightweight Aggregates for Structural Concrete.
~~29.~~30. ASTM C494 - Standard Specification for Chemical Admixtures for Concrete.
~~30.~~31. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
~~31.~~32. ASTM C1017 - Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
~~32.~~33. ASTM C1064 - Standard Test Method for Temperature of Freshly Mixed Hydraulic Cement Concrete.
~~33.~~34. ASTM C1077 - Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation.
~~34.~~35. ASTM C1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
~~35.~~36. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
~~36.~~37. ASTM D2103 - Standard Specification for Polyethylene Film and Sheeting.
~~37.~~38. ASTM E154 - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.
~~38.~~39. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection.
~~39.~~40. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.
~~40.~~41. Concrete Reinforcing Steel Institute (CRSI) - Manual of Standard Practice.

1.4 SAMPLING AND TESTING REQUIREMENTS

A. Maintain records verifying materials used are of the specified and accepted types and sizes and are in conformance with the requirements of the Contract Documents.

B. Use of testing services will not relieve the Contractor of the responsibility to furnish materials and construction in full compliance with the Contract Documents.

C. Take samples of fresh concrete at the job site for each mix design placed each day. Sampling and testing shall be done after the final addition and proper mixing of any water or admixtures that are added on site.

1. Personnel and testing equipment shall meet the requirements of ASTM E329.
2. Testing Frequency: Obtain at least one composite sample for each 150 cu. yd. or 5,000 sq. ft. of surface area, whichever is less or fraction thereof of each concrete mixture placed each day.

a. On a given project, if the total volume of concrete is such that the frequency of testing required above would provide less than five strength tests for a given class of concrete, tests shall be made from at least five randomly selected batches or from each batch if fewer than five batches are used.

3. A strength test shall be the average of the strengths of two 6x12 inch or three 4x8 inch cylinders made from the same sample of concrete and tested at 28 days.

D. For each sample of fresh concrete, perform the following duties:

1. Measure and record slump in accordance with ASTM C143.
2. Measure and record temperature in accordance with ASTM C1064.

a. Provide one test hourly when air temperature is 40°F and below and when 80°F and above, and one test for each composite sample.

3. Measure and record air content by volume in accordance with either ASTM C231 or ASTM C173.
4. Mold three 6x12 inch or four 4x8 inch cylinders (laboratory cylinders) in accordance with ASTM C31 to be laboratory-cured. Protect from moisture loss and maintain at 60°F to 80°F for 24 to 48 hours before moving. Deliver cylinders to testing laboratory for curing and testing.
5. Mold two 6x12 inch or three 4x8 inch cylinders (field cylinder) in accordance with ASTM C31 to be field-cured. Field cylinder shall be placed as near as possible to the in-place concrete from which it was taken, protected, and cured in the same manner. Deliver field-cured cylinder to testing laboratory, and measure and record compressive strength in accordance with ASTM C39. Field cylinder shall be used to determine if concrete footings, walls, or piers have reached the required compressive strength for steel erection to begin.
~~5.~~6. Unit Weight: ASTM C138, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.

E. Measure and record compressive strength in accordance with ASTM C39 for laboratory cylinders. Test one laboratory cylinder at 7 days and all other cylinders at 28 days. Acceptance is based on the average of the two 6x12 inch or three 4x8 inch laboratory cured 28-day tests. Notify Architect in the event strength levels do not meet the acceptance requirements of ACI 318.

1. Any additional cylinders molded for Contractor to have a compressive strength test done before seven days shall be at the Contractor's expense.

F. Prepare and submit test reports to the Architect, Engineer, Contractor and Supplier. Reports shall be completed and furnished within 48 hours of testing. Refer to description in Submittals.

G. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.

H. Should the strength of any grade of concrete for any portion of work, as indicated by molded test cylinders, fall below the minimum 28-day compressive strength specified on the drawings, upon approval of the Structural Engineer, the concrete supplier shall adjust the concrete mix for remaining portion of construction so that the resulting concrete meets the minimum strength requirements.

1.5 SUBMITTALS

A. Concrete Materials: Submit information on concrete materials as listed below.

1. Cementitious materials: Submit type, class, producer name, and certification not more than 90 days old of compliance with applicable ASTM standard.
2. Aggregates: Submit type, pit or quarry location, producer name, gradations, specific gravity, water content, and certification not more than 90 days old.
3. Admixtures: Submit product data sheet. Product data shall include: dosages and performance data, brand names, producers, chloride ion concentrations, and certifications of compliance with applicable ASTM standard. Certifications shall not be more than 90 days old.
4. Water: Submit name of source.

B. Product Data: Prepare and submit product and performance data for materials and accessories, including patching compounds, joint systems, curing compounds, finish materials, and other concrete related items.

C. Testing Agency Qualifications: When requested, the proposed testing agencies shall submit data on qualifications for acceptance.

D. Concrete Mix Design:

1. Concrete mix design submittals shall be submitted to the Structural Engineer for review and approval at least 14 days prior to placing concrete.
2. Obtain Structural Engineer approval for each mix design prior to use, including new mix designs required to be prepared should there be a change in materials being used.
3. Submit concrete mixture proportions and characteristics for each concrete mix. Include standard deviation analysis or trial batch data with mix design. Submit historical field test data to demonstrate the average compressive strength for approval. Concrete mix proportions, materials, and handling methods for field test data or trial batches shall be the same as used for the work. Include the following information for each mix design:

    a. Water/cementitious materials ratio.
    b. Slump per ASTM C143
    c. Air content per ASTM C231 or ASTM C173
    d. Unit weight of concrete per ASTM C138
    e. Compressive strength at 28 days per ASTM C39

4. If trial batches are used, submit representative samples of each proposed ingredient to independent testing laboratory for use in preparation of mix design.
5. Include alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments. Indicate amounts of mix water to be withheld for later addition at Project site.
6. Provide a record copy of the final mix designs and test results to the testing agency prior to commencement of the concrete work.

E. Test Reports: Submit laboratory test reports for concrete materials, mix design, compressive strength, slump, air content, and temperature. Each report shall indicate date of sampling, date of test, mix design, and location of concrete in structure.

F. Repair Methods: When stains, rust, efflorescence, and surface deposits must be removed, submit the proposed method of removal.

G. Certificates: Submit written certification regarding the design mix from the ready-mix supplier and the admixture manufacturer stating all concrete and admixtures do not contain chloride ions in excess of concentrations specified herein.

H. Placement Notification: Notify the Architect at least 24 hours in advance of concrete placement.

I. Adjustments: Submit any adjustments to mixture proportions or changes in materials, suppliers, or sources, along with supporting documentation, during the course of the work.

J. Cold Weather Procedure Submittal: Refer to Cold Weather Concreting article in Part 3 for more information.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Cementitious materials: Store cementitious materials in dry weather tight buildings, bins, or silos that exclude contaminants.

B. Aggregates: Store and handle aggregate in a manner that will avoid segregation and prevent contamination with other materials or other sizes of aggregates. Store aggregates so as to drain freely.

C. Admixtures: Protect stored admixtures against contamination, evaporation, or damage. Protect liquid admixtures from freezing and temperature changes, which would adversely affect their performance. Handle chemical admixtures in accordance with manufacturer's instructions.

~~C.~~D. Do not allow machinery to run over lightweight aggregates.

PART 2 - PRODUCTS

2.1 CONCRETE MATERIALS

A. Portland Cement: Portland cement shall conform to ASTM C150, Type I Normal, and be a standard brand of Portland cement. Use one brand of cement throughout project, unless approved in writing by the Engineer. Cement, which conforms to ASTM C150 Type II or ASTM C595 Type IL, may be used if it also meets the requirements of ASTM C150 Type I. Cement used in concrete shall be of the same brand and type as the cement used in the concrete represented by the submitted field test data or used in the trial mixtures. Maintain consistent cement color throughout project unless directed otherwise by architectural requirements.

1. Total replacement of Portland cement by supplementary cementitious materials in design mixture shall not exceed 50% (by weight).

B. Supplementary Cementitious Materials

1. Fly Ash: Fly ash shall conform to ASTM C618, Class C or Class F. Replacement of Portland cement by fly ash shall not exceed the following (percentages are by weight):

a. Concrete Flatwork: 20 percent.
b. All other concrete: 25 percent.
c. Concrete to be placed in cold weather as defined herein: No fly ash allowed unless the cold weather procedure submitted has compensated for the increased setting time and decreased rate of strength gain due to cold weather and fly ash.

2. Slag Cement: ASTM C989, Grade 100 or 120.

   a. Ground Granulated Blast-Furnace Slag Limit: 50% by weight of total cementitious materials.

3. Combined Fly Ash and Ground Granulated Blast-Furnace Slag:

   a. Supplementary Cementitious Materials Limit: 50% with fly ash not exceeding 25% by weight of total cementitious materials.

C. Coarse Aggregate for Normal Weight Concrete: Comply with ASTM C33. Provide coarse aggregate from a single source for exposed concrete. Gradations shall be similar to that described in the following table:

COARSE AGGREGATE GRADATIONS							
SIEVE SIZE - PERCENT PASSING							
Grade No.	1-1/2"	1"	3/4"	1/2"	3/8"	No. 4	No. 16
4	90-100 Note 1	20-55	0-15	---	0-5	---	---
57	100	95-100	---	25-60	0-10	0-10	---
67	---	100	90-100	---	20-55	0-10	---
89	---	---	---	100	90-100	20-55	0-10

1. Shall be 100 percent passing the 2" sieve.

D. Fine Aggregate for Normal Weight Concrete: Comply with ASTM C33. Provide fine aggregate from a single source for exposed concrete. Fine aggregate shall consist of washed sand. Gradations shall be similar to that described in the following table:

FINE AGGREGATE GRADATIONS							
SIEVE SIZE - PERCENT PASSING							
Grade No.	3/8	No. 4	No. 8	No. 16	No. 50	No. 80	No. 100
FA	100	95-100	80-100	50-85	5-30	---	0-10

E. Do not use aggregates containing deleterious substances that could cause spalling on any exterior exposed surface. These include, but are not limited to the following:

1. Organic impurities.
2. Ferrous metals.
3. Soluble salts.
4. Coal, lignite, or other lightweight materials.
5. Soft particles.
6. Clay lumps and friable particles.
7. Cherts of less than 2.40 specific gravity.

F. Water: Mixing water for concrete shall meet the requirements of ASTM C94. Water shall be clean and free from injurious amounts of acids, alkalis, organic materials, chloride ions and oils deleterious to concrete or reinforcing steel.

G. Testing agency shall be given access to plants and stockpiles to obtain samples for testing for compliance with the Contract Documents.

~~G.~~H. Aggregates for Structural Lightweight Concrete: Lightweight aggregates shall comply with ASTM C330 and not exceed 1/2" sieve size. Aggregates shall have not more than 8% loss if tested by sodium sulfate solution and not more than 10% if tested by magnesium sulfate solution complying with ASTM C88.

2.2 ADMIXTURES

A. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures. Calcium chloride thiocyanates or admixtures containing intentionally added chlorides are not permitted.

B. Water Reducing Admixture: Material shall comply with ASTM C494, Type A.

1. Acceptable:

a. BASF Corporation - MasterPozzolith Series or MasterPolyheed Series.
b. Chemical Company - Eucon WR Series.
c. Sika Chemical Corp. - Plastocrete 161.
d. GRT - Polychem 400 NC.
e. Grace Construction Products - WRDA 82.

C. High Range Water Reducing Admixture (superplasticizer): Material shall comply with ASTM C494, Type F or Type G.

1. Acceptable:

a. BASF Corporation - MasterRheobuild 1000 or MasterGlenium Series.
b. Euclid Chemical Company - Eucon 37 or Plastol Series.
c. Sika - ViscoCrete 2100.
d. GRT - Melchem.
e. Grace Construction Products - Mira 110.

D. High Range Water Reducing, Slump Retaining Admixture: Material shall comply with ASTM C494, Type F or Type G.

1. Acceptable:

a. BASF Corporation - MasterGlenium 7700.
b. Euclid Chemical Company - Eucon 537, Eucon 1037, or Plastol Series.
c. Sika - Sikament 686.
d. GRT - Melchem - M.
e. Grace Construction Products - ADVA FLEX.

E. Non-Chloride Accelerator: Material shall comply with ASTM C494, Type C or Type E, and not contain a higher chloride ion concentration than municipal drinking water.

1. Acceptable:

a. BASF Corporation - MasterSet FP 20 or MasterSet AC 534.
b. Euclid Chemical Company - Accelguard Series.
c. Sika Chemical Corp. - Sika Rapid-1.
d. GRT - Polychem HE.
e. Grace Construction Products - Lubricon NCA.

F. Air Entraining Admixture: Air entraining admixture shall comply with ASTM C260, and be certified by the manufacturer to be compatible with other admixtures to be used.

1. Acceptable:

a. BASF Corporation - MasterAir Series.
b. Euclid Chemical Company - Air-Mix or AEA Series.
c. Sika Chemical Corporation - Sika-Aer.
d. GRT - Polychem VR.
e. Grace Construction Products - Darex II or Daravair 1000.

G. Admixtures used in concrete shall be the same brand, type, and dosage used in concrete represented by field test data or used in trial mixes.

2.3 CURING PRODUCTS

A. Moisture Retaining Cover

1. Plastic Film: Use 6 mil polyethylene film sheet materials that meet the requirements of ASTM C171.
2. White burlap-polyethylene sheet meeting ASTM C171.
3. Reinforced curing paper complying with ASTM C171.
4. Moisture Retaining Fabric: A naturally colored, non-woven, polypropylene fabric with a 4-mil, non-perforated reflective (white) polyethylene coating containing stabilizers to resist degradation from ultraviolet light. Fabric shall exhibit low permeability and high moisture retention. Acceptable manufacturers and products include:

a. PNA Construction Technologies, Inc.: Hydracure S16.
b. PNA Construction Technologies, Inc.: Hydracure M5.
c. Reef Industries Incorporated: Transguard 4000.

B. Dissipating Resin Curing Compound: Clear, waterborne, membrane-forming curing compound complying with ASTM C309, Type 1, Class B shall be composed of hydrocarbon resins and dissipating agents that begin to break down upon exposure to ultraviolet light and traffic approximately 4 to 6 weeks after application, providing a film that is removable with standard degreasing agents and mechanized scrubbing actions so as to not impair the later addition of applied finishes.

1. Curing compounds used on interior enclosed environments shall be a water-borne product and VOC compliant as required by the U.S. EPA Architectural Coating Rule.

C. Non-dissipating Curing Compound: Clear, membrane-forming curing compound complying with ASTM C309, Type 1, Class B.

1. Curing compounds used on interior enclosed environments shall be a water-borne product and VOC compliant as required by the U.S. EPA Architectural Coating Rule.

D. Curing and Sealing Compound: Clear, membrane-forming curing and sealing compound complying with ASTM C309, Type 1, and ASTM C1315, Type 1, Class A. Compound shall dry to a clear finish, resist yellowing due to ultraviolet degradation and provide a long-lasting finish that has high resistance to chemicals, oil, grease, deicing salts, and abrasion.

1. Curing and sealing compounds used on interior enclosed environments shall be a water-borne product and VOC compliant as required by the U.S. EPA Architectural Coating Rule.

2.4 MISCELLANEOUS MATERIALS

A. Patching Mortar: Non-shrink, non-slump, non-metallic, quick setting.

1. Acceptable manufacturers and products:

a. Euclid Chemical Company - Eucospeed.
b. BASF Corporation - MasterEmaco N 424.
c. Adhesive Technologies. - Hard Rok Vertipatch.
d. W.R. Meadows - Speed Crete (Red Line).
e. Dayton Superior - Re-Crete 20 minute.
f. SpecChem - Precast Patch.

B. Cement Grout: Mix 1 part Portland cement, 2-1/2 to 3 parts fine aggregate, and enough water for required consistency. Depending on use, consistency may range from mortar consistency to a mixture that will flow under its own weight. Do not mix more than the amount that can be used within 30 minutes. Retempering is not permitted. Use for leveling, preparing setting pads, beds, construction joints (with liquid bonding admixture) and similar uses. Do not use for grouting under bearing plates or structural members in place.

C. Dry-Pack: Mix 1 part Portland cement, 2 parts fine aggregate, and enough water to hydrate cement and provide a mixture that can be molded with the hands into a stable ball (a stiff mix). Do not mix more than the amount that can be used within 30 minutes.

D. Expansion Joint Material: Preformed, resilient, non-extruding asphalt-impregnated fiber conforming to ASTM D1751. Thickness of expansion joint material shall be 1/2" unless noted otherwise on the drawings.

E. Magnesium phosphate patching cement specially designed for cold weather grouting and anchoring.

1. Acceptable:

a. BASF Corporation - MasterEmaco T545.
b. Euclid Chemical Company - Eucospeed MP.

F. Vapor Retarder: ASTM E 1745, Class A, not less than 10 mils thick.

1. Acceptable:

a. Stego Industries, LLC - Stego Wrap.
b. W.R. Meadows, Inc. - Perminator.
c. Raven Industries - Vapor Block
d. Insulation Solutions - Viper VaporCheck II.

G. Penetrating Liquid Floor Treatment: Chemically reactive, waterborne solution of inorganic silicate or siliconate materials and proprietary components; odorless; colorless; that penetrates, hardens, and densifies concrete surfaces.

1. Manufacturers and products:

a. BASF Corporation - MasterKure HD 200WB.
b. Conspec Marketing & Manufacturing Co., Inc. - Intraseal
c. Curecrete Chemical Co., Inc. - Ashford Formula
d. Dayton Superior Corporation - Day-Chem Sure Hard (J-17)
e. Euclid Chemical Company - Eucosil
f. L&M Construction Chemicals, Inc. - Seal Hard
g. Vexcon Chemicals, Inc - Vexcon Starseal PS
h. SpecChem - SpecHard

H. Control Joint Filler: Flexible, single-component polyurethane sealant with backer rod compliant with ASTM C 920, Type S, Grade P, Class 25. Apply sealant per manufacturers written recommendations.

1. Acceptable:

a. Dayton Superior - Perma 230 SL.
b. Euclid Chemical Company - Eucolastic I.
c. BASF Corporation - MasterSeal SL 1.

2.5 STRENGTH AND PROPERTIES

A. Concrete Mix Designs: Refer to the drawings for specified compressive strength. Proportion concrete mixes according to the properties in the following table. The concrete supplier may produce a mix at a lower water-cement ratio to allow for adjustment of slump at the site by adding water. The addition of site water shall be in accordance with ASTM C94, and the total water-cement ratio shall not exceed the value specified below.

Class	Coarse Aggregate Gradation	Fine Aggregate Gradation	Range of Slump	Max. w/c	Air Content	Other Requirements
A	57 or 67	FA	1" to 4"	0.40	5% to 8%	
B	57 or 67	FA	1" to 4"	0.45	5% to 8%	
C	57 or 67	FA	1" to 4"	0.50	n/a	
D	57 or 67	FA	4" to 6"	0.50	n/a	Use water reducing admixture to achieve slump specified
E	4 or 57	FA	1" to 4"	0.50	n/a	

Class	Coarse Aggregate Gradation	Fine Aggregate Gradation	Range of Slump	Max. w/c	Air Content	Other Requirements
F	4 or 57	FA	5" to 8"	0.50	n/a	Use retarder
H	89	FA	5" to 8"	0.50	n/a	
J	Light-weight	FA	5" max	0.5	4% to 7%	

B. Schedule of Concrete Classes: Provide concrete of the specified class according to the following:

1. Footings: Class E
2. Exterior foundation walls and piers: Class B
3. Interior piers: Class C
4. Retaining walls: Class B
5. Interior slabs on grade: Class D
6. Interior slab on metal decks: Class D for normal weight; Class J for lightweight
7. Unless noted otherwise: Class B

C. Density of Lightweight Concrete: Dry density of lightweight concrete shall be 107-116 pcf as determined by ASTM C567. Correlate air-dry density with fresh bulk density of concrete. Use fresh bulk density as the basis for acceptance during construction.

~~C.~~D. Slump of Superplasticized Concrete: Concrete containing high-range water reducing admixtures (superplasticizer) shall have 8" maximum slump, unless otherwise approved by Structural Engineer.

E. Slump of Lightweight Concrete: For lightweight concrete slabs placed by pump, slump shall not exceed 5 inches at the point of placement. For all other lightweight concrete slump shall not exceed 4 inches.

F. Compliance with Fire Assembly: All concrete supplied for slab on metal decks shall meet the requirements for a 1-hour floor construction per UL assembly number D925. Specifically, the concrete must meet the following:
1. Be lightweight with fresh bulk density of 107-116.
2. Be vibrated during placement.
3. Be air-entrained between 4 to 7 percent.
4. Be constructed to maintain a minimum 2-1/2-inch slab thickness above the metal flutes.

~~D.~~G. Accelerators: Add non-chloride accelerator to all concrete slabs placed at air temperatures below 50°°F only when approved in the mix design. Use of admixtures will not relax cold weather placement requirements.

~~E.~~H. Water Reducer: Add water reducing admixture or high range water reducing admixtures (superplasticizers) as follows:

1. All pumped concrete.
2. Fiber reinforced concrete.
3. As required for placement or workability.
4. As required by high temperatures, low humidity, or other adverse placement conditions.
5. Concrete with water-cementitious materials ratio below 0.50.

~~F.~~I. No other admixtures shall be used unless approved by Structural Engineer.

~~G.~~J. Workability: Concrete shall have a workability such that it will fill the forms without voids, honeycombs, or rock pockets with proper vibration without permitting materials to separate or excess water to collect on the surface.

~~H.~~K. Concrete Temperatures: Minimum concrete temperature of fresh concrete varies in relation to average air temperature over a 24-hour period as follows:

1.	Air temperature below 0°F	Concrete temperature 70°F min.
2.	Air temperature 0°F to 30°F	Concrete temperature 65°F min.
3.	Air temperature 30°F to 50°F	Concrete temperature 50°F min.
4.	Air temperature above 50°F	No minimum temperature

5. The maximum temperature of concrete at the time of delivery shall be 90°F. When concrete temperature exceeds 90°F, concrete supplier shall attempt to reduce temperature by shading aggregates and cement and cooling mix water. When these methods fail to reduce the concrete temperature below 0°F, supplier shall use ice in the water to reduce the concrete temperature. Use set retarding admixtures only when approved in the mix design.

PART 3 - EXECUTION

3.1 PREPARATION

A. Verify requirements for concrete cover over reinforcement.

B. Verify anchors, seats, plates, reinforcement, and other items to be cast into concrete are accurately placed, positioned securely, and will not cause hardship in placing concrete.

C. Do not place concrete until data on materials and mix designs have been approved, Architect has been notified, and all other affected trades have coordinated their work.

D. Remove snow, ice, frost, water, mud, and other foreign material from surfaces, reinforcing bars and embedded items against which concrete will be placed.

E. Prepare previously placed concrete by cleaning with sandblasting, steel brush, or water blast to expose aggregate to minimum 1/4" amplitude.

F. Sandblast all existing concrete surfaces older than 28 days against which concrete is to be placed, unless directed otherwise in writing by Architect/Engineer.

3.2 SLABS

A. Slab on Grade:

1. All interior slabs on grade shall have a polyethylene vapor retarder conforming to ASTM E1745. Lap all joints minimum 6" and seal edges with adhesive tape. Fit vapor retarder around utilities and seal with adhesive tape as required. Place, protect, and repair vapor-retarder sheets according to ASTM E 1643 and manufacturer's written instructions.
2. Refer to drawings and Section 31 23 00 for required sub-grade preparation beneath slabs on grade.
3. Where vapor retarder is not used below the slab on grade, wet sub-grade below slab prior to placing concrete. Subgrade shall be moist with no free water and no muddy or soft spots.

4. Saw cut control joints: Cut with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks. Control joints shall be located along column lines, with intermediate joints spaced at a maximum distance indicated on the drawings, unless noted otherwise. Control joints shall be continuous, not staggered or offset. Slab panels shall have a maximum length to width ratio of 1.5 to 1. Provide additional control joints at all reentrant or isolated corners formed in the slab on grade. Refer to the drawings for typical control joint detailing.
5. Provide isolation joints around each column, and along foundation walls. Form isolation joints with 1/2" expansion joint material. Extend isolation joint material full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.
6. Depress slabs as required for architectural finishes, pits. Obtain layout and locations from Architect.
7. Verify completion of all under slab work with mechanical and electrical trades before placing slabs.
8. Slope slabs as indicated on the drawings and to provide positive drainage. Slope slab keeping bottom level and varying top. Maintain minimum thickness of concrete as indicated on the drawings. Refer to floor finishes for tolerances.

B. All supported slabs, including slabs-on-steel decking and cast-in-place concrete slabs:

1. Supported slabs have deflections that may cause areas of concrete to have thicknesses greater than indicated on the drawings. Contractor is expected to provide that volume as needed to finish the floor at the specified elevation. If specified floor finish tolerances are not achieved during the concrete floor construction, the Contractor shall install, at no cost to the project, a self-leveling cementitious underlayment BASF Corporation - MasterTop 110 SL or approved equivalent to correct the floor flatness and levelness.

3.3 CONSTRUCTION JOINTS

A. Slabs: Where slab pour is to receive a subsequent topping or additional concrete, expose aggregate in top surface by brooming in two directions at right angles to each other.

B. Vertical: Locate vertical construction joints in walls not farther than a maximum of 100 feet on center. Coordinate joint locations with architectural design.

C. Horizontal: Locate horizontal joints in walls, piers, at underside of slabs, and at the top of slabs and footings unless otherwise indicated. At least 24 hours shall elapse between placing concrete in a wall, and placing concrete in an area supported by the walls, unless approved in writing by the Structural Engineer.

D. Reinforcing: Stop all welded wire reinforcement and/or reinforcing at construction joints in slabs on grade and provide dowel bars as detailed. Provide reinforcement at other construction joints as detailed. Roughen and thoroughly clean the surface of the concrete, remove all laitance, and wet the surface before placing new concrete against the joint. Slush vertical joints with a neat cement grout before placing new concrete.

E. Wall Control Joints: Locate vertical control joints in exposed walls at a minimum uniform spacing not to exceed 25'-0". Coordinate joint locations with architectural drawings.

F. Exposed Surfaces: Locate construction joints only at predetermined locations approved by the Architect and the Structural Engineer.

3.4 CONCRETE PLACEMENT

A. Place concrete as continuously as possible until placement is complete. Do not place against concrete that has attained initial set, except at authorized joints. If, for any reason, concrete pour is delayed for more than 45 minutes, bulkhead off pour at last acceptable construction joint. Immediately remove excess concrete and clean forms.

B. Do not begin to place concrete during periods of rain, sleet, or snow unless adequate protection is provided.

C. No concrete shall be cast onto or against sub-grades containing free water, frost, ice, or snow. If earth at bottom of forms has dried out, rewet so the soil is moist, but free of standing water and mud.

D. Notify the Architect in advance if concrete is to be pumped.

E. Do not place concrete until all reinforcement is in place, forms have been thoroughly cleaned and approval has been given.

F. Do not accept concrete delivered to the job site more than 90 minutes after initial mixing.

G. Concrete from its point of release to mixers, hoppers, or conveyances, shall not be permitted to drop more than 5 feet (10 feet for concrete containing high range water reducers). Deposit concrete directly into conveyances and directly from conveyances to final points of deposit. Sufficient transportation equipment in good working order shall be on hand before work begins. All conveying equipment must be clean and kept clean during concreting operations. Take every possible precaution to prevent segregation or loss of ingredients.

H. Regulate rate of placement so concrete surface is kept level throughout; a minimum being permitted to flow from one area to another. Use tremie heads spaced at approximately 10-foot intervals for placing concrete in walls. Control rate of placement consistent with form design.

I. Deposit concrete in one continuous operation until section being placed has been completed. For slab thicknesses greater than 12 inches, prevent excessive segregation of aggregate and high temperatures in accordance with ACI 304 and ACI 308. Place concrete in wall forms in layers not greater than 12 inches in depth, each layer being compacted by internal vibration before succeeding layer is placed.

J. Place concrete as near as possible to its final position to prevent segregation or loss of materials. Do not use vibrators to transport concrete within forms. Consolidate concrete in walls, columns, beams, and slabs or joist construction thicker than 8" with internal vibrators (8,000 to 12,000 VPM). Slabs less than 8" thick may be consolidated with internal vibrators (9,000 to 13,500 VPM) or vibrating screeds supported on forms, boards, or rails, approved by the Structural Engineer, supplement vibration by forking or spading by hand along surfaces adjacent to forms and construction joints. Be sure an adequate number of operating vibrator units are on hand to properly consolidate quantity of concrete to be placed, including spares for emergency use.

    1. Vertically insert and remove handheld vibrators at constant intervals 18 to 30 inches apart. Vibrate concrete the maximum amount and time required for complete consolidation, without segregation, and release of entrapped air bubbles, but in no instance exceed 15 seconds per square foot of exposed surface.

K. Re-tempering of concrete shall not be permitted. Concrete that has stood more than 15 minutes after leaving the mixer shall be discarded.

L. Exercise care in placing concrete over waterproof membranes, rigid insulation, and/or protection boards to avoid damaging those materials. Report damage immediately, and do not proceed until damage is repaired.

M. Remove loose debris from hardened surfaces of previous pours by sandblasting surfaces and expose clean coarse aggregate firmly embedded in cement matrix.

N. Protect existing concrete work to be exposed to view and other finished materials from damage and staining resulting from concreting operations. Handle concrete carefully to avoid dripping and spillage. Remove spilled concrete from existing surfaces immediately. Covering sills, ledges, and other surfaces with protective coverings may be necessary to protect the work.

O. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete Work.

P. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on drawings. Set anchor rods for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.

Q. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in inserts and accessories as shown on the drawings. Screed, tamp, and trowel-finish concrete surfaces.

3.5 CONCRETE FINISHES AND TOLERANCES

A. Exposed Smooth Formed Surfaces: Remove forms and perform necessary repairs and patch to produce surface finish-3.0 as specified in ACI 301. Apply the following to smooth-formed finished concrete exposed to view in the finished work. Confirm finishes with the Architect prior to concrete placement by submitting shop drawings indicating locations of all types of finishes.

1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.

B. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.6 CONCRETE SLAB FINISHES AND TOLERANCES

A. Trowel Finish:

1. Screed concrete to an even plane, float, then power trowel the surface.
2. Hand trowel the surface smooth and free of trowel marks. Continue hand troweling until a ringing sound is produced as the floor is troweled.
3. Provide trowel finish as indicated on the drawings and at the following locations:

    a. Concrete floors exposed in finished work unless otherwise indicated.
    b. Slabs to receive curing compounds and sealers.

c. Slabs to receive resilient flooring or carpet.
d. Slabs to receive waterproof membranes.

B. Fine Broom Finish:

1. Screed concrete to an even plane, float, then power trowel the surface. Provide fine hair broom finish perpendicular to slope, free of loose particles, ridges, projections, voids, and concrete droppings.
2. Provide fine broom finish as indicated on the drawings and at the following locations:

a. Stoop slabs.
b. Raised curbs and walkway areas.
c. Slabs to receive thin set ceramic tile.

C. Broom Finish:

1. Screed concrete to an even plane and then float. Immediately after concrete has received a floated finish, give the concrete surface a coarse transverse scored texture by drawing a coarse broom across the surface.
2. Provide as indicated on the drawings and at the following locations:

a. ADA ramp slabs.
b. Exterior walkway slabs.

D. Floor Finish Tolerances: Floor finish tolerances shall be measured by placing a freestanding (unleveled) 10-foot straightedge anywhere on the slab and allowing it to rest upon two high spots within 72 hours after placement of slab and removal of shoring (if present). The gap at any point between the straightedge and the floor (and between the high spots) shall not exceed:

1. Slab on Grade: 1/4"
2. Suspended Slabs: 1/4"

E. Slab Drainage: Finish all concrete slabs to proper elevations to ensure that all surface moisture will drain freely to floor drains, and that no puddle areas exist. Contractor shall bear the cost of corrections to provide positive drainage.

F. Special Tolerances for Concrete Slabs: No abrupt change in vertical elevation of 1/4" or more is acceptable at the interface between slabs and within areas where pedestrian traffic is expected.

3.7 CONCRETE CURING

A. Freshly placed concrete shall be protected from premature drying and excessively hot temperatures.

B. Concrete other than high-early strength shall be maintained above 50°F and in a moist condition for at least the first 7 days after placement, except when special curing is used. Special curing procedures shall not be used without written permission from the Structural Engineer.

C. High-early strength concrete shall be maintained above 50°F and in a moist condition until it has reached 2/3 of the specified 28-day compressive strength, but not less than 3 days unless special curing is used with written permission from the Structural Engineer.

D. Formed surfaces shall be cured by leaving the formwork in place during the curing period.

E. Protect concrete from excessive changes in temperature during the curing period and at the termination of the curing process. Changes in the temperature of the concrete shall be as uniform as possible and shall not exceed 5°F in any one hour or 50°F in any 24-hour period.

F. Protect concrete from injury from the elements until full strength is developed. Protect from mechanical injury.

G. During cold weather construction, all footings shall be protected from frost penetration until the building is enclosed and temporary heat is provided.

3.8 SLAB CURING

A. Begin curing after finishing concrete, but not before free water has disappeared from concrete surface. Use one of the methods described below.

B. Moisture-Retaining-Cover Curing for Concrete Floors Not Exposed in Final Condition: Cover concrete surface with waterproof sheet material as soon as finishing operations are complete and the concrete is sufficiently hard to be undamaged by covering. The cover shall be placed flat on the concrete surface, avoiding wrinkles. Sprinkle concrete with water as necessary during application of covering. Place in widest practicable width, with sides and ends lapped at least 12 inches, and seal with waterproof tape or adhesive. Verify the concrete is continuously wet under the sheets; otherwise, add water through soaker hoses under the sheets. Weight down covering to prevent displacement. Immediately repair any holes or tears during the curing period using polyethylene sheet and waterproof tape. Curing process shall be maintained for a minimum of 7 days.

C. Moisture-Retaining-Fabric Curing for Concrete Floors to Remain Exposed: Cover concrete surface with moisture retaining fabric as soon as finishing operations are complete and the concrete is sufficiently hard to be undamaged by covering. The cover shall be installed in accordance with the manufacturer's written recommendations, in largest practical widths. Wet the slab to rejection, then thoroughly wet fabric side of cover and install with poly side up. Lap over adjacent covers a minimum of 18". Wet all laps and outside edges to prevent displacement and to ensure intimate contact with concrete and adjacent covers. Rewet as necessary and protect covers from damage during curing process.

1. After minimum 7-day cure, remove moisture retaining fabric in sections.
2. A maximum of 3,500 square feet of concrete curing cover may be removed at any one time. At no time shall the exposed area be permitted to dry prior to completion of the floor scrubbing process.
3. Using a high-powered floor scrubber capable of a minimum 80 pounds head pressure, and a mild citrus-based detergent that does not damage or mar the surface in any way, scrub the floor to remove any minerals or soluble salts that may have accumulated at the floor surface. Rinse area thoroughly with clean fresh water. Remove water and allow floor to dry. If whitening occurs during drying, repeat scrubbing process before floor dries until no whitening occurs during drying.
4. All areas of the floor shall remain wet during floor scrubbing process. Expose only the amount of floor surface that can be cleaned before any drying occurs without exceeding the maximum allowable exposed area.

D. Curing Compound: Apply uniformly in continuous operation by low pressure spray equipment or roller as soon as finishing operations are complete, free water on the surface has disappeared, and no water sheen can be seen. Follow the manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period. Verify compatibility of the curing compound with paint, finishes, or toppings that require positive bond to the concrete. If curing compound is

not compatible with paint finishes or toppings, utilize a dissipating curing compound and remove in accordance with the manufacturer's recommendations.

3.9 PENETRATING LIQUID FLOOR TREATMENTS

A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions.

B. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs in accordance with manufacturer's written instructions.

C. Do not apply to concrete that is less than seven days old.

D. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing. Rinse with water; remove excess material until surface is dry. Apply a second coat in a similar manner if surface is rough or porous.

3.10 JOINT FILLING

A. Prepare, clean, and install joint filler according to manufacturer's written instructions.

B. Do not fill joints until construction traffic has permanently ceased.

C. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.

3.11 APPLICATION OF FLOOR SEALER - FINISH COAT

A. Give concrete floors, as indicated in the Room Finish Schedule and where exposed in finished Work, a second coat of curing and sealing compound immediately prior to Substantial Completion.

B. Clean floors and apply sealer strictly according to manufacturer's instructions. Dilution and coverage shall be as recommended by the manufacturer. Apply sealer evenly.

3.12 COLD WEATHER CONCRETING

A. Definition: Cold weather shall be defined as a period when for more than three successive days the average daily outdoor temperature drops below 40°F. The average daily temperature is the average of the highest and lowest temperature during the period from midnight to midnight. When temperatures above 50°F occur during more than half of any 24-hour duration, the period shall not be regarded as cold weather.

B. All cast-in-place concrete work occurring during cold weather shall conform to all requirements of ACI 306.1, "Standard Specification for Cold Weather Concreting", published by the American Concrete Institute, Detroit, Michigan, except as modified by the contract documents or this specification.

C. Planning: The General Contractor, concrete contractor, and Architect shall have a pre-construction conference to outline the cold weather concreting operations concerning the placing, finishing, curing and protection of the concrete during cold weather. Pre-construction conference shall occur before cold weather is expected to occur.

D. Detailed procedure submittal: Concrete contractor shall prepare and submit for review detailed procedures for the production, transportation placement, protection, curing and temperature monitoring of concrete during cold weather. Include procedures to be implemented upon abrupt changes in weather conditions. Do not begin cold weather concreting until these procedures have been reviewed and approved.

E. Mixing: Concrete flatwork poured in cold weather shall be proportioned to obtain a lower slump to minimize the amount of bleed water during finishing. All bleed water should be skimmed off flatwork prior to troweling. Concrete that will be exposed to cycles of freezing and thawing while saturated should be properly air entrained as outlined in this specification.

F. Protection of Concrete: Cure and protect concrete against damage from freezing for a minimum period of 72 hours, unless approved by the Structural Engineer. The protection period may be reduced according to ACI 306.1 requirements. Concrete contractor shall submit a letter of request to reduce the protection period, by outlining the method used to achieve the reduction per ACI 306.1.

1. When practical for the construction schedule, formwork shall be insulated and remain in place for at least the required protection period.

G. Concrete Temperatures: The minimum temperature of concrete immediately after placement shall be as specified in the following table.

			Mixing Temperatures		
Section Size	Minimum temperature of concrete as placed and maintained during the protection period	Maximum gradual decrease in surface temperature during any 24 hours after the end of the protection.	Above 30°F	0 to 30°F	Below 0°F
Less than 12 in	55°F	50°F	60°F	65°F	70°F
12-36 in	50°F	40°F	55°F	60°F	65°F
36-72 in	50°F	30°F	50°F	55°F	60°F
Greater than 72 in	50°F	20°F	45°F	50°F	55°F

H. Mixing Temperatures: As the ambient air temperature decreases, the concrete mixing temperature shall be increased to compensate for the heat lost in the period between mixing and placement. The concrete supplier shall use one or both of the following methods for increasing the concrete temperature.

1. Heating the mixing water to a temperature necessary to offset the temperature losses during transport. Supplier shall not heat water to temperatures in excess of 140°F, without taking special precautions as outlined in ACI 306.
2. Heating the aggregate with a circulated steam piping system.

I. Temperature measurements: The Contractor shall be responsible for monitoring and recording the concrete temperatures during placement and throughout the protection period.

1. Inspection personnel shall keep a record of the date, time, outside air temperature, temperature of concrete as placed, and weather conditions.
2. Temperature of the concrete and the outside air shall be recorded at regular intervals but not less than twice in a 24-hour period. The record shall include temperatures at several points within the enclosure and on the concrete surface of sufficient frequency to determine a range of temperatures.

3. Inspection agency shall submit the temperature logs to the Architect for permanent job records.

3.13 HOT WEATHER PROTECTION

A. Definition: Hot weather shall be defined as any combination of high ambient temperature, low relative humidity, high winds, and intense solar radiation that leads to higher than usual evaporation. The table below defines low relative humidity based on air temperature. For a given air temperature, if the relative humidity is equal to or less than the specified minimum, provisions for hot weather concreting shall be as follows:

Air Temperature	Minimum Relative Humidity
105°F	90%
100°F	80%
95°F	70%
90°F	60%
85°F	50%
80°F	40%
75°F	30%

B. Scheduling: When hot weather is expected, adjust concrete placement schedules to avoid placing or finishing during the period from noon until 3:00 pm. When possible, slab pours should be delayed until the building is enclosed to protect the concrete from wind and direct sunlight. The construction schedule shall account for 7-day moist curing period.

C. Mixing: Concrete supplier shall adjust mix designs and admixtures to minimize slump loss. Concrete shall be mixed at a water-cement ratio, which is lower than the specified maximum, to allow for the adjustment of slump by addition of water in the field. Water reduction shall be accomplished without reducing initial slump by increasing dosage of a water reducing admixture.

D. Preparation: Do not order concrete earlier than is required to avoid delays. Cool forms, subgrades and reinforcing bars with water spray from fog nozzle prior to concrete placement.

E. Delivery: Site traffic shall be coordinated, and delivery times scheduled to minimize waiting times for concrete trucks.

F. Placement: Preparations shall be made to place and consolidate the concrete at the fastest possible rate. Maintain a continuous flow of concrete to the job site to avoid development of cold joints, during placement of slabs, apply fog spray to prevent moisture loss without causing surplus water to stand on concrete surface.

G. Finishing: Finish concrete as fast as practical. Continue fogging concrete during finishing. Where fogging is not possible, apply sprayable moisture-retaining film between finishing passes.

H. Curing: Formed concrete shall be covered with a waterproof material to retain moisture. Flat work shall be moisture cured as described in this specification. Moist curing shall continue for at least 7 days.

3.14 FIELD QUALITY ASSURANCE

A. Independent Testing Agency and Inspector shall each perform their prescribed inspection, sampling, and testing services as described in Part 1 of this specification section.

B. In cases where samples have not been taken or tests conducted as specified or strength of laboratory test cylinders for a particular portion of the structure fails to meet requirements of ACI 301, for evaluation of concrete strength, Structural Engineer shall have the right to order compressive or flexural test specimens or both be taken from the hardened concrete according to ASTM C42, load tests according to ACI 318, or such other tests as may be necessary to clearly establish the strength of the in situ concrete, and such tests shall be paid for by the Contractor. Where cores have been cut from the Work, Contractor shall fill voids with dry-pack and patch the finish to match the adjacent existing surfaces.

3.15 REPAIR OF DEFECTIVE AREAS

A. All repair of defective areas shall be made, with prior approval of Architect and Structural Engineer as to method and procedure, in accordance with Section 5 of ACI 301, except specified bonding compound must be used. Cosmetic repairs of minor defects in exposed concrete surfaces shall be in a manner acceptable to the Architect. Defective areas shall be deemed when:

1. Tests on core or prism specimens fail to show specified strengths.
2. Not formed as indicated or detailed.
3. Not plumb or level where so indicated or required to receive subsequent work.
4. Not true to intended grades and levels.
5. Cut, filled, or resurfaced, unless under direction of the Structural Engineer.
6. Debris is embedded therein.
7. Not fully in conformance with provisions of the drawings.
8. Damaged by hot or cold weather conditions.
9. Mixing time exceeds 90 minutes from ready-mix plant to the time of deposit.

B. Patch form tie holes at the following locations:

1. Unfinished exposed concrete (not scheduled for painting, plus at board formed concrete finish).
2. All other areas: Prime voids with bonding compound and fill with patching mortar. Strike flush without overlap, float to uniform texture to match adjacent surfaces.
3. Exposed areas scheduled for spray texture:

    a. Remove projections and protrusions: 1/16" or larger.
    b. Remove continuous ridges 1/32" or larger.
    c. Fill voids and pin holes.

4. Exposed areas scheduled for paint or epoxy:

    a. Remove projections, ridges, and other protrusions 1/32" or larger.
    b. Fill voids and pin holes 1/16" or larger.

5. Exposed areas not scheduled for paint or other finishes:

    a. Remove projections, ridges and other protrusions not conforming to requirements specified under Section 03 10 00.
    b. Fill voids and pin holes not conforming to requirements specified under Section 03 10 00.

C. All structural repairs shall be made, with prior approval of the Architect/Engineer, as to method and procedure, using the specified epoxy adhesive and/or epoxy mortar.

D. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension in solid concrete but not less than 1 inch in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
2. Repair defects on surfaces exposed to view by blending white Portland cement and standard Portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.

E. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
2. After concrete has cured at least 14 days, correct high areas by grinding.
3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mix as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

3.16 CEMENT GROUT AND DRY-PACK

A. Cement Grout: Thoroughly mix sufficient quantities to avoid combining different batches of grout mix. Ensure that grout completely fills all spaces and voids. Level, screed, or cut flush excess grout to produce smooth, neat, even exposed surfaces.

B. Dry-Pack: Thoroughly blend dry ingredients prior to mixing with water. Forcibly pack mixture to completely fill voids and spaces.

3.17 CLEANING

A. Clean exposed concrete to remove laitance, efflorescence and stains.

END OF SECTION

SECTION 06 40 00 - ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Shop fabricated cabinetwork, casework, counters, shelves, and other architectural woodwork items.
2. Wood furring, blocking, shims, and hanging strips for installing plastic-laminate-clad architectural cabinets that are not concealed within other construction.

B. Related Requirements:

1. Section 06 10 00 "Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing cabinets that are concealed within other construction before cabinet installation.

1.3 REFERENCES

A. AWS - Architectural Woodwork Standards (Current Edition)
1. Published jointly by the Architectural Woodwork Institute, Architectural Woodwork Manufacturer Association of Canada, and Woodwork Institute.

B. NEMA - National Electrical Manufacturers Association
1. LD3 - High Pressure Decorative Laminates

C. HPVA - Hardwood Plywood & Veneer Association
1. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood

D. ANSI - American National Standards Institute
1. ANSI A208.1 - Particleboard
2. ANSI A208.2 - Medium Density Fiberboard (MDF) for Interior Applications

1.4 DEFINITIONS

A. Refer to AWS Section 10 - Casework for definitions of exposed (exterior and interior), semi-exposed, and concealed surfaces.

B. For the purpose of factory finishing, both sides of cabinet doors shall be considered “exposed”.

1.5 SUBMITTALS

A. Product Data: Submit for each type of product and process specified and incorporated into items of architectural woodwork during fabrication, finishing, and installation.

B. Quality Certification: Submit woodwork fabricator's certification, stating that fabricated woodwork complies with quality grades and other requirements indicated.

C. Shop Drawings: Submit in conformance with the requirements of the Architectural Woodwork Standards.

D. Samples: Submit the following samples:

1. Plastic laminate, 8-inch x 8-inch for each type, color, pattern and surface finish.
2. Wood veneer, 8-inch x 8-inch for each species and cut, and finish.

3. Wood lumber, not less than 5 inches wide by 12 inches long, for each species and cut, finished one side and one edge.
4. Exposed cabinet hardware, one unit of each type and finish.
5. Drawer body material, 8-inch x 8-inch size.
6. Solid surface material, 8-inch x 8-inch for each type, color, and edge detail.

1.6 QUALITY ASSURANCE

A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of architectural woodwork indicated for construction, finishes, installation, and other requirements.

B. Fabricator Qualifications: Firm with minimum 5 years experience in producing architectural woodwork similar in type and quality to those required for this project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units without delaying the Work.

C. Factory-mark each piece of lumber and plywood with type, grade, mill and grading agency identification; except omit marking from surfaces to receive transparent finish, and submit mill certificate that material has been inspected and graded in accordance with requirements if it cannot be marked on a concealed surface.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect woodwork during transit, delivery, storage and handling to prevent damage, soiling and deterioration.

B. Do not deliver woodwork, until painting, wet work, grinding and similar operations that could damage, soil or deteriorate woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas meeting requirements specified for installation areas.

1.8 FIELD CONDITIONS

A. Architectural woodwork fabricator and installer shall advise Prime Contractor of indoor temperature and humidity requirements for woodwork installation and storage areas. Do not install woodwork until indoor temperature and humidity are within the range recommended by the "Architectural Woodwork Standards" for the location of the Project and will be maintained in installation and storage areas.

B. Field Measurements: Where architectural woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Locate concealed framing, blocking, and reinforcements that support cabinets by field measurements before being enclosed, and indicate measurements on Shop Drawings.

D. Established Dimensions: Where architectural woodwork is indicated to fit to other construction, establish dimensions for areas where architectural woodwork is to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.9 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that architectural woodwork can be supported and installed as indicated.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General:

1. Provide materials that comply with requirements of the "Architectural Woodwork Standards" for each type of woodwork and quality grade indicated and, where the following products are part of interior woodwork, with requirements of the referenced product standards that apply to product characteristics indicated.
2. Optimum Moisture Content: Kiln-dry architectural woodwork to an average moisture content of 8 percent or as otherwise recommended by applicable "Architectural Woodwork Standards" for the regional climatic conditions involved.

B. Dowels: Hardwood

C. Softwood Plywood: APA A-B EXT - Group 1, made without urea-formaldehyde adhesive.

D. Veneer Faced Panel Products (Hardwood Plywood): HPVA HP-1, made without urea-formaldehyde adhesive.

E. Fiberboard: Medium density complying with ANSI A208.2, made with binder containing no urea-formaldehyde resin.

F. Particleboard: ANSI A208.1, made with binder containing no urea-formaldehyde resin.

G. Fasteners and Anchorages: Provide all nails, screws, bolts, nuts, washers, and other anchoring devices of the type, size, material, and finish required for application indicated to provide secure attachment, concealed where possible, and complying with applicable Federal Specifications.

H. Miscellaneous lumber for blocking, furring, cabinet bases: Provide materials and comply with provisions as specified in Section 06 10 00.

2.2 LAMINATE CLAD ARCHITECTURAL CABINETS

A. Quality Standards: Comply with AWS Section 10 - Casework.

1. Grade: Custom.
2. Cabinet Construction: Type A, frameless with cabinet and door Interface Style 1, flush overlay.
3. Core Material: ANSI A208.1, Type M-3 particleboard.
4. Laminate Cladding: High pressure decorative laminate complying with NEMA LD3 and as follows:
    a. Manufacturers/Products/Colors: As scheduled in Interior Finish Legend.
    b. Exposed Surfaces (other than edges):
        1) Horizontal Surfaces: HGS (0.048-inch nominal thickness).
        2) Postformed Surfaces: HGP (0.039-inch nominal thickness).
    c. Vertical Surfaces: VGP (0.028-inch nominal thickness).
    d. Semi-Exposed Surfaces (other than edges): Decorative surface of thermally fused polyester or melamine laminated to core under pressure and complying with NEMA LD3 GP28 and LD3 CL20 standards. Vinyl overlays not acceptable. Painted material not acceptable.
    e. Exposed Edges of Laminated Components:
        1) Body Members and Shelves: HPL matching exposed faces.
        2) Doors and Drawers: HPL matching exposed faces.
        3) Concealed Laminate: Where balancing sheet is indicated or required by referenced quality standards, provide backer type laminate, grade designation BK-20 (0.020-inch nominal thickness) complying with NEMA LD3 CL20 standards.

2.3 WOOD ARCHITECTURAL CABINETS

A. Quality Standards: Comply with AWS Section 10 - Casework.

B. Wood Cabinets for Transparent Finish:

1. Grade: Premium.
2. Cabinet Construction: Type A, frameless with cabinet and door Interface Style 1, flush overlay.
3. Wood Species for Exposed Surfaces: As noted in Drawings and scheduled in Interior Finish Legend
4. Wood Species for Semi-Exposed Surfaces: Match species and cut indicated for exposed surfaces.
    a. Concealed Surfaces: Solid hardwood or hardwood plywood, any species.
5. Grain Matching: Run and match grain vertically for drawer fronts, doors, and fixed panels.

2.4 THICKNESS AND MATERIALS FOR CABINET COMPONENTS

COMPONENTS	MATERIALS	MINIMUM THICKNESS OF MATERIALS
Body Members	Panels	3/4-inch
Rails	Solid Lumber or Panel	3/4-inch
Shelves Shelves exceeding spans indicated require additional support	Panels Medium Density Particle board or Fiberboard	3/4-inch for spans up to 32-inch 1-inch for spans up to 42-inch
Backs	Panels	3/8-inch
Drawer Sides, Backs, and Subfronts	Solid Lumber or Particleboard Panel	1/2-inch Lumber 1/2-inch (50# density or more)
Drawer Bottoms	Panels	3/8-inch
Drawer Fronts	Panels	3/4-inch
Doors	Panels	3/4-inch; up to 30 inches wide by 80 inches high 1-inch; over 30 inches wide by 80 inches high

2.5 ARCHITECTURAL CABINET TOPS, COUNTERS, AND SHELVES

A. Quality Standards: Comply with AWS Section 11 - Countertops.

B. Laminate Clad Tops:

1. Grade: Custom.
2. Core Material: ANSI A208.1, Type 2-M-2 particleboard (1-inch thick). Provide balancing sheet (BK-20) on all surfaces that do not have high-pressure decorative laminate.
3. Front Edge: Straight with PVC edge matching plastic laminate unless otherwise indicated on Drawings.
4. Back Splash: Butt joint except provide coved for tops in all wet areas; 4-inches high unless otherwise indicated on Drawings. Provide square with scribe top at splash.
5. Laminate Cladding: High pressure decorative laminate complying with NEMA LD 3 and as follows:

a. Manufacturers/Products/Colors: As scheduled in Interior Finish Legend.
b. Horizontal Surfaces: HGS (0.048-inch nominal thickness).
c. Postformed Surfaces: HGP (0.039-inch nominal thickness).
d. Edge Treatment: Same as laminate cladding on horizontal surfaces.

C. Solid Surface Countertops:

1. Grade: Custom.
2. Material: Homogeneous solid sheets of filled plastic resin complying with the material and performance requirements of ANSI Z124.3, Type 5 or Type 6, without a precoated finish.
3. Thickness: 1/2-inch thick unless otherwise noted.
4. Front Edge: Waterfall unless otherwise indicated on Drawings.
5. Back Splash: Applied butt joint; 4-inches high unless otherwise indicated on Drawings. Provide square top at splash.
6. Basis-of-Design Products: Subject to compliance with requirements, provide each product indicated in the Interior Finish Legend or an equivalent product of type, pattern, and color by one of the following:

a. Avonite
b. Corian; DuPont Polymers
c. Gibraltar; Ralph Wilson Plastics Company
d. Hi-Macs
e. Meganite, Inc.
f. Romanite

2.6 CABINET HARDWARE

A. Basis-of-Design Products: Products specified below indicate quality and function. Subject to compliance with requirements, equivalent products by other manufacturers may be provided.

1. Drawer Slides: Accuride 7432; except Accuride 3640 Series for drawers over 24 inches wide.
2. Two-Way Drawer Slides: Accuride Model 0363 Two-Way Travel Slide.
3. Wire Pulls: Mockett DP105c/4 x US26D
4. Hinges: Grass Tiomos 110 Series, self-closing, number of hinges per door as follows:

a. 2 per door up to 24 inches wide by 35-1/2 inches high
b. 3 per door up to 24 inches wide by 63 inches high
c. 4 per door up to 24 inches wide by 78-3/4 inches high
d. 5 per door up to 24 inches wide by 94-1/2 inches high

5. Hinges for Inside Secure Perimeter: Heavy-duty, five knuckle 2-3/4 inch institutional type hinge complying with ANSI/BHMA A156.9, Grade 1 requirements. Finish: Epoxy coated.
6. Shelf Support: Double pin design with anti-tip shelf restraints, equivalent to Bainbridge Manufacturing 3220CL.
7. Courtroom Gate Hinges: McKinney 4007MRB x US26D
8. Courtroom Gate Stop/Holder: Ives 449 x aluminum
9. Locks: KV 986 NP (each lock keyed alike by room and master keyed)
10. Closet Rod: KV 28P ZC
11. Shelf Standards: KV 87 ANO
12. Shelf Brackets: KV 187LL ANO
13. Trash Bin Slides : KV USC series in platinum with two waste bins
14. Grommets: Purpose made round wire management grommets; black
15. Label Holder: 3/4" high by 2-3/8" wide purpose made label holder at each opening on mailboxes; nickel plated.

2.7 DISPLAY CASE HARDWARE

A. Basis-of-Design Products: Products specified below indicate quality and function. Subject to compliance with requirements, equivalent products by other manufacturers may be provided.

B. Single-sided Display Case:

1. Shelf Standards: KV 87
2. Shelf Brackets: KV 187 with purpose made shelf rests for glass shelves

2.8 ACCESSORY ITEMS

A. Tackable Panels: Equivalent to Claridge No. 550 comprised of 1/4-inch cork laminated to 1/4-inch hardboard substrate with fabric wall covering wrapped over the panel face and edges and returned to the back of the panel. Ensure flat wrinkle free surfaces and tailored corners. Fabric: As scheduled in Interior Finish Legend.

B. Countertop Steel Support Brackets: Equivalent to A&M Hardware, Inc. (1-888-647-0200), 1/8-inch thick steel workstation brackets with manufacturer's standard powder coat finish in color selected by A/E from manufacturer's full range. See Drawings for sizes and locations.

C. Armor Panels: UL 752 listed, Level 3 rated bullet resistant fiberglass panel equivalent to ArmorCore as manufactured by Waco Composites, Ltd., 7/16 inch thick, unless otherwise indicated.

2.9 FABRICATION

A. Fabricate architectural woodwork to dimensions, profiles, and details indicated with openings and mortises precut, where possible, to receive hardware and other items and work.

B. Fabricate solid surface countertops in one piece with shop-applied backsplashes and edges, unless otherwise indicated. Comply with solid surface material manufacturer's recommendations for adhesives, sealers, fabrication, and finishing.

C. Complete fabrication, including assembly, finishing, hardware application, and other work to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

D. Pre-Cut Openings: Fabricate architectural woodwork with pre-cut openings, where possible, to receive hardware, appliances, plumbing fixtures, electrical work and similar items. Locate openings accurately from on-site dimensions and use templates or roughing-in diagrams for proper size and shape. Smooth edges of cutoffs and, where located in countertops and similar exposures seal edges of cutouts with a water-resistant coating.

E. Measurements: Before proceeding with fabrication of woodwork required to be fitted to other construction, obtain field measurements and verify dimensions and shop drawing details as required for accurate fit.

2.10 JOINERY AND FASTENING OF CASE BODY MEMBERS

A. Fixed case body members (shelves, bottoms, tops and rails which are fastened to sides, ends and dividers) shall be joined using concealed dado, or dowel matched or interlocking mechanical fasteners. Where the concealed dado and dowel methods are employed, cases shall be assembled utilizing glue and pressure. The dado method must be reinforced with blind nailing or screwing.

B. No nails, screws or other fastenings may be visible on exposed surfaces. On semi-exposed surfaces, mechanical fasteners may be visible.

C. Rails or top panels must be provided where case will have a separate top in order to permit concealed fastening of the separate top through such rails.

D. Where not in violation of design, surfaces of intersecting body members may be set back not to exceed 1/8 inch, provided setback is constant.

2.11 BACKPRIMING

A. Apply one coat of sealer or primer, compatible with finish coats, to concealed surfaces of woodwork in contact with cementitious materials. Concealed surfaces of plastic-laminate-clad woodwork do not require backpriming when surfaced with plastic laminate, backing paper, or thermoset decorative overlay.

2.12 SHOP FINISHING

A. Preparations for Finishing: Set exposed nails and screws. Apply wood filler in exposed nail and screw. Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing architectural woodwork, as applicable to each unit of work.

B. General:

1. Comply with AWS Section 5 - Finishing, unless otherwise indicated. Provide finishes of same grades as items to be finished.
2. Finish architectural woodwork at fabrication shop as specified in this Section. Defer only final touchup, cleaning, and polishing until after installation.
3. Transparent Finish System: AWS System - 5 Conversion Varnish.
4. Staining: Match A/E approved sample for color.
5. Sheen: Satin, 31-45 Gloss units measured on 60-degree gloss meter per ASTM D 523.

PART 3 - EXECUTION

3.1 PREPARATION

A. Before installation, condition architectural woodwork to average prevailing humidity conditions in installation areas.

B. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

3.2 INSTALLATION

A. Quality Standard: Install architectural woodwork to comply with "Architectural Woodwork Standards" for the same grade specified in PART TWO of this Section for type of architectural woodwork involved.

B. Assemble architectural woodwork and complete fabrication at Project site to the extent that it was not completed in the shop.

C. Install architectural woodwork plumb, level, true and straight with no distortions. Shim as required using concealed shims. Install to a tolerance of 1/8-inch in 8-feet for plumb and level (including tops); and with no variations in flushness of adjoining surfaces.

D. Scribe and cut architectural woodwork to fit adjoining work, leaving gaps of 1/32-inch maximum, and refinish cut surfaces or repair damaged finish at cuts. Do not use additional overlay trim for this purpose.

E. Anchor architectural woodwork to anchors or blocking built-in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork.

F. For shop finished items use filler matching final finish of items being installed.

G. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete the installation of hardware and accessory items as indicated.

H. Tops: Anchor securely to base units and other support systems as required. Caulk space between backsplash and wall with sealant.

I. Armor Panels:

1. Install panels on threat side. Fully support weight of armor panels. Overlap panel ends at corners.
2. Stagger joints so they are not located over framing members. Reinforce joints with 4 inch wide back-up layer of same UL listed level panel material, centered on panel joint, and fasten per manufacturer's installation instructions.
3. Provide 12 inch high by width of framing spacing, backer panel of the same UL listed level panel material behind electrical, data, and other penetrations through armor wall panels. Place backer panel tight to penetrating assembly.

3.3 CLEANING, ADJUSTMENT, AND PROTECTION

A. Cleaning: Clean all work of this Section prior to acceptance by Owner. Repair damaged and defective architectural woodwork where possible to eliminate defects functionally and visually. Where not possible to repair, replace woodwork at no cost to Owner. Adjust joinery for uniform appearance.

B. Adjustment: Clean, lubricate and adjust hardware for proper operation.

C. Protection: Protect all work of this Section until acceptance by Owner. Advise Prime Contractor of final protection and maintained conditions necessary to ensure that architectural woodwork will be without damage or deterioration at time of acceptance.

End of Section 06 40 00

SECTION 07 21 00 - THERMAL INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Extruded polystyrene foam-plastic board insulation.
2. Phenolic thermoset rainscreen board insulation
3. Mineral-wool board insulation.
4. Bearing polyurethane foam insulation.
5. Structural thermal break.

B. Related Requirements:

1. Section 07 53 23 "Ethylene-Propylene-Diene-Monomer (EPDM) Roofing" for insulation specified as part of roofing construction.
2. Section 09 29 00 "Gypsum Board" for sound attenuation blanket used as acoustic insulation.

1.3 ACTION SUBMITTALS

A. Product Data: For the following:

1. Extruded polystyrene foam-plastic board insulation.
2. Phenolic thermoset rainscreen board insulation
3. Mineral-wool board insulation.
4. Bearing insulation.
5. Structural thermal break.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each product, for tests performed by a qualified testing agency.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

B. Protect foam-plastic board insulation as follows:

1. Do not expose to sunlight except to necessary extent for period of installation and concealment.
2. Protect against ignition at all times. Do not deliver foam-plastic board materials to Project site until just before installation time.
3. Quickly complete installation and concealment of foam-plastic board insulation in each area of construction.

PART 2 - PRODUCTS

2.1 EXTRUDED POLYSTYRENE FOAM-PLASTIC BOARD INSULATION

A. Extruded Polystyrene Board Insulation, Type IV, for Use Below Grade: ASTM C578, Type IV, 25-psi minimum compressive strength; unfaced.

1. 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:
    a. DiversiFoam Products.
    b. Dow Chemical Company (The).
    c. Kingspan Insulation Limited.
    d. Owens Corning.
2. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.
3. Smoke-Developed Index: Not more than 450 when tested in accordance with ASTM E84.
4. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width.

2.2 MINERAL-WOOL BLANKET INSULATION

A. Mineral-Wool Blanket Insulation, Unfaced : ASTM C665, Type I (blankets without membrane facing); consisting of fibers; passing ASTM E136 for combustion characteristics.
1. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.
2. Smoke-Developed Index: Not more than 50 when tested in accordance with ASTM E84.
3. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width.

2.3 MINERAL-WOOL BOARD INSULATION

A. Mineral-Wool Board Insulation, Type II, Unfaced for Use In Cavity Wall Construction: ASTM C612, Type II; passing ASTM E136 for combustion characteristics.
1. 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:
    a. Johns Manville; a Berkshire Hathaway company.
    b. Rockwool International.
    c. Thermafiber, Inc.; an Owens Corning company.
2. Nominal Density: 6 lb/cu. ft..
3. Flame-Spread Index: Not more than 15 when tested in accordance with ASTM E84.
4. Smoke-Developed Index: Not more than zero when tested in accordance with ASTM E84.
5. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width.

B. Black-Scrimmed Mineral-Wool Board Insulation, Type IVB, Faced, for Use In Open-Joint Rain Screen Applications: ASTM C612, Type IVB; faced on one side with black scrim.
1. Manufacturers: Subject to compliance with requirements, provide Rockwool; Cavityrock Black or equivalent products by one of the following:
    a. Johns Manville; a Berkshire Hathaway company.
    b. Rockwool International.
    c. Thermafiber, Inc.; an Owens Corning company.
2. Nominal Density: 4.3 lb/cu. ft..
3. Flame-Spread Index: Not more than 15 when tested in accordance with ASTM E84.
4. Smoke-Developed Index: Not more than zero when tested in accordance with ASTM E84.
5. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width. Do not provide writing on scrim face.

C. Mineral-Wool Board Insulation, Type II, Faced: ASTM C612, Type III; faced on one side with foil-scrim or foil-scrim-polyethylene vapor retarder.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. Johns Manville; a Berkshire Hathaway company.
    b. Rockwool International.
    c. Thermafiber, Inc.; an Owens Corning company.
2. Nominal Density: 8 lb/cu. ft..
3. Flame-Spread Index: Not more than 15 when tested in accordance with ASTM E84.
4. Smoke-Developed Index: Not more than zero when tested in accordance with ASTM E84.
5. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width.
6.

2.4 BEARING POLYURETHANE FOAM INSULATION

A. Bearing Polyurethane Foam Insulation: For use in bearing applications as indicated in Drawings.

1. Manufacturers: Subject to compliance with requirements, provide General Plastics Manufacturing Company; Last-A-Foam R-9300 series or equivalent products by one of the following:
    a. Armatherm
    b. Dow Chemical Company (The).
    c. Jasper Plastics
2. Density: Not less than 20 lb/cu. ft when tested in accordance with ASTM D-1622.
3. Compressive Strength Parallel to Rise at 2% Deflection: Not less than 350 psi when tested in accordance with ASTM D1621.
4. R-Value: Not less than 2.58 per inch when tested in accordance with ASTM C518.

2.5 STRUCTURAL THERMAL BREAK

A. Structural Thermal Break: For use in bearing applications as indicated in Drawings.

1. Manufacturers: Subject to compliance with requirements provide one of the following products:
    a. Armatherm; Armatherm FRR
    b. Fabreeka International, Inc.; Fabreeka-Tim.
    c. Farrat Isolevel Ltd; Farrat Structural Thermal Break.
    d. Schöck USA, Inc.; Schöck Isokorb
2. Density: Not less than 100 lb/cu. ft.
3. Minimum Ultimate Mechanical Properties, Nominal:
    a. Tensile Strength, ASTM D 638: 11,000 psi (75.8 MPa).
    b. Flexural Strength, ASTM D 790: 25,000 psi (172.4 MPa).
    c. Compressive Strength, ASTM D 695: 38,900 psi (268.2 MPa).
    d. Compressive Modulus, ASTM D 695: 291,194 psi (2,007.7 MPa)
        1) 1/2-Inch (12.7 mm) Thickness: 291,194 psi (2,007.7 MPa).
        2) 1-Inch (25.4 mm) Thickness: 519,531 psi (3,582.0 MPa).
    e. Shear Strength, ASTM D 732: 15,000 psi (103.4 MPa).
    f. Operating Temperature Range: Minus 20 degrees F to 250 degrees F (Minus 29 degrees C to 121 degrees C).
        1) Maximum Loss in Ultimate Strength at 250 degrees F (121 degrees C): 30 percent.

2.6 ACCESSORIES

A. Insulation for Miscellaneous Voids:

1. Spray Polyurethane Foam Insulation: ASTM C1029, Type II, closed cell, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E84.

B. Adhesive for Bonding Insulation: Product compatible with insulation and air and water barrier materials, and with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.

C. Foil Faced Insulation Tape: Product capable of bonding to foil faced insulation and adjacent substrates to provide a complete, air-tight seal, 3M Venture Tape Reinforced Aluminum Foil Tape or equivalent.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean substrates of substances that are harmful to insulation, including removing projections capable of puncturing insulation or vapor retarders, or that interfere with insulation attachment.

3.2 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and applications.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

C. Install insulation with manufacturer's R-value label exposed after insulation is installed.

D. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

E. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

3.3 INSTALLATION OF SLAB INSULATION

A. On vertical slab edge and foundation surfaces, set insulation units using manufacturer's recommended adhesive according to manufacturer's written instructions.

1. If not otherwise indicated, extend insulation a minimum of 48 inchesbelow exterior grade line.

B. On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.

1. If not otherwise indicated, extend insulation a minimum of 48 inchesin from exterior walls.

3.4 INSTALLATION OF FOUNDATION WALL INSULATION

A. Butt panels together for tight fit.

B. Adhesive Installation: Install with adhesive or press into tacky waterproofing or dampproofing according to manufacturer's written instructions.

3.5 INSTALLATION OF CAVITY-WALL INSULATION

A. Foam-Plastic Board Insulation: Install pads of adhesive spaced approximately 24 inches o.c. both ways on inside face and as recommended by manufacturer.

1. Fit courses of insulation between wall ties and other obstructions, with edges butted tightly in both directions, and with faces flush.
2. Press units firmly against inside substrates.
3. Supplement adhesive attachment of insulation by securing boards with two-piece wall ties designed for this purpose and specified in Section 04 20 00 "Unit Masonry."

B. Mineral-Wool Board Insulation: Install insulation fasteners 4 inches from each corner of board insulation, at center of board, and as recommended by manufacturer.

1. Fit courses of insulation between masonry wall ties and other obstructions, with edges butted tightly in both directions, and with faces flush.
2. Press units firmly against inside substrates.

3.6 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

A. Blanket Insulation: Where indicated, install in cavities formed by framing members according to the following requirements:

1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.

B. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:

1. Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.
2. Mineral Fiber Batt: Apply only where indicated.

3.7 INSTALLATION OF CURTAIN-WALL INSULATION

A. Install board insulation in curtain-wall construction according to curtain-wall manufacturer's written instructions.

1. Hold insulation in place by securing metal clips and straps or integral pockets within window frames, spaced at intervals recommended in writing by insulation manufacturer to hold insulation securely in place without touching spandrel glass.
2. Maintain cavity width of dimension indicated on Drawings between insulation and glass.
3. Install insulation to fit snugly without bowing.

3.8 INSTALLATION OF FOIL FACED INSULATION

A. Install sheet reflective insulation according to ASTM C727.

1. Seal foil face to adjacent construction utilizing foil tape. Seal all gaps for a complete, airtight installation.

3.9 PROTECTION

A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes.

B. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION

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SECTION 07 46 16.13 – EXTRUDED ALUMINUM SIDING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes preformed and prefinished aluminum siding for walls, complete with flashings, corner posts, window and door trim, starter strips, and miscellaneous accessories.

B. Items installed but not furnished under this section: Black-scrimmed Mineral Wool Board Insulation as specified in Section 07 21 00 “Thermal Insulation.”

1.3 ALTERNATES

A. Work of this Section is affected by Alternates. See Section 01 23 00.

1.4 COORDINATION

A. Coordinate siding installation with flashings and other adjoining construction to ensure proper sequencing.

1.5 ACTION SUBMITTALS

A. Product Data: Submit for each type of product specified. Include identification of materials, dimensions of individual components, installation instructions, available profiles, textures, and colors.

B. Samples for Verification: Submit two 12-inch lengths for verification of each color, profile, and texture selected.

C. Maintenance Data: For each type of product, including related accessories, to include in maintenance manuals.

1.6 INFORMATIONAL SUBMITTALS

A. Delegated-Design Submittal: For siding indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer who has completed siding installations similar in material, design, and extent to that indicated for project that has resulted in construction with a record of successful in-service performance.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to project site in manufacturer’s unopened packages or bundles with labels intact.

B. Store materials in a dry, well-ventilated, weathertight place. Comply with manufacturer’s written instructions for storage, handling, and protection.

1.9 FIELD CONDITIONS

A. Proceed with Work of this Section after the substrate construction and penetrating work have been completed.

B. Weather Limitations: Proceed with Work of this Section only if existing and forecasted weather conditions permit siding to be installed to manufacturer's written instructions and if substrate is completely dry.

1.10 WARRANTY

A. Finish Warranty: Manufacturer’s standard form in which manufacturer agrees to repair finish or replace siding that show evidence of deterioration of factory-applied finishes. “Deterioration” is defined to include, but is not limited to, checking, crazing, cracking, chipping, mottling, peeling, fading, noticeable color change and other defects.

B. Finish Warranty Period: 15 years from date of Substantial Completion.

1.11 EXTRA MATERIALS

A. Provide minimum of 2 percent of installed quantity of each type, color, and texture of siding used in the work. Deliver in unopened clearly labeled bundles to Owner's designated storage space.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General: Provide siding that complies with performance requirements specified as determined by testing manufacturer's standard assemblies similar to those indicated for this Project, by a qualified testing and inspecting agency.

B. Delegated Design: Design siding, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

1. Structural Performance: Design, engineer, fabricate and install siding to withstand design loads indicated on Drawing S001.
2. Thermal Movements: Provide siding that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime sky heat loss.
3. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

2.2 MANUFACTURERS

A. Source Limitations: Obtain each color, texture, pattern, and type of siding and related accessories from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.

2.3 EXTRUDED ALUMINUM SIDING

A. Extruded Aluminum Siding and Soffits: Longboard Wood Grain Aluminum Siding and Soffits with Alluminate bonded film finish with integrated venting system.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Longboard Architectural Products; Link And Lock Siding or pre-approved equivalent product acceptable to A/E and Owner.

a. Dimensions: 1 5/8 inches x 4 inches.

B. Siding Accessories: Provide matching accessories prefinished to match finish and color of siding.

2.4 MISCELLANEOUS MATERIALS

A. Clips and Fasteners: Manufacturer's standard noncorrosive aluminum clips and fasteners. Provide prefinished fasteners in color matching siding where exposed fasteners are unavoidable.

B. Fiberglass Thermal Spacer: Provide Cascadia Window LTD; Fiberglass Thermal Spacer adjustable fiberglass spacer.

C. Hat-Channel: Provide Monarch Metal Inc; MHATLW-BP Hat Channel extruded aluminum pre-finished hat channel or equivalent.
1. Finish: Powder-coated black.

D. Sealants:

1. Exposed: Provide Type 1 sealant as specified in Section 07 92 00.

2.5 FABRICATION

A. Fabricate all aluminum trim to profiles shown or required to fit applications indicated and to perform optimally with respect to weather resistance, water tightness, durability, strength, and uniform appearance.

2.6 FINISHES

A. Pretreatment: Manufacturer's standard process.

B. Wood Grained Powder Coating: Alluminate Premium Wood Finish using a polyurethane powder coat with ink based wood grain patterns sublimated into the base powder effectively tattooing the powder.

1. Color: Light National Walnut.
2. Siding Interior Finish: All concealed from view faces shall receive compatible, non-corrosive material and finish recommended by siding manufacturer.

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

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

B. Verify that weather barrier underlayment has been installed over sheathing to prevent air infiltration or water penetration. Report to the General Contractor any tears, cuts, unsealed seams, and other deficiencies in the weather barrier underlayment needing repair by the General Contractor.

C. Examine rough-in for components and systems penetrating siding to verify actual locations of penetrations relative to seam locations of siding before siding installation.

D. Notify General Contractor of any other conditions detrimental to performance of the Work. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrates of projections and substances detrimental to application.

B. Coordinate installation with flashings and other adjoining construction to ensure proper sequencing.

C. Prime or finish cut edges and ends of aluminum siding to match balance of siding prior to installation.

3.3 INSTALLATION

A. Comply with siding manufacturer's written installation instructions applicable to products and applications indicated, unless more stringent requirements apply. Overlap joints to shed water away from direction of prevailing wind.

B. Aluminum Trim: Provide for thermal expansion of all exposed trim work exceeding 10 ft. running length.

C. Isolate dissimilar materials by separating from siding with rubber gaskets, elastomeric sealant, or rubber washers where fasteners penetrate siding. Dissimilar metals behind siding shall be isolated from back of siding.

D. Ensure site cuttings or burred edges do not remain on finish surfaces.

E. Use concealed fasteners except where approved by A/E.

F. Apply sealants as indicated or required to resist wind and water penetration. Comply with applicable provisions of Section 07 92 00. Maintain neat appearance.

3.4 ADJUSTING AND CLEANING

A. Remove and replace damaged, improperly installed, or otherwise defective siding and soffit materials with new materials complying with specified requirements.

B. Clean finished surfaces according to siding manufacturer's written instructions and maintain in a clean condition during construction. Furnish two (2) copies of manufacturer's care and maintenance instructions to Owner.

C. Remove all debris and excess materials from site. Upon completion of siding work, clean all siding work.

End of Section 07 46 16.13

SECTION 07 62 00 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Roof-drainage sheet metal fabrications.
2. Low-slope roof sheet metal fabrications.
3. Wall sheet metal fabrications.
4. Miscellaneous sheet metal fabrications.

B. Related Requirements:

1. Section 06 10 00 "Rough Carpentry" for wood nailers, curbs, and blocking.
2. Section 04 20 00 "Unit Masonry" for installation of manufactured sheet metal through-wall flashing and trim integral with masonry.
3. Section 07 53 23 "Ethylene-Propylene-Diene-Monomer (EPDM) Roofing" for installation of sheet metal flashing and trim integral with roofing.
4. Section 07 95 13.13 "Interior Expansion Joint Cover Assemblies" for manufactured expansion-joint cover assemblies for interior floors, walls, and ceilings.
5. Section 07 95 13.16 "Exterior Expansion Joint Cover Assemblies" for manufactured expansion-joint cover assemblies for exterior building walls, soffits, and parapets.

1.2 COORDINATION

A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.

B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review construction schedule. Verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Review special roof details, roof drainage, roof-penetration flashing, equipment curbs, and condition of other construction that affect sheet metal flashing and trim.
3. Review requirements for insurance and certificates if applicable.
4. Review sheet metal flashing observation and repair procedures after flashing installation.

1.4 ACTION SUBMITTALS

A. Product Data: For each of the following

1. Butyl sealant.
2. Roof edge flashings and copings.

B. Shop Drawings: For sheet metal flashing and trim.

1. Include plans, elevations, sections, and attachment details.
2. Detail fabrication and installation layouts, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled Work.
3. Include identification of material, thickness, weight, and finish for each item and location in Project.
4. Include details for forming, including profiles, shapes, seams, and dimensions.
5. Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.

6. Include details of termination points and assemblies.
7. Include details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction from fixed points.
8. Include details of roof-penetration flashing.
9. Include details of edge conditions, including eaves, ridges, valleys, rakes, crickets, flashings, and counterflashings.
10. Include details of special conditions.
11. Include details of connections to adjoining work.

C. Samples for Initial Selection: For each type of sheet metal and accessory indicated with factory-applied finishes.

1.5 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each product, for tests performed by a qualified testing agency.

B. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For sheet metal flashing and trim, and its accessories, to include in maintenance manuals.

B. Special warranty.

1.7 QUALITY ASSURANCE

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

1. Build mockup as described in Section 04 20 00 and as detailed in Drawings.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Owner specifically approves such deviations in writing.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage.

1. Store sheet metal flashing and trim materials away from uncured concrete and masonry.
2. Protect stored sheet metal flashing and trim from contact with water.

B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

1.9 WARRANTY

A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
    a. Color fading more than 5 Delta E units when tested in accordance with ASTM D2244.
    b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.
    c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Sheet metal flashing and trim assemblies, including cleats, anchors, and fasteners, are to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim are not to rattle, leak, or loosen, and are to remain watertight.

B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual: Architectural Metal Flashing, Condensation and Air Leakage Control, and Reroofing" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.

C. SPRI Wind Design Standard: Manufacture and install copings and roof edge flashings tested in accordance with ANSI/SPRI/FM 4435/ES-1 and capable of resisting the following design pressure:

1. Design Pressure: As indicated on Drawings.

D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 SHEET METALS

A. Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.

B. Aluminum Sheet: ASTM B209, alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required; with smooth, flat surface.

1. Exposed Coil-Coated Finish:

a. Two-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

C. Stainless Steel Sheet: ASTM A240/A240M, Type 304, dead soft, fully annealed; with smooth, flat surface.

1. Finish: ASTM A480/A480M, No. 4 (polished directional satin).

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) When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

D. Metallic-Coated Steel Sheet: Provide zinc-coated (galvanized) steel sheet in accordance with ASTM A653/A653M, G90 coating designation or aluminum-zinc alloy-coated steel sheet in accordance with ASTM A792/A792M, Class AZ50 coating designation, Grade 40; prepainted by coil-coating process to comply with ASTM A755/A755M.

1. Surface: Smooth, flat.
2. Exposed Coil-Coated Finish:
    a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
3. Color: As selected by Architect from manufacturer's full range.
4. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil.

2.3 MISCELLANEOUS MATERIALS

A. Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.

B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.
1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
    a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
    b. Blind Fasteners: High-strength aluminum or stainless steel rivets suitable for metal being fastened.
2. Fasteners for Zinc-Coated (Galvanized) or Aluminum-Zinc Alloy-Coated Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel in accordance with ASTM A153/A153M or ASTM F2329.

C. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.

D. Elastomeric Sealant: Comply with requirements in Section 07 92 00.

E. Butyl Sealant: ASTM C1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.

F. Bituminous Coating: Cold-applied asphalt emulsion in accordance with ASTM D1187/D1187M.

G. Asphalt Roofing Cement: ASTM D4586, asbestos free, of consistency required for application.

H. Reglets: Units of type, material, and profile required, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated with factory-mitered and -welded corners and junctions and with interlocking counterflashing on exterior face, of same metal as reglet.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. Fry Reglet Corporation.
    b. Heckmann Building Products, Inc.
    c. Hohmann & Barnard, Inc.
    d. Metal-Era, Inc.
2. Source Limitations: Obtain reglets from single source from single manufacturer.

3. Material: Galvanized steel, 0.022 inch thick.
4. Surface-Mounted Type: Provide with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.
5. Masonry Type: Provide with offset top flange for embedment in masonry mortar joint.

2.4 FABRICATION, GENERAL

A. Custom fabricate sheet metal flashing and trim to comply with details indicated and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required.

1. Fabricate sheet metal flashing and trim in shop to greatest extent possible.
2. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
3. Verify shapes and dimensions of surfaces to be covered and obtain field measurements for accurate fit before shop fabrication.
4. Form sheet metal flashing and trim to fit substrates without excessive oil-canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
5. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.

B. Fabrication Tolerances:

1. Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.
2. Fabricate sheet metal flashing and trim that is capable of installation to tolerances specified.

C. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.

1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.
2. Use lapped expansion joints only where indicated on Drawings.

D. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal in accordance with cited sheet metal standard to provide for proper installation of elastomeric sealant.

E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

F. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard for application, but not less than thickness of metal being secured.

G. Seams:

1. Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use.

2.5 ROOF-DRAINAGE SHEET METAL FABRICATIONS

A. Hanging Gutters: Provide Metal-Era Roof Edge Solutions; Seal-Tite Gold Industrial Gutter IGGB-C6 or equivalent.

1. Fabricate to cross section required, complete with end pieces, outlet tubes, and other accessories as required.
2. Fabricate in minimum 96-inch- long sections.

3. Furnish flat-stock gutter brackets and flat-stock gutter spacers and straps fabricated from same metal as gutters, of size recommended by cited sheet metal standard, but with thickness not less than twice the gutter thickness.
4. Fabricate expansion joints, expansion-joint covers, and gutter accessories from same metal as gutters. Shop fabricate interior and exterior corners.
5. Gutter Profile: Square.
6. Expansion Joints: Butt type with cover plate.

B. Downspouts: Fabricate open-face downspouts to dimensions indicated on Drawings, complete with mitered elbows. Furnish with metal hangers from same material as downspouts and anchors. Shop fabricate elbows.

C. Parapet Scuppers: Fabricate scuppers to dimensions required, with closure flange trim to exterior, 4-inch- wide wall flanges to interior, and base extending 4 inches beyond cant or tapered strip into field of roof. Fabricate from the following materials:

1. Galvanized Steel: 24 gage.

2.6 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

A. Roof Edge Flashing (Gravel Stop) and Fascia Cap: Fabricate in minimum 96-inch- long, but not exceeding 12-foot- long sections. Furnish with 6-inch- wide, joint cover plates. Shop fabricate interior and exterior corners.

1. Joint Style: Butted with expansion space and 6-inch- wide, concealed backup plate.
2. Fabricate scuppers to dimensions required with 4-inch- wide flanges and base extending 4 inches beyond cant or tapered strip into field of roof. Fasten gravel guard angles to base of scupper.
3. Fabricate from the following materials:
    a. Galvanized Steel: 24 gage.

B. Copings: Fabricate in minimum 96-inch- long, but not exceeding 12-foot- long, sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support edge of external leg and interior leg. Miter corners, fasten and seal watertight. Shop fabricate interior and exterior corners.

1. Joint Style: Butted with expansion space and 6-inch- wide, concealed backup plate.
2. Fabricate from the following materials:
    a. Galvanized Steel: 20 gage.

C. Rigid Aluminum Sills: Fabricate from the following materials:

1. Aluminum: .090 inch.

D. Base Flashing: Fabricate from the following materials:

1. Stainless Steel: 26 gage.

E. Counterflashing: Shop fabricate interior and exterior corners. Fabricate from the following materials:

1. Galvanized Steel: 24 gage.

F. Flashing Receivers: Fabricate from the following materials:

1. Galvanized Steel: 24 gage.

G. Roof-Penetration Flashing: Fabricate from the following materials:

1. Galvanized Steel: 22 gage.

2.7 WALL SHEET METAL FABRICATIONS

A. Through-Wall Flashing: Fabricate continuous flashings in minimum 96-inch- long, but not exceeding 12-foot- long, sections, under copings, and at shelf angles. Fabricate discontinuous lintel, sill, and similar flashings to extend 6 inches beyond each side of wall openings; and form with 2-inch- high, end dams. Fabricate from the following materials:

1. Galvanized Steel: 24 gage.

B. Opening Flashings in Frame Construction: Fabricate head, sill, jamb, and similar flashings to extend beyond wall openings as indicated in drawings. Form head and sill flashing with 2-inch-high, end dams. Fabricate from the following materials:

1. Galvanized Steel: 24 gage.

2.8 MISCELLANEOUS SHEET METAL FABRICATIONS

A. Equipment Support Flashing: Fabricate from the following materials:

1. Galvanized Steel: 22 gage.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with installer present, for compliance with requirements for installation tolerances, substrate, and other conditions affecting performance of the Work.

1. Verify compliance with requirements for installation tolerances of substrates.
2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
3. Verify that air- or water-resistant barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

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

3.2 INSTALLATION, GENERAL

A. Install sheet metal flashing and trim to comply with details indicated and recommendations of cited sheet metal standard that apply to installation characteristics required unless otherwise indicated on Drawings.

1. Install fasteners, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
2. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of sealant.
3. Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement.
4. Install sheet metal flashing and trim to fit substrates and to result in watertight performance.
5. Space individual cleats not more than 12 inches apart or as required by tested assembly. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
6. Install exposed sheet metal flashing and trim with limited oil-canning, and free of buckling and tool marks.
7. Do not field cut sheet metal flashing and trim by torch.

B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.

1. Coat concealed side of stainless steel sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.

C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim.

1. Space movement joints at maximum of 10 feet with no joints within 24 inches of corner or intersection.
2. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.
3. Use lapped expansion joints only where indicated on Drawings.

D. Fasteners: Use fastener sizes that penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.

E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

F. Seal joints as required for watertight construction.

1. Use sealant-filled joints unless otherwise indicated.
    a. Embed hooked flanges of joint members not less than 1 inch into sealant.
    b. Form joints to completely conceal sealant.
    c. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way.
    d. Adjust setting proportionately for installation at higher ambient temperatures.
        1) Do not install sealant-type joints at temperatures below 40 deg F.
2. Prepare joints and apply sealants to comply with requirements in Section 07 92 00 "Joint Sealants."

3.3 INSTALLATION OF ROOF-DRAINAGE SYSTEM

A. Install sheet metal roof-drainage items to produce complete roof-drainage system in accordance with cited sheet metal standard unless otherwise indicated. Coordinate installation of roof perimeter flashing with installation of roof-drainage system.

B. Hanging Gutters:

1. Join sections with joints sealed with sealant.
2. Provide for thermal expansion.
3. Attach gutters at eave or fascia to firmly anchor them in position.
4. Provide end closures and seal watertight with sealant.
5. Slope to downspouts.
6. Anchor and loosely lock back edge of gutter to continuous eave or apron flashing.
7. Anchor gutter with gutter brackets spaced not more than 24 inches apart to roof deck unless otherwise indicated, and loosely lock to front gutter bead.

C. Downspouts:

1. Join sections with 1-1/2-inch telescoping joints.
2. Provide hangers with fasteners designed to hold downspouts securely to walls.
3. Locate hangers at top and bottom and at approximately 60 inches o.c.
4. Provide elbows at base of downspout to direct water away from building.

D. Parapet Scuppers:

1. Continuously support scupper, set to correct elevation, and seal flanges to interior wall face, over cants or tapered edge strips, and under roofing membrane.

2. Anchor scupper closure trim flange to exterior wall and seal with elastomeric sealant to scupper.

3.4 INSTALLATION OF ROOF FLASHINGS

A. Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and cited sheet metal standard.

1. Provide concealed fasteners where possible, and set units true to line, levels, and slopes.
2. Install work with laps, joints, and seams that are permanently watertight and weather resistant.

B. Roof Edge Flashing:

1. Install roof edge flashings in accordance with ANSI/SPRI/FM 4435/ES-1.
2. Anchor to resist uplift and outward forces in accordance with recommendations in cited sheet metal standard unless otherwise indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at staggered 3-inch centers.
3. Anchor to resist uplift and outward forces in accordance with recommendations in FM Global Property Loss Prevention Data Sheet 1-49 for FM Approvals' listing for required windstorm classification.

C. Copings:

1. Install roof edge flashings in accordance with ANSI/SPRI/FM 4435/ES-1.

D. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending minimum of 4 inches over base flashing. Install stainless steel draw band and tighten.

E. Counterflashing: Coordinate installation of counterflashing with installation of base flashing.

1. Insert counterflashing in reglets or receivers and fit tightly to base flashing.
2. Extend counterflashing 4 inches over base flashing.
3. Lap counterflashing joints minimum of 4 inches.
4. Secure in waterproof manner by means of interlocking folded seam or blind rivets and sealant unless otherwise indicated.

F. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with butyl sealant and clamp flashing to pipes that penetrate roof.

3.5 INSTALLATION OF WALL FLASHINGS

A. Install sheet metal wall flashing to intercept and exclude penetrating moisture in accordance with cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

B. Opening Flashings in Frame Construction: Install continuous head, sill, jamb, and similar flashings to extend beyond wall openings as shown in drawings.

C. Reglets: Installation of reglets is specified in Section 04 20 00 "Unit Masonry."

3.6 INSTALLATION OF MISCELLANEOUS FLASHING

A. Equipment Support Flashing:

1. Coordinate installation of equipment support flashing with installation of roofing and equipment.
2. Weld or seal flashing with elastomeric sealant to equipment support member.

3.7 INSTALLATION TOLERANCES

A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.8 CLEANING

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean off excess sealants.

3.9 PROTECTION

A. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions.

B. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended in writing by sheet metal flashing and trim manufacturer.

C. Maintain sheet metal flashing and trim in clean condition during construction.

D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures, as determined by Architect.

END OF SECTION

SECTION 07 95 13.13 - INTERIOR EXPANSION JOINT COVER ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Floor expansion joint covers.
2. Wall expansion joint covers.
3. Ceiling expansion joint covers.

1.2 ACTION SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for expansion joint cover assemblies.

1. Floor expansion joint covers.
2. Wall expansion joint covers.
3. Ceiling expansion joint covers.

B. Shop Drawings: For each expansion joint cover assembly.

1. Include plans, elevations, sections, details, splices, block-out requirement, attachments to other work, and line diagrams showing entire route of each expansion joint.
2. Where expansion joint cover assemblies change planes, provide isometric or clearly detailed drawing depicting how components interconnect.

C. Samples for Initial Selection: For each type of exposed finish.

1. Include manufacturer's color charts showing the full range of colors and finishes available for each exposed metal and elastomeric-seal material.

D. Samples for Verification: For each type of expansion joint cover assembly, full width by 6 inches long in size.

E. Expansion Joint Cover Assembly Schedule: Prepared by or under the supervision of the supplier. Include the following information in tabular form:

1. Manufacturer and model number for each expansion joint cover assembly.
2. Expansion joint cover assembly location cross-referenced to Drawings.
3. Nominal, minimum, and maximum joint width.
4. Movement direction.
5. Materials, colors, and finishes.
6. Product options.
7. Fire-resistance ratings.

1.3 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each fire-resistance-rated expansion joint cover assembly, for tests performed by a qualified testing agency.

PART 2 - PRODUCTS

2.1 ASSEMBLY DESCRIPTION

A. Furnish units in longest practicable lengths to minimize field splicing.

B. Include factory-fabricated closure materials and transition pieces, T-joints, corners, curbs, cross-connections, and other accessories as required to provide continuous expansion joint cover assemblies.

C. See Expansion Joint Cover Schedule at end of this section for specific basis-of-design products.

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

a. Balco; a CSW Industrials Company.
b. Construction Specialties, Inc.
c. Nystrom, Inc.
d. inpro Corporation.

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Resistance Ratings: Provide expansion joint cover assemblies with fire barriers identical to those of systems tested for fire resistance according to UL 2079 or ASTM E1966 by a qualified testing agency.

1. Hose Stream Test: Wall-to-wall and wall-to-ceiling assemblies to be subjected to hose stream testing.

B. Expansion Joint Design Criteria:

1. Type of Movement: Wind sway.

a. Nominal Joint Width: As indicated on Drawings.

2.3 FLOOR EXPANSION JOINT COVERS

A. Elastomeric-Seal Floor Joint Cover: Assembly consisting of elastomeric seal anchored to frames fixed to sides of joint gap.

1. Application: Floor to floor and Floor to wall.
2. Installation: Surface mounted.
3. Load Capacity:

a. Uniform Load: 50 lb/sq. ft..
b. Concentrated Load: 300 lb.
c. Maximum Deflection: 0.0625 inch.

4. Fire-Resistance Rating: Not less than that indicated on Drawings.
5. Exposed Metal:
6. Seal: Preformed elastomeric membrane or extrusion.

a. Color: Bronze. ~~As selected by Architect from manufacturer's full range.~~

2.4 WALL EXPANSION JOINT COVERS

A. Metal-Plate Wall Joint Cover: Metal cover plate fixed on one side of joint gap and free to slide on other.

1. Application: Wall to wall and Wall to corner.
2. Exposed Metal:

a. Aluminum: Clear anodic, Class I, unless indicated otherwise in Schedule or Drawings.
b. Primed Aluminum: Provide manufacturer's standard primer where indicated in schedule, or joint covers are indicated to match adjacent surfaces in Drawings.

B. Elastomeric-Seal Wall Joint Cover: Assembly consisting of elastomeric seal anchored to frames fixed to sides of joint gap.

2.5 CEILING EXPANSION JOINT COVERS

A. Metal-Plate Ceiling Joint Cover: Metal cover plate fixed on one side of joint gap and free to slide on other.

1. Application: Ceiling to ceiling and Wall to ceiling.

2. Exposed Metal:

a. Primed Aluminum: ~~Mill~~ Provide manufacturer's standard primer where indicated in schedule, or joint covers are indicated to match adjacent surfaces in Drawings.

B. Elastomeric-Seal Acoustical Ceiling Joint Cover: Elastomeric-seal assembly designed for use in acoustical ceilings.

1. Application: Ceiling to ceiling and Wall to ceiling.
2. Exposed Metal:

a. Aluminum: Clear anodic, Class I.

3. Seal: Preformed elastomeric membranes or extrusions.

a. Color: White ~~as selected by Architect from manufacturer's full range.~~

2.6 MATERIALS

A. Aluminum: ASTM B221, Alloy 6063-T5 for extrusions; ASTM B209, Alloy 6061-T6 for sheet and plate.

1. Apply manufacturer's standard protective coating on aluminum surfaces to be placed in contact with cementitious materials.

B. Elastomeric Seals: Manufacturer's standard preformed elastomeric membranes or extrusions to be installed in metal frames.

C. Fire Barriers: Any material or material combination, when fire tested after cycling, designated to resist the passage of flame and hot gases through a movement joint and to comply with performance criteria for required fire-resistance rating.

2.7 ALUMINUM FINISHES

A. Mill finish.

B. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

2.8 ACCESSORIES

A. Manufacturer's standard attachment devices. Include anchors, clips, fasteners, set screws, spacers, and other accessories compatible with material in contact, as indicated or required for complete installations.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces where expansion joint cover assemblies will be installed for installation tolerances and other conditions affecting performance of the Work.

B. Notify Architect where discrepancies occur that will affect proper expansion joint cover assembly installation and performance.

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

3.2 PREPARATION

A. Prepare substrates according to expansion joint cover assembly manufacturer's written instructions.

B. Coordinate and furnish anchorages, setting drawings, and instructions for installing expansion joint cover assemblies. Provide fasteners of metal, type, and size to suit type of construction indicated and to provide for secure attachment of expansion joint cover assemblies.

3.3 INSTALLATION

A. Comply with manufacturer's written instructions for storing, handling, and installing expansion joint cover assemblies and materials unless more stringent requirements are indicated.

B. Metal Frames: Perform cutting, drilling, and fitting required to install expansion joint cover assemblies.

1. Install frames in continuous contact with adjacent surfaces.
    a. Shimming is not permitted.
2. Install in true alignment and proper relationship to joints and adjoining finished surfaces measured from established lines and levels.
3. Cut and fit ends to accommodate thermal expansion and contraction of metal without buckling of frames.
4. Locate anchors at interval recommended by manufacturer, but not less than 3 inches from each end and not more than 24 inches o.c.

C. Seals: Install elastomeric seals and membranes in frames to comply with manufacturer's written instructions. Install with minimum number of end joints.

1. Provide in continuous lengths for straight sections.
2. Seal transitions. Vulcanize or heat-weld field-spliced joints as recommended by manufacturer.
3. Installation: Mechanically lock seals into frames or adhere to frames with adhesive or pressure-sensitive tape as recommended by manufacturer.

D. Install with hairline mitered corners where expansion joint cover assemblies change direction or abut other materials.

E. Terminate exposed ends of expansion joint cover assemblies with field- or factory-fabricated termination devices.

F. Fire-Resistance-Rated Assemblies: Coordinate installation of expansion joint cover assembly materials and associated work so complete assemblies comply with performance requirements.

1. Fire Barriers: Install fire barriers to provide continuous, uninterrupted fire resistance throughout length of joint, including transitions and field splices.

3.4 PROTECTION

A. Do not remove protective covering until finish work in adjacent areas is complete. When protective covering is removed, clean exposed metal surfaces to comply with manufacturer's written instructions.

B. Protect the installation from damage by work of other Sections. Where necessary due to heavy construction traffic, remove and properly store cover plates or seals and install temporary protection over expansion joint cover assemblies. Reinstall cover plates or seals prior to Substantial Completion.

3.5 MOVEMENT JOINT COVER SCHEDULE

A. Balco USA products listed to establish level of quality. Product series indicated. Provide products from indicated series to comply with fire ratings where applicable. Alternate products by other listed manufacturers meeting or exceeding performance of listed systems acceptable.

B. Floor-To-Floor

1. General – 75FPE
2. Firerated (room S1012/L1074): 2H75FPE
3. Vinyl tile to vinyl tile: 75FTE
4. Carpet to carpet: 75FCE
5. Carpet to carpet recessed (where furnishings require flush flooring): 75FP

C. Floor-to-Wall

1. General: 75FVPE
2. Carpet (recessed): 75FVP

D. Wall-to-Wall

1. General: WD, primed.
2. General corner: WDC, primed.

E. Wall-to-Ceiling

1. Gyp wall to gyp ceiling: WDC, primed.
2. Gyp wall to ACT ceiling: 75FCAC

F. Ceiling-to-Ceiling

1. Gyp to gyp: WD, primed.
2. ACT to ACT: 75FCA

END OF SECTION

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SECTION 08 71 63 - DETENTION DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes detention door hardware for the following:

1. Swinging detention doors.

B. Related Requirements:

1. Section 01 35 13.16 "Special Project Procedures for Detention Facilities" for general requirements for detention work.
2. Section 05 05 53 "Security Metal Fasteners."
3. Section 08 34 63 "Detention Doors and Frames."
4. Section 08 88 53 "Security Glazing."
5. Division 26: Electrical, Conduit.
6. Division 28: Electronic Safety and Security.

1.3 COORDINATION

A. Templates: Obtain and distribute, to the parties involved, templates for detention doors, frames, and other work specified to be factory prepared for installing detention door hardware.

B. Electrical System Roughing-In: Coordinate layout and installation of electrically powered detention door hardware with connections to power supplies detention monitoring and control system fire-alarm system and detection devices and building control system.

1.4 PREINSTALLATION MEETINGS

A. Detention Keying Conference: Conduct conference at Project site to comply with requirements in Section 01 31 00 "Project Management and Coordination." In addition to Owner, Contractor, and Architect, conference participants shall also include Detention Equipment Contractor and Installer. Incorporate detention keying conference decisions into Project's final Detention Keying Schedule after reviewing detention door hardware keying system including, but not limited to, the following:

1. Preliminary key system schematic diagram.
2. Requirements for key-control system.
3. Requirements for access control.

B. Preinstallation Conference: Conduct conference at Project site. Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Notify Owner and Architect of scheduled meeting dates.

1. Inspect and discuss power and control system roughing-in and other preparatory work performed by other trades.
2. Review sequence of operation for each type of detention door hardware.
3. Review and finalize a construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Certifying procedures.

1.5 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 each type of detention door hardware.

B. Shop Drawings: For each type of detention door hardware.

1. Include plans, elevations, sections, and attachment details.
2. Include diagrams for power, signal, and control wiring; differentiate between manufacturer-installed and field-installed wiring for detention door hardware. Include the following:

a. System schematic.
b. Point-to-point wiring diagram, including location of connections.
c. Riser diagram.
d. Elevation of each detention door type.

3. Detail interface between electrically powered detention door hardware and detention monitoring and control fire-alarm and building control system.

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

1. Integrate detention door hardware indicated in "Detention Door Hardware Schedule" Article into Project's final Detention Door Hardware Schedule, and indicate complete designations of every item required for each detention door and opening.
2. Keying Schedule: Coordinate detention keying with other door hardware in Project's final Keying Schedule.
3. Indicate each detention lock and type of key cylinder using the following prefixes: "P" for paracentric, "M" for mogul, "HS" for high security, and "C" for commercial.
4. Indicate security level of each item.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer and supplier.

B. Product Certificates: For each type of detention door hardware.

1. Certify that detention door hardware complies with listed fire door assemblies.

C. Product Test Reports: For each type of detention lock and latch security door closer and sliding detention door device, for tests performed by manufacturer and witnessed by a qualified testing agency or an independent, qualified testing agency.

D. Examination reports documenting inspections of substrates, areas, and conditions.

E. Anchor inspection reports documenting inspections of built-in and cast-in anchors.

F. Field quality-control reports documenting inspections of installed products.

1. Field quality-control certification signed by Construction Manager and Detention Equipment Contractor.

G. Sample Warranties: For special warranties.

1.7 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For detention door hardware to include in emergency, operation, and maintenance manuals.

1. In addition to items specified in Section 01 78 23 "Operation and Maintenance Data," include the following:
    a. Normal remote security operation.
    b. Normal local security operation.
    c. Emergency security operation.

1.8 MAINTENANCE MATERIAL SUBMITTALS

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

B. Initial Maintenance Service: Beginning at Substantial Completion, provide 12 months' full maintenance by skilled employees of detention door hardware Installer. Include monthly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper detention door hardware operation. Provide parts and supplies the same as those used in the manufacture and installation of original equipment.

C. Furnish the following:

1. Include complete listing of spare parts (with re-order part numbers and re-order procedures), a list of contact persons (including addresses, phone numbers) for both routine and emergency advise, and a schedule for all maintenance activities required for each detention door hardware item.
2. Include graphic and narrative descriptions of all products and equipment defining parts and their assembly; function; trouble-shooting situations and repair options, maintenance, replacement, and adjustment instructions.

1.9 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer and an authorized representative of detention door hardware manufacturer for installation and maintenance of units required for this Project.

1. Submit evidence of minimum five (5) years' experience in the installation of detention equipment. Provide a list of ten (10) projects of equivalent size or larger, giving the names, locations and architects.
2. Submit a letter from manufacturer of detention locks and door operating devices stating that Installer is factory-trained, fully authorized and qualified to install their products specifically for this Project

B. Supplier Qualifications: Detention door hardware supplier with warehousing facilities in Project's vicinity who is, or employs, a qualified Architectural Hardware Consultant, available during the course of the Work to consult with Contractor, Architect, and Owner about detention door hardware and keying.

1. Detention Door Hardware Supplier Qualifications: An experienced detention door hardware supplier who has completed projects with electrically powered detention door hardware similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance, and who is acceptable to manufacturer of primary materials.
    a. Engineering Responsibility: Prepare data for electrically powered detention door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
    b. Scheduling Responsibility: Preparation of Detention Door Hardware and Keying schedules.

C. Architectural Openings Consultant Qualifications: A person who is currently certified by DHI as an Architectural Openings Consultant (AOC) and who is experienced in providing consulting services for detention door hardware installations that are comparable in material, design, and extent to that indicated for this Project.

D. Source Limitations: Obtain door locks, sliding devices, operators, controls, and associated detention equipment from same manufacturer.

E. Qualifications for Welding: Qualify welding processes and welding operators in accord with AWS "Standard Qualification Procedure".

1. Provide certification that welders to be employed in work have satisfactorily passed AWS qualification tests within previous twelve months. If recertification of welders is required, retesting will be Contractor's responsibility.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Inventory detention door hardware on receipt and provide secure lockup for detention door hardware delivered to Project site.

B. Tag each item or package separately with identification related to the Detention Door Hardware Schedule, and include basic installation instructions with each item or package.

C. Deliver detention door keys to Owner by registered mail or overnight package service.

1.11 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of detention door hardware that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
    a. Structural failures including excessive deflection, cracking, or breakage.
    b. Faulty operation of operators and detention door hardware.
    c. Deterioration of metals, metal finishes, and other materials beyond normal weathering or detention use.
2. Warranty Period: Three years from date of Substantial Completion.
3. Warranty Period for Continuous-Pin Detention Hinges: 10 years from date of Substantial Completion.
4. Warranty Period for Security Door Closers: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Swinging Detention Door Assemblies: Provide detention door hardware as part of a detention door assembly that complies with security grade indicated, when tested according to ASTM F 1450, based on testing manufacturer's standard units in assemblies similar to those indicated for this Project.

2.2 DETENTION DOOR HARDWARE, GENERAL

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

1. Detention Door Hardware Sets: Provide quantity, item, size, finish, or color indicated.
2. Sequence of Operation: Provide electrically powered detention door hardware function, sequence of operation, and interface with other building control systems indicated.

B. Electrically Powered Detention Door Hardware: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. Detention Door Hardware Control and Monitoring: Provide detention door hardware with features, functions, and internal equipment required to perform control and monitoring functions indicated in Section 28 46 03 "Door Control and Monitoring Systems."

D. Source Limitations: Obtain mechanical detention door hardware from same manufacturer as that of electrically powered or pneumatic detention door hardware.

E. Regulatory Requirements:

1. Fire-Rated Detention Door Assemblies: Provide detention door hardware for assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
2. Where indicated to comply with accessibility requirements, comply with local authorities having jurisdiction.

2.3 KEYS AND KEYING

A. The contractor of this Section shall meet with the Owner and Architect to determine final keying requirements. Each key shall be individually stamped in accord with the following designations or any changes in designation provided during the keying meeting.

B. Coordinate with Owner to match keying to existing key system.

2.4 DETENTION HINGES

A. Standard for Electric Detention Hinges: UL 634.

B. Mortise Detention Hinges: ANSI A156.7 Grade 1, 0.188-inch stainless steel, detention fastener mounted, ASI A156.7 template Mortise hinge with anti-friction bearing, hospital tips and integral anti-shear studs.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Southern Folger Detention Equipment Company.
2. Leaves: Drilled for countersunk security fasteners.
3. Size: Minimum 4 1/2 by 4 1/2 by 0.200 inch.
4. Security Grade: 1 according to ASTM F 1758.
5. Finish: BHMA 630.

C. Utility-Door Detention Hinges: Heavy weight, plain bearing; fabricated from cast iron or steel; 3/8-inch- diameter, case-hardened, fully welded, steel hinge pin; full surface.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Southern Folger Detention Equipment Company.
2. Leaves: Solid.
3. Size: Minimum 3 by 4 by 0.200 inch.
4. Security Grade: 1 according to ASTM F 1758.
5. Finish: BHMA 600.

D. Food-Pass Detention Hinges: Heavy weight, plain bearing; fabricated from cast iron or steel; 3/8-inch- diameter, case-hardened, fully welded, steel hinge pin; with applied stop preventing door from opening more than 90 degrees and supporting door in horizontal position as a shelf; full surface.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Southern Folger Detention Equipment Company.
2. Leaves: Solid.
3. Size: Minimum 3 by 4 by 0.200 inch.

4. Security Grade: 1 according to ASTM F 1758.
5. Finish: BHMA 600.

E. Full-Surface Detention Hinges: Extra heavy weight; two heavy-duty thrust bearings with hardened-steel ball bearings; fabricated from steel plate; 3/4-inch- diameter, case-hardened, fully welded, steel hinge pin.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Southern Folger Detention Equipment Company.
2. Leaves: Drilled for countersunk security fasteners.
3. Size: Minimum 5 by 5-1/4 by 1/2 inch.
4. Security Grade: 1 according to ASTM F 1758.
5. Finish: BHMA 600.

2.5 MECHANICAL DETENTION LOCKS AND LATCHES

A. Lock Mountings:

1. Hollow-Metal Detention Doors: Mount detention lock to back of 0.179-inch nominal-thickness steel cover plate for installation in lock pocket fabricated into detention door. Attach cover plate to hollow-metal detention door with security fasteners.

B. Utility-Door Mechanical Deadlocks, Paracentric Cylinder:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Southern Folger Detention Equipment Company.
2. Function: Lockbolt retracted and extended by five -tumbler paracentric cylinder; keyed one side.
3. Lockbolt: 1-1/2 inches high by 3/4 inch thick; 5/8-inch throw.
4. Security Grade: 1 according to ASTM F 1577.

C. Utility-Door Mechanical Deadlocks, Mogul Cylinder:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Southern Folger Detention Equipment Company.
2. Function: Lockbolt retracted and extended by mogul cylinder; keyed one side.
3. Lockbolt: 1-1/2 inches high by 3/4 inch thick; 5/8-inch throw.
4. Security Grade: 1 according to ASTM F 1577.

D. Utility-Door Mechanical Snaplatches, Paracentric Cylinder:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Southern Folger Detention Equipment Company.
2. Function: Automatic snaplatch when door is closed; latchbolt retracted by five -tumbler paracentric cylinder; keyed one side.
3. Latchbolt: 1 inch high by 7/16 inch thick; 5/16-inch throw.
4. Security Grade: 1 according to ASTM F 1577.

E. Utility-Door Mechanical Snaplatches, Mogul Cylinder:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Southern Folger Detention Equipment Company.
2. Function: Automatic snaplatch when door is closed; latchbolt retracted by mogul cylinder; keyed one side.
3. Latchbolt: 1 inch high by 7/16 inch thick; 5/16-inch throw.

4. Security Grade: 1 according to ASTM F 1577.

F. Mechanical Snaplatches, Paracentric Cylinder:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Southern Folger Detention Equipment Company.
2. Function: Automatic snaplatch when door is closed (slam locking); latchbolt retracted by half turn and extended by full turn in opposite direction of five -tumbler paracentric cylinder; keyed one side.
3. Latchbolt: 2-inch-high by 3/4-inch- thick steel, with two case-hardened-steel insert pins; 3/4-inch throw; 1/2-inch bolt projection when retracted.
4. Listed and labeled for use on fire doors.
5. Security Grade: 1 according to ASTM F 1577.

G. Mechanical Mortise Lock and Latch:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Southern Folger Detention Equipment Company.
2. Function: Variety of function to meet specific door requirements.
3. Latchbolt: 1 1/8-inch-high by 3/4-inch- thick stainless steel, with 3/4-inch throw.
4. Deadbolt: 1 ¼-inch-high by ¾-inch-thick stainless steel with 1-inch throw.
5. Security Grade: 1 according to ASTM F 1577.

2.6 ELECTROMECHANICAL DETENTION LOCKS AND LATCHES

A. Connectors: Provide electromechanical detention locks and latches with factory-wired plug connector with 6-inch wire pigtail.

1. Provide security ring for installation of electromechanical detention lock in hollow-metal detention frame, welded to frame or access cover.
2. Equip direct-current, solenoid-operated detention locks and latches with diode transient voltage protection at each locking device.

B. Solenoid-Operated Deadlatches, Mogul Cylinder:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Southern Folger Detention Equipment Company.
2. Function: Remote switch activates electric solenoid that retracts latchbolt; automatic latching and deadlocking when door is closed (slam locking). Latchbolt can be mechanically retracted by mogul cylinder; keyed one side or two sides.
   a. Latchback: Latchbolt remains retracted until door is opened 2 inches, then releases.
   b. If power fails, latchbolt automatically deadlocks (fail secure).
3. Latchbolt: 1-1/2-inch-high by 3/4-inch- thick hardened steel; 1-inch throw.
4. Provide internal deadlock indicator switch.
5. Provide roller-type deadlock actuator.
6. Voltage: 120-V ac.
7. Listed and labeled for use on fire doors.
8. Security Grade: 1 according to ASTM F 1577.

C. Motor-Operated Deadlatches, Mogul Cylinder:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Southern Folger Detention Equipment Company.

2. Function: Remote switch activates electric motor that retracts latchbolt; automatic latching and deadlocking when door is closed (slam locking). Latchbolt can be mechanically retracted by mogul cylinder; keyed one side or two sides.
    a. Latchback: Latchbolt remains retracted until door is opened 2 inches, then releases.
    b. If power fails, latchbolt automatically deadlocks (fail secure).
3. Latchbolt: 1-1/2-inch-high by 3/4-inch- thick hardened steel; 1-inch throw.
4. Provide internal deadlock indicator switch.
5. Provide roller-type deadlock actuator.
6. Voltage: As scheduled.
7. Listed and labeled for use on fire doors.
8. Security Grade: 1 according to ASTM F 1577.

D. Motor-Operated Gate Locks, Mogul Cylinder:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. Southern Folger Detention Equipment Company.
2. Function: Remote switch activates electric motor that raises an internal bolt; automatic deadlocking when gate is closed. Bolt can be mechanically retracted by five -tumbler paracentric cylinder; keyed one side or two sides.
    a. Latchback: Bolt remains raised until gate is closed.
    b. If power fails, latchbolt automatically deadlocks (fail secure).
3. Bolt: 5/8-inch- diameter stainless steel; 1-inch throw.
4. Provide internal deadlock indicator switch.
5. Voltage: 120-V ac.
6. Finish: Galvanized.
7. Mounting: Mount lock to gate post; mount locking tongue to gate frame.
8. Security Grade: 1 according to ASTM F 1577.

2.7 DETENTION LOCK TRIM

A. Levers: Solid stainless steel.

B. Cylinder Shields for Paracentric Locks: 0.125-inch- thick, 3-inch- diameter brass with BHMA 606 finish and swinging cover to protect keyhole. Attach with security fasteners.

1. Style: Single or double wing as required by lock function.

2.8 DETENTION CYLINDERS AND KEYING

A. Source Limitations: Subject to compliance with requirements, provide cylinders and keying for paracentric and mogul cylinders by same manufacturer as for detention locks and latches.

B. Paracentric Cylinders: Manufacturer's standard lever-tumbler type, constructed from one-piece spring-tempered brass; with tumblers activated by phosphor bronze springs; five tumblers per lock.

C. Mogul Cylinders: Manufacturer's standard pin-tumbler type, minimum 2-inch diameter; body constructed from brass or bronze, stainless steel, or nickel silver; with stainless-steel tumblers and engaging cylinder balls; complying with the following:

1. Number of Pins: Six.
2. Mortise Type: Threaded cylinders with rings and straight- or clover-type cam.
    a. High-Security Grade: Listed and labeled as complying with pick- and drill-resistant testing requirements in UL 437 (Suffix A).
3. Finish: BHMA 606.

D. Keying System: Provide a factory-registered keying system complying with the following requirements:

1. Paracentric cylinders operated by change keys only.
2. Master Key System: Mogul cylinders operated by a change key and a master key.

E. Keys: Provide cast silicon-bronze copper alloy keys complying with the following:

1. Stamping: Permanently inscribe each key with a visual key-control number and include the following notation:
   a. "DO NOT DUPLICATE."
2. Quantity: In addition to one extra blank key for each lock, provide the following:
   a. Cylinder Change Keys: Three.
   b. Master Key(s): One.

2.9 SWITCHES

A. General: Provide switches configured with contact type required for functions indicated, including multiple circuiting where required by functional performance of Section 28 52 11 "Detention Monitoring and Control Systems."

B. Magnetic Door Position Switches, Concealed: Consist of actuating magnet mortised into detention and switch mortised into frame with stainless steel faceplate, 24 VDC, factory-wired with plug connector. Wire in series with lock monitors. Attach with security fasteners.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Southern Folger Detention Equipment Company.

C. Surface-Mounted Door Position Switches: Switch enclosed in 0.134-inch nominal-thickness steel enclosure, factory primed for painting; 120-V ac; factory wired with plug connector. Wire in series with lock monitors. Attach with security fasteners.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Southern Folger Detention Equipment Company.
2. Galvanize enclosure for exterior locations.

D. Strike Indicator Switches: Designed to be mortised behind strike and to indicate whether door is locked or unlocked; enclosed in metal strike box. Wire in series with door position switches. Attach with security fasteners.

1. Voltage: 120-V dc.
2. Locations: Where indicated.
3. Manufacturer: Same as detention lock.

2.10 DETENTION OPERATING TRIM

A. Standard: BHMA A156.6, Grade 1.

B. Surface-Mounted Door Pulls: 8-3/4-inch overall length and 2-1/4-inch projection; attach to door with two security fasteners.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Southern Folger Detention Equipment Company.
2. Material: Cast stainless steel with BHMA 630 finish.

C. Flush Door Pulls: 5 inches high by 4 inches wide by 1 inch deep, with 1/8-inch- thick faceplate; attach to door with four security fasteners.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Southern Folger Detention Equipment Company.
2. Material: Formed, wrought, or cast brass/bronze with BHMA 626 finish.

D. Lever-Handle Guides: Guide tracks and escutcheons that provide selective stopping of lever handle by use of an adjustable stop; fabricated from steel with BHMA 633 finish. Attach with security fasteners.

2.11 SECURITY DOOR CLOSERS

A. Standard: BHMA A156.4, Grade 1.

1. Certified Products: Provide security door closers listed in BHMA's "Directory of Certified Door Products."

B. Surface-Mounted Security Door Closers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Corbin Russwin, Inc.; an ASSA ABLOY Group company.
   b. LCN; an Allegion brand.
   c. Norton Door Controls; an ASSA ABLOY Group company.
   d. Yale Security Inc; an ASSA ABLOY Group company.
2. Arms: Minimum 3/8-inch- thick by 1-1/8-inch- wide, rectangular steel main arm; 5/16-inch- thick by 1-inch- wide, rectangular steel secondary arm; full rack-and-pinion type; fabricated with orbital-riveted, pinned, or welded elbow and arm shoe/soffit plate joints designed to prevent disassembly with ordinary hand tools.
3. Cover: Heavy-duty metal, attached with four security fasteners.
4. Mounting: Attach security door closer with security fasteners.

C. Unit Size: Comply with manufacturer's written recommendations for size of security door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to comply with field conditions and requirements for opening force.

2.12 DETENTION DOOR STOPS

A. Detention Floor Stops: 1-1/2-inch-high by 2-inch- diameter, rubber bumper mounted on steel lag bolt; BHMA A156.16; install in floor with nonshrink grout; for detention doors unless wall or other type stops are indicated. Do not mount floor stops where they can impede traffic.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Burns Manufacturing Incorporated.
   b. Hager Companies.
   c. Southern Folger Detention Equipment Company.
   d. Triangle Brass Manufacturing Co., Inc.
   e. Airteq, a Division of Cornerstone Detention Products, Inc.

B. Silencers for Detention Door Frames: BHMA A156.16, Grade 1; neoprene or rubber, minimum 1/2-inch diameter; fabricated for drilled-in application to detention door frame. Attach with security fasteners.

2.13 FABRICATION

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

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

C. Detention Lock Construction: Fabricate detention lock case and cover plate from steel plate. Fabricate bolts from solid sections; laminated construction is unacceptable.

2.14 HARDWARE FINISHES

A. Standard: Comply with BHMA A156.18.

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

C. BHMA Designations: Comply with base material and finish requirements indicated by the following:

1. BHMA 600: Primed for painting, over steel base metal.
2. BHMA 606: Satin brass, clear coated, over brass base metal.
3. BHMA 626: Satin chromium plated over nickel, over brass or bronze base metal.
4. BHMA 630: Stainless steel, satin, over stainless-steel base metal.
5. BHMA 633: Satin brass plated, clear coated, over steel base metal.
6. BHMA 652: Satin chromium plated over nickel, over steel base metal.

2.15 SECURITY FASTENERS

A. Security Fasteners: Refer to Section 05 05 53.

PART 3 - EXECUTION

3.1 EXAMINATION

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

B. Examine roughing-in for embedded and built-in anchors to verify actual locations of detention door hardware connections before detention door hardware installation.

C. Inspect built-in and cast-in anchor installations, before installing detention door hardware, to verify that anchor installations comply with requirements. Prepare inspection reports.

1. Remove and replace anchors where inspections indicate that they do not comply with specified requirements. Reinspect after repairs or replacements are made.
2. Perform additional inspections to determine compliance of replaced or additional work.

D. Verify locations of detention door hardware with those indicated on Shop Drawings.

E. Examine roughing-in for electrical power systems to verify actual locations of connections before detention door hardware installation.

F. Investigate doors to be reused. Notify Architect of any conditions that would be detrimental to re-installation.

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

3.2 PREPARATION

A. Steel Detention Doors and Frames: Comply with BHMA A156.115 Series.

1. Surface-Applied Detention Door Hardware: Drill and tap detention doors and frames according to SDI A250.6.

3.3 INSTALLATION

A. Mounting Heights: Mount detention door hardware units at heights indicated in DHI's "Recommended Locations for Builders' Hardware for Custom Steel Doors and Frames."

B. Install each detention door hardware item to comply with Shop Drawings and manufacturer's written instructions. Where cutting and fitting are required to install detention door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.

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

C. Hinge Installation:

1. Welding: Where indicated, weld hinges to detention doors and frames with continuous fillet weld around three sides of hinge perimeter.
2. Security Fasteners: Provide socket flat countersunk head machine screws; finish screw heads to match surface of detention hinges. Install into drilled and tapped holes.

D. Install interconnecting wiring and connectors between detention door hardware devices. Terminate device wiring for detention door hardware installed in swinging doors at a plug-type connector located in lock pocket or door frame junction box and for sliding doors at a junction box in door frame.

E. Security Fasteners: Install detention door hardware using security fasteners with head style appropriate for installation requirements, strength, and finish of adjacent materials.

3.4 FIELD QUALITY CONTROL

A. Inspect installed products to verify compliance with requirements. Prepare inspection reports and indicate compliance with and deviations from the Contract Documents.

B. Perform the following tests and inspections:

1. After installing electrically powered detention door hardware and after electrical circuitry has been energized, test detention door hardware for compliance with requirements.
    a. Test: Operate lock of each door and group of doors in normal remote, normal local, and emergency operating modes. Verify that remote controls operate correct door locks and in correct sequence.
2. Verify that lock bolts engage strikes with required bolt projection.
3. Verify that detention door hardware is installed, connected, and adjusted according to the Contract Documents.
4. Verify that electrical wiring installation complies with manufacturer's submittal and written installation requirements.

C. Detention work will be considered defective if it does not pass tests and inspections.

D. Perform additional inspections to determine compliance of replaced or additional work.

E. Prepare field quality-control certification endorsed by Detention Equipment Contractor that states installed products comply with requirements in the Contract Documents.

F. Prepare test and inspection reports.

3.5 ADJUSTING

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

1. Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.

3.6 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by detention door hardware installation.

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

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

3.7 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain detention door hardware and detention door hardware finishes.

3.8 DETENTION DOOR HARDWARE SCHEDULE

A. General: Provide detention door hardware for each detention door to comply with requirements in this Section and with detention door hardware sets indicated below.

Hardware Set DH1.1 - Secure Perimeter - Exterior/Weather

4	EA	HINGE	204 FMSS	US32D	Southern Steel
1	EA	LOCK	10120AE x 115VAC	US26D	Southern Steel
1	EA	STRIKEPLATE	Mortise Strikeplate		Southern Steel
1	EA	SHIELD	219 M Mogul Cylinder Shield	UA26D	Southern Steel
1	EA	CLOSER	2210 Concealed		LCN
2	EA	PULLS	212C Raised Pull	US32D	Southern Steel
1	EA	THRESHOLD	171A		Pemko
1	EA	WEATHERSTRIPPING	312CR Head and Jamb		Pemko
1	EA	RAIN DRIP/SEAL	347A with 68AR Seal		Pemko
1	EA	SEAL	4301CRL Automatic Door Bottom		Pemko
1	EA	DPS	220A		Southern Steel

Function: Pin tumbler, solenoid-actuated lock, standard operation without latchback, and mechanically at door by mogul cylinder key with remote operation at control panel. Latch retracts by momentary depression of switch where it is held without power until door is moved open to release auxiliary latch. After door opens, the latch is extended and the door can be closed for relocking. Monitor door position and lock status.

Hardware Set DH1.2 - Secure Perimeter - Exterior

4	EA	HINGE	204 FMSS	US32D	Southern Steel
1	EA	LOCK	10120 AM x 24VDC	US26D	Southern Steel
1	EA	STRIKEPLATE	Mortise Strikeplate		Southern Steel
1	EA	CLOSER	2210 Concealed		LCN
2	EA	PULLS	212C Raised Pull	US32D	Southern Steel
1	EA	STOP	420 Wall Bumper		Southern Steel
1	EA	DPS	220A		Southern Steel

Function: Pin tumbler, motor-actuated lock utilizing two-position cam with remote operation at control panel and mechanically at door by mogul cylinder key with momentary depression of switch, latch retracts where it is held without power until door is moved open to release auxiliary latch. After door opens, the latch is extended and the door can be closed for relocking. Monitor door position and lock status.

Hardware Set DH1.3 - Secure Perimeter - Interior

4	EA	HINGE	204 FMSS	US32D	Southern Steel
1	EA	LOCK	10120 AM x 24VDC	US26D	Southern Steel
1	EA	STRIKEPLATE	Mortise Strikeplate		Southern Steel
1	EA	CLOSER	2210 Concealed		LCN
2	EA	PULLS	212C Raised Pull	US32D	Southern Steel
1	EA	THRESHOLD	114A Pass-Proof		Pemko
1	EA		Hook x 12 Gauge	304 SS	DHM Supplier
1	EA	STOP	420 Wall Bumper		Southern Steel
1	EA	SMOKE SEALS	S88D x 17'		Pemco
1	EA	DPS	220A		Southern Steel

Function: Pin tumbler, motor-actuated lock utilizing two-position cam with remote operation at control panel and mechanically at door by mogul cylinder key with momentary depression of switch, latch retracts where it is held without power until door is moved open to release auxiliary latch. After door opens, the latch is extended and the door can be closed for relocking. Monitor door position and lock status.

Hardware Set DH1.4 - Secure Perimeter - Exterior/Weather/Exercise

4	EA	HINGE	204 FMSS	US32D	Southern Steel
1	EA	LOCK	10120AE x 115VAC	US26D	Southern Steel
1	EA	STRIKEPLATE	Mortise Strikeplate		Southern Steel
1	EA	SHIELD	219 M Mogul Cylinder Shield	UA26D	Southern Steel
1	EA	CLOSER	2210 Concealed		LCN
2	EA	PULLS	214S Recessed Pull	US32D	Southern Steel
1	EA	RAIN DRIP/SEAL	347A with 68AR Seal		Pemko
1	EA	DPS	220A		Southern Steel

Function: Pin tumbler, solenoid-actuated lock, standard operation without latchback, and mechanically at door by mogul cylinder key with remote operation at control panel. Latch retracts by momentary depression of switch where it is held without power until door is moved open to release auxiliary latch. After door opens, the latch is extended and the door can be closed for relocking. Monitor door position and lock status.

Hardware Set DH3.1 - Padded Cell - Exterior Perimeter, UL Fire Resistive Rated

4	EA	HINGE	204 FMSS	US32D	Southern Steel
1	EA	LOCK	10120 AM x 24 VDC	US26D	Southern Steel
1	EA	STRIKEPLATE	Mortise Strikeplate		Southern Steel
1	EA	CLOSER	2210		LCN
1	EA	PULLS	212C Raised		Southern Steel
1	EA	THRESHOLD	114A Pass-Proof		Pemko
1	EA	SMOKE SEAL	S88D x 17's		Pemko
1	EA	DPS	200 MRS Magnetic Switch		Southern Steel
1	EA	BOTTOM SWEEP	18062CNB X 36"		Pemko

Function: Pin tumbler, solenoid-actuated lock, standard operation without latchback, with remote operation at control panel and mechanically at door by mogul cylinder key with momentary depression of switch, latch retracts where it is held without power until door is moved open to release auxiliary latch. After door opens, the latch is extended and the door can be closed for relocking. Monitor door position and lock status. .

Hardware Set DH3.2 - Padded Cell - Interior Perimeter, UL Fire Resistive Rated

4	EA	HINGE	204 FMSS	US32D	Southern Steel
1	EA	LOCK	10120 AM x 24 VDC	US26D	Southern Steel
1	EA	STRIKEPLATE	Mortise Strikeplate		Southern Steel
1	EA	CLOSER	2210 Concealed		LCN
1	EA	PULLS	212C Raised		Southern Steel
1	EA	DPS	200 MRS Magnetic Switch		Southern Steel
1	EA	BOTTOM SWEEP	18062CNB X 36"		Pemko
1	EA	SMOKE SEALS	S88D x 17'		Pemko

Function: Pin tumbler, solenoid-actuated lock, standard operation without latchback, with remote operation at control panel and mechanically at door by mogul cylinder key with momentary depression of switch, latch retracts where it is held without power until door is moved open to release auxiliary latch. After door opens, the latch is extended and the door can be closed for relocking. Monitor door position and lock status.

Hardware Set DH5.1 - Janitor's Closet/Inmate Toilet/Storage/Office

4	EA	HINGE	204 FMSS	US32D	Southern Steel
1	EA	DEADBOLT	10507 (Storage Function)	US32D	Southern Steel
1	EA	STOP	420 Wall Bumper		Southern Steel

Function: Mechanical mortise lockset with storage function. Deadlock actuator. Keyed both sides, free access. Lever outside always rigid.

Hardware Set DH5.2 – Program Room

4	EA	HINGE	204 FMSS	US32D	Southern Steel
1	EA	DEADLATCH	1070A-2-HM		Southern Steel
1	EA	STRIKEPLATE	471 GL (Switch)		Southern Steel
1	EA	PULLS	212C Raised		Southern Steel
1	EA	DPS	200 MRSMagnetic Switch		Southern Steel

Function: Mechanical automatic deadlatch operated by paracentric key. Keyed on outside. Monitored at Central Control

Hardware Set DH5.3 – Courtroom Holding Room/Receiving Cells

4	EA	HINGE	204 FMSS	US32D	Southern Steel
1	EA	DEADLATCH	1070A-1-HM		Southern Steel
1	EA	STRIKEPLATE	471 GL (Switch)		Southern Steel
1	EA	PULLS	212C Raised		Southern Steel
1	EA	DPS	200 MRS Magnetic Switch		Southern Steel

Function: Mechanical automatic deadlatch operated by paracentric key. Keyed on outside. Monitored at Central Control

Hardware Set DH5.4 – Visitation/Conference

3	EA	HINGE	204 FMSS	US32D	Southern Steel
1	EA	DEADBOLT	10572	US32D	Southern Steel

Function: Mechanical operated mortise lockset, lever rigid both sides. Latch, bolt operated by key both sides. Deadlock actuator.

Hardware Set DH5.5 – Change-Over

4	EA	HINGE	204 FMSS	US32D	Southern Steel
1	EA	DEADBOLT	1026-206	US32D	Southern Steel

Function: Mechanically operated mortise deadbolt, key both sides, handles inactive.

Hardware Set DH5.6 - Medication Storage

3	EA	HINGE	204 FMSS	US32D	Southern Steel
1	EA	DEADBOLT	10603E-24 VDC	US32D	Southern Steel
1	EA	POWER TRANSFER	204E	US32D	Southern Steel
1	EA	CLOSER	2210 Concealed		LCN
1	EA	DPS	200MRS Magnetic Switch		Southern Steel
1		CARD READER			By Div. 28

Function: Electrical/Mechanical operated mortise lockset with electrically controlled outside lever operates latch bolt when outside lever is locked out. Key outside lever is locked, except when power is applied. Lever inside always active.

Hardware Set DH5.7 ~~- Medication Storage~~

Remove knob from 10500 mortise lockset. Provide lever and lever escort to existing 10500 mortise lockset.

Hardware Set DH6.1 - Detention Access Panels - Wall Mounted

1	EA	DEADBOLT	12		Southern Steel
2	EA	HINGE	3FS		Southern Steel

Hardware Set DH6.2 - Security Ceiling Access Panel

1	EA	DEADBOLT	12		Southern Steel
2	EA	HINGE	HD Piano Hinge x Continuous	SS	Panel Mfr.

Hardware Set DH6.6 -Food Pass Door

1	EA	LOCK	7017M-1 x Hinge Side		Southern Steel
2	EA	HINGE	735 x Hinge Side		Midwest Portland

END OF SECTION **08 71 63**

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SECTION 08 88 53 - SECURITY GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes monolithic polycarbonate laminated glass, laminated polycarbonate glass-clad polycarbonate, laminated glass, and polycarbonate and insulating security glazing for the following applications:

1. Windows
2. Doors.
3. Interior borrowed lites.

B. Related Requirements:

1. Section 01 35 13.16 "Special Project Procedures for Detention Facilities" for general requirements for detention work.
2. Section 05 05 53 "Security Metal Fasteners."
3. Section 08 34 63 "Detention Doors and Frames."

1.3 DEFINITIONS

A. Glazing Manufacturers: Firms that produce primary glass, monolithic plastic glazing, or fabricated security glazing, as defined in referenced glazing publications.

B. Interspace: Space between lites of air-gap security glazing or insulating security glazing.

1.4 COORDINATION

A. Coordinate glazing channel dimensions to provide necessary bite on security glazing, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Review temporary protection requirements for security glazing during and after installation.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Security Glazing Samples: For each type of security glazing; 12 inches square.

C. Glazing Accessory Samples: For sealants, in 12-inch lengths. Install sealant Samples between two strips of material representative in color of the adjoining framing system.

D. Security Glazing Schedule: List security glazing types and thicknesses for each size opening and location. Use same designations indicated on Drawings. Indicate coordinated dimensions of security glazing and construction that receives security glazing, including clearances and glazing channel dimensions.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For installers manufacturers of insulating security glazing with sputter-coated, low-e coatings glazing testing agency and sealant testing agency.

B. Product Certificates: For each type of product indicated, from manufacturer.

C. Product Test Reports: For each type of glazing sealant, for tests performed by a qualified testing agency.

1. Provide test reports based on testing current sealant formulations within previous 36-month period.

D. Preconstruction adhesion and compatibility test reports.

E. Sample Warranties: For special warranties.

1.8 QUALITY ASSURANCE

A. Manufacturer Qualifications for Insulating Security Glazing Units with Sputter-Coated, Low-E Coatings: A qualified insulating glazing manufacturer who is approved and certified by coated-glass manufacturer.

B. Installer Qualifications: A qualified installer who employs glazing installers for this Project who are certified under the National Glass Association Glazier Certification Program.

C. Security Glazing Testing Agency Qualifications: Subject to compliance with requirements, testing agency is one of the following:

1. H. P. White Laboratory, Inc.
2. Underwriters Laboratories, Inc.
3. Wiss, Janney, Elstner Associates, Inc.
4. Warnock-Hersey International.

D. Sealant Testing Agency Qualifications: Qualified according to ASTM C 1021 for testing indicated.

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

1. Install security glazing in mockups specified in to match glazing systems required for Project, including glazing methods.
2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 PRECONSTRUCTION TESTING

A. Preconstruction Adhesion and Compatibility Testing: Test each security glazing type, tape sealant, gasket, glazing accessory, and glazing-framing member for adhesion to and compatibility with elastomeric glazing sealants.

1. Testing will not be required if data based on previous testing of current sealant products and glazing materials match those submitted.
2. Use ASTM C 1087 to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to security glazing, tape sealants, gaskets, and glazing channel substrates.
3. Test no fewer than eight Samples of each type of material, including joint substrates, shims, sealant backings, secondary seals, and miscellaneous materials.
4. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
5. For materials failing tests, submit sealant manufacturer's written instructions for corrective measures, including the use of specially formulated primers.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Protect security glazing and glazing materials according to manufacturer's written instructions. Prevent damage from condensation, temperature changes, direct exposure to sun, or other causes.

B. Comply with insulating security glazing and with air-gap security glazing manufacturers' written recommendations for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.11 FIELD CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or below 40 deg F.

1.12 WARRANTY

A. Manufacturer's Special Warranty on Laminated Glass: Manufacturer agrees to replace laminated glass that deteriorates within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

1. Warranty Period: Five years from date of Substantial Completion.

B. Manufacturer's Special Warranty for Polycarbonate Sheet: Manufacturer agrees to replace polycarbonate sheet that deteriorates within specified warranty period. Deterioration of polycarbonate sheet is defined as defects developed from normal use that are not attributed to maintaining and cleaning polycarbonate sheet contrary to manufacturer's written instructions. Defects include yellowing and loss of light transmission.

1. Warranty Period: 10 years from date of Substantial Completion.

C. Manufacturer's Special Warranty for Laminated Polycarbonate: Manufacturer agrees to replace laminated polycarbonate that deteriorates within specified warranty period. Deterioration of laminated polycarbonate is defined as defects developed from normal use that are not attributed to maintaining and cleaning laminated polycarbonate contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glazing, blemishes exceeding those allowed by referenced standard, yellowing, and loss of light transmission.

1. Warranty Period: 10 years from date of Substantial Completion.

D. Manufacturer's Special Warranty for Glass-Clad Polycarbonate: Manufacturer agrees to replace glass-clad polycarbonate that deteriorates within specified warranty period. Deterioration of glass-clad polycarbonate is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning glass-clad polycarbonate contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glazing, blemishes exceeding those allowed by referenced glass-clad polycarbonate standard, yellowing, and loss of light transmission.

1. Warranty Period: Five years from date of Substantial Completion.

E. Manufacturer's Special Warranty for Laminated Glass and Polycarbonate: Manufacturer agrees to replace laminated glass and polycarbonate that deteriorates within specified warranty period. Deterioration of laminated glass and polycarbonate is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass and polycarbonate contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glazing, blemishes exceeding those allowed by referenced glass-clad polycarbonate standard, yellowing, and loss of light transmission.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Security Glazing: Obtain security glazing from single source from single manufacturer using the same types of lites, plies, interlayers, and spacers for each security glazing type indicated.

1. Source Limitations for Tinted Glass: Obtain from single source from single primary glass manufacturer for each tint color indicated.

B. Source Limitations for Glazing Sealants and Gaskets: Obtain from single source from single manufacturer for each product and installation method.

2.2 PERFORMANCE REQUIREMENTS

A. General:

1. Installed security glazing shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing; or other defects in construction.
2. Installed security glazing shall withstand security-related loads and forces without damage to the glazing beyond that allowed by referenced standards.

B. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated.

1. Design Procedure for Glass: ASTM E 1300 and ICC's International Building Code.
2. Design Wind Pressures: As indicated on Drawings.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on glazing framing members and glazing components.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

D. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.

2.3 SECURITY GLAZING, GENERAL

A. Glazing Publications: Comply with published recommendations of security glazing and glazing material manufacturers and organizations below unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. GANA Publications: "Laminated Glazing Reference Manual" and "Glazing Manual."
2. AAMA Publications: AAMA GDSG-1, "Glass Design for Sloped Glazing," and AAMA TIR-A7, "Sloped Glazing Guidelines."
3. IGMA Publication for Sloped Glazing: IGMA TB-3001, "Guidelines for Sloped Glazing."

4. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."

B. Plastic Glazing Labeling: Identify plastic sheets with appropriate markings of applicable testing and inspecting agency, indicating compliance with required fire-test-response characteristics.

C. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction . Label shall indicate manufacturer's name, type of glazing, glass thickness, and safety glazing standard with which glazing complies.

D. Insulating Glazing Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of the Insulating Glass Certification Council.

E. Thickness of Tinted Glass: Provide same thickness for each tint color indicated throughout Project.

F. Fire-Test-Response Characteristics of Polycarbonate Sheets: As determined by testing polycarbonate sheets identical to those used in security glazing products by a qualified testing agency acceptable to authorities having jurisdiction.

1. Self-ignition temperature of 650 deg F or more when tested according to ASTM D 1929 on plastic sheets in thicknesses indicated for the Work.
2. Smoke-Developed Index of 450 or less when tested according to ASTM E 84, or smoke density of 75 or less when tested according to ASTM D 2843 on plastic sheets in thicknesses indicated for the Work.
3. Burning extent of 1 inch or less when tested according to ASTM D 635 at a nominal thickness of 0.060 inch or thickness indicated for the Work.

G. Thermal and Optical Performance Properties: Provide security glazing with performance properties specified, as indicated in manufacturer's published test data, based on construction products indicated and on procedures indicated below:

1. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F.
2. Solar-Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
3. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.4 GLASS PRODUCTS

A. Float Glass: ASTM C 1036, Type I, Quality-Q3, Class I (clear) unless otherwise indicated.

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

1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
2. For heat-strengthened float glass, comply with requirements for Kind HS.
3. For fully tempered float glass, comply with requirements for Kind FT.
4. For uncoated glass, comply with requirements for Condition A.
5. For coated vision glass, comply with requirements for Condition C (other coated glass).

C. Chemically Strengthened Glass: Annealed float glass is chemically strengthened to comply with ASTM C 1422, Surface Compression Level 2 and Case Depth Level A.

D. Reflective-Coated Vision Glass: ASTM C 1376, Kind CV (coated vision glass), coated by vacuum deposition (sputter-coating) process, and complying with other requirements specified.

2.5 LAMINATED GLASS

A. Laminated Glass: ASTM C 1172. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.

1. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.
2. Interlayer Color: Clear unless otherwise indicated.

2.6 POLYCARBONATE SECURITY GLAZING

A. Polycarbonate Sheet: ASTM C 1349, Appendix X1, Type II, coated, mar-resistant, UV-stabilized polycarbonate with coating on exposed surfaces and Type I, standard, UV-stabilized polycarbonate where no surfaces are exposed.

B. Laminated Polycarbonate: Polycarbonate sheets laminated with clear urethane interlayer that complies with ASTM C 1349, Appendix X2, and has a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation. Provide laminated units that comply with requirements of ASTM C 1349 for maximum allowable laminating process blemishes and haze.

C. Glass-Clad Polycarbonate: ASTM C 1349.

D. Laminated Glass and Polycarbonate: ASTM C 1349.

2.7 GLAZING SEALANTS

A. General:

1. Compatibility: Provide glazing sealants that are compatible with one another and with other materials they contact, including security glazing, seals of insulating security glazing and air-gap security glazing, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
2. Suitability: Comply with sealant and security glazing manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.

B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 50, Use NT, G, and O.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. Dow Corning Corporation.
    b. GE Construction Sealants; Momentive Performance Materials Inc.
    c. Pecora Corporation.
    d. Sika Corporation.
    e. Tremco Incorporated.

2.8 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and security glazing manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:

1. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:

1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.9 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of security glazing and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by security glazing manufacturer to maintain security glazing lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit security glazing lateral movement (side walking).

2.10 FABRICATION OF SECURITY GLAZING

A. Fabricate security glazing in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing for security glazing, with Installer present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
2. Presence and functioning of weep system.
3. Minimum required face or edge clearances.
4. Minimum required bite.
5. Effective sealing between joints of framing members.

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

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving security glazing immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that will leave visible marks in the completed work.

3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of security glazing, sealants, gaskets, and other glazing materials unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Protect edges of security glazing from damage during handling and installation. Remove damaged security glazing from Project site and legally dispose of off Project site. Damaged security glazing includes units with edge or face damage or other imperfections that, when installed, could weaken security glazing and impair performance and appearance.

C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications unless otherwise required by glazing unit manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

E. Do not exceed edge pressures stipulated by security glazing manufacturers for installing lites.

F. Provide spacers for security glazing lites where the length plus width is larger than 50 inches.

1. Locate spacers directly opposite each other on both inside and outside faces of security glazing. Install correct size and spacing to preserve required face clearances unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with performance requirements.
2. Provide 1/8-inch minimum bite of spacers on glazing lites and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

G. Provide edge blocking where indicated or needed to prevent security glazing from moving sideways in glazing channel, as recommended in writing by security glazing manufacturer and according to requirements in referenced glazing publications.

H. Set security glazing in each series with uniform pattern, draw, bow, and similar characteristics.

I. Set coated security glazing with proper orientation so that coatings and films face exterior or interior as specified.

J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.4 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by security glazing, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until just before each glazing unit is installed.

F. Apply heel bead of elastomeric sealant.

G. Center security glazing in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

B. Insert soft compression gasket securely in place between glazing unit and frame or fixed stop, so it is securely in place with joints miter cut and bonded together at corners.

C. Installation with Drive-in Wedge Gaskets: Center security glazing in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in security glazing. Seal gasket joints with sealant recommended by gasket manufacturer.

D. Installation with Pressure-Glazing Stops: Center security glazing in openings on setting blocks and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in security glazing. Seal gasket joints with sealant recommended by gasket manufacturer.

E. Install gaskets so they protrude past face of glazing stops.

3.6 SEALANT GLAZING (WET)

A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between security glazing and glazing stops to maintain face clearances and to prevent sealant from extruding into glazing channel and blocking weep systems. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to security glazing and channel surfaces.

C. Tool exposed surfaces of sealants to provide a substantial washaway from security glazing.

3.7 CLEANING AND PROTECTION

A. Immediately after installation remove nonpermanent labels and clean surfaces.

B. Protect security glazing from contact with contaminating substances resulting from construction operations, including weld splatter. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.

1. If, despite such protection, contaminating substances do come into contact with security glazing, remove substances immediately as recommended in writing by security glazing manufacturer. Remove and replace security glazing that cannot be cleaned without damage.

C. Wash security glazing on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash security glazing as recommended in writing by security glazing manufacturer.

3.8 SECURITY GLAZING SCHEDULE

A. DG-1A: ~~Not used~~. Equivalent to Global Secur-Tem+Poly SP028, 1-inch thick; ASTM F 1915, Grade 1 (60-minute containment rated).

B. DG-2A: Equivalent to Global Secur-Tem+Poly SP019, 3/4-inch thick; ASTM F 1915, Grade 2 (40-minute containment rated).

C. DG-2B: Same as Type DG-2A except with Pilkington Mirropane one-way mirror glass-clad polycarbonate, 13/16-inch thick; ASTM F 1915, Grade 2 (40-minute containment rated).

D. DG-3A: Equivalent to Global Secur-Tem+Poly 2116 glass-clad polycarbonate, 11/16 inch thick; ASTM F 1915, Grade 3 (20-minute containment rated).

END OF SECTION

SECTION 09 84 33 - SOUND-ABSORBING WALL UNITS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes shop-fabricated, acoustical panel units tested for acoustical performance, including the following:

1. Sound-absorbing wall panels.

1.3 DEFINITIONS

A. NRC: Noise Reduction Coefficient.

B. SAA: Sound Absorption Average.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include fabric facing, panel edge, core material, and mounting indicated.

B. Shop Drawings: For unit assembly and installation.

1. Include plans, elevations, sections, and mounting devices and details.

C. Samples for Verification: For the following products:

1. Fabric: Full-width by approximately 36-inch- long Sample, but not smaller than required to show complete pattern repeat, from dye lot to be used for the Work, and with specified treatments applied. Mark top and face of fabric.
2. Panel Edge: 12-inch- long Sample(s) showing each edge profile, corner, and finish.
3. Core Material: 12-inch- square Sample at corner.
4. Mounting Devices: Full-size Samples.
5. Assembled Panels: Approximately 36 by 36 inches , including joints and mounting methods.

1.6 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Elevations and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Electrical outlets, switches, and thermostats.
2. Items penetrating or covered by units.
3. Coordination with paneling.

B. Sample Warranty: For manufacturer's special warranty.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of unit to include in maintenance manuals. Include fabric manufacturers' written cleaning and stain-removal instructions.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Comply with fabric and unit manufacturers' written instructions for minimum and maximum temperature and humidity requirements for shipment, storage, and handling.

B. Deliver materials and units in unopened bundles and store in a temperature-controlled dry place with adequate air circulation.

1.9 FIELD CONDITIONS

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

B. Lighting: Do not install units until a lighting level of not less than 50 fc is provided on surfaces to receive the units.

C. Air-Quality Limitations: Protect units from exposure to airborne odors, such as tobacco smoke, and install units under conditions free from odor contamination of ambient air.

D. Field Measurements: Verify unit locations and actual dimensions of openings and penetrations by field measurements before fabrication, and indicate them on Shop Drawings.

1.10 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace units and components that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to the following:
    a. Acoustical performance.
    b. Fabric sagging, distorting, or releasing from panel edge.
    c. Warping of core.
2. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain wall units specified in this Section from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: Units shall comply with "Surface-Burning Characteristics" or "Fire Growth Contribution" Subparagraph below, or both, as determined by testing identical products by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:

1. Surface-Burning Characteristics: Comply with ASTM E 84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
    a. Flame-Spread Index: 25 or less.
    b. Smoke-Developed Index: 450 or less.
2. Fire Growth Contribution: Comply with acceptance criteria of local code and authorities having jurisdiction when tested according to NFPA 265 Method B Protocol or NFPA 286.

2.3 SOUND-ABSORBING WALL UNITS

A. Sound-Absorbing Wall Panel (Finish Code WP1): Manufacturer's standard panel construction consisting of facing material laminated to front face, edges, and back edge border of core.

1. Manufacturers: Subject to compliance with requirements, provide Conwed Designscape; Respond HI panels or equivalent products by one of the following:
    a. Armstrong World Industries.
    b. Decoustics Limited; a Saint Gobain company.
    c. Wall Technology, Inc.; an Owens Corning company.
2. Panel Shape: Flat.
3. Mounting: Back mounted with manufacturer's standard perimeter adhesive and impaling clips, secured to substrate.
4. Core: Glass-fiber board.
5. Edge Construction: Manufacturer's standard chemically hardened core with no frame.
6. Edge Profile: Square.
7. Corner Detail in Elevation: Square with continuous edge profile indicated.
8. Reveals between Panels: Flush reveals as indicated on Drawings.
9. Facing Material: As scheduled in the Interior Finish Legend.
10. Acoustical Performance: Sound absorption NRC of not less than 0.85 according to ASTM C 423 for Type A mounting according to ASTM E 795.
11. Nominal Core Thickness: 1 1/16 inches or as indicated on Drawings.
12. Panel Width: As indicated on Drawings.
13. Panel Height: As indicated on Drawings.

2.4 MATERIALS

A. Core Materials:

1. Glass-Fiber Board: ASTM C 612; of type standard with manufacturer; nominal density of 6 to 7 lb/cu. ft., unfaced, and dimensionally stable, molded rigid board; and with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.

B. Mounting Devices: Concealed on back of unit, recommended by manufacturer to support weight of unit, and as follows:

1. Adhesives shall have a VOC content of 70 g/L or less.
2. Impaling Clips: Manufacturer's standard.

2.5 FABRICATION

A. Standard Construction: Use manufacturer's standard construction unless otherwise indicated; with facing material applied to face, edges, and back border of dimensionally stable core; and with rigid edges to reinforce panel perimeter against warpage and damage.

B. Edge Hardening: For glass-fiber board cores, chemically harden core edges and areas of core where mounting devices are attached.

C. Core-Face Layer: Evenly stretched over core face and edges and securely attached to core; free from puckers, ripples, wrinkles, or sags.

D. Facing Material: Apply fabric facing fully covering visible surfaces of unit; with material stretched straight, on the grain, tight, square, and free from puckers, ripples, wrinkles, sags, blisters, seams, adhesive, or other visible distortions or foreign matter.

1. Square Corners: Tailor corners.
2. Radius and Other Nonsquare Corners: Attach facing material so there are no seams or gathering of material.
3. Fabrics with Directional or Repeating Patterns or Directional Weave: Mark fabric top and attach fabric in same direction so pattern or weave matches in adjacent units.

E. Dimensional Tolerances of Finished Units: Plus or minus 1/16 inch for the following:

1. Thickness.
2. Edge straightness.
3. Overall length and width.
4. Squareness from corner to corner.
5. Chords, radii, and diameters.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine fabric, fabricated units, substrates, areas, and conditions for compliance with requirements, installation tolerances, and other conditions affecting unit performance.

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

3.2 INSTALLATION

A. Install units in locations indicated. Unless otherwise indicated, install units with vertical surfaces and edges plumb, top edges level and in alignment with other units, faces flush, and scribed to fit adjoining work accurately at borders and at penetrations.

B. Comply with manufacturer's written instructions for installation of units using type of mounting devices indicated. Mount units securely to supporting substrate.

C. Align fabric pattern and grain with adjacent units.

3.3 INSTALLATION TOLERANCES

A. Variation from Plumb and Level: Plus or minus 1/16 inch in 48 inches , noncumulative.

B. Variation of Joint Width: Not more than 1/16-inch variation from hairline in 48 inches , noncumulative.

3.4 CLEANING

A. Clip loose threads; remove pills and extraneous materials.

B. Clean panels on completion of installation to remove dust and other foreign materials according to manufacturer's written instructions.

END OF SECTION

SECTION 22 05 23 - GENERAL DUTY VALVES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED WORK

A. The requirements of Division 00 – Procurement, Contracting and Warranty Requirements, Division 01 - General Requirements and Section 22 00 10 - Plumbing General Provisions are applicable to work required of this section.

1.2 DESCRIPTION OF WORK

A. Provide material, equipment, labor and supervision necessary to install valves as required by the drawings and this section.

1.3 SUBMITTALS

A. Submittal data shall include physical dimensions, construction materials, and pressure and temperature ratings.

1.4 QUALITY ASSURANCE

A. ANSI/NSF 372 Certification: All potable water supply piping valves (excluding main gate valves greater than 2") shall meet the requirements of ANSI/NSF 372 Certification, Drinking Water System Components, Lead Content.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Check Valves

1. NIBCO
2. Powell
3. Milwaukee
4. Watts
5. Clow

B. Lugged Body Butterfly Valves

1. NIBCO
2. ABZ
3. Milwaukee
4. Watts

C. Ball Valves

1. Watts LFB-6080/6081
2. Milwaukee UPBA-400S/450S
3. NIBCO T/S-585-66 LF
4. Apollo 77CLF-140/240

D. Domestic Hot Water Recirculation and Softened Cold Water Balancing Valves

1. Taco
2. Bell & Gossett
3. Wheatley
4. Armstrong
5. Flow Design Inc. (Flow Set)
6. Griswold
7. NIBCO

E. All valves of same type shall be of the same manufacturer unless otherwise specified in this section or on the drawings.

F. Model numbers in valve schedule based on NIBCO, unless noted otherwise.

2.2 VALVE CONSTRUCTION

A. Check Valves: 2" and smaller, horizontal swing type with Teflon seat, bronze lead free body. 200 psi, CWP and 300 deg. F maximum temperature. 2-1/2" and larger, flanged silent check type with bronze mounted bolted bonnet and renewable seat and disc, ductile iron body, 150 psi at 366 deg F conforming to MSS SP-136.

B. Ball Valves 4" and smaller: Bronze or brass two-piece with stainless steel ball, teflon seats and stuffing box ring, vinyl insulated lever handle.

1. Full port for valves 2-1/2" and smaller.
2. Standard port for valves 3" and larger.

C. Domestic hot water recirculation and softened cold water balancing valves: Bell & Gossett Model CB "Circuit Setter" or equal.

1. Ball type valve with brass body and stainless-steel ball construction, glass and carbon fitted TFE seat rings, extended readout ports with integral check valves and gasketed caps, drain port, calibrated nameplate and position indicator, memory stops, and NPT connectors, rated for 300 psig at 250□F.
2. Valves to seal leak-tight at maximum rated working pressure.
3. Valves to be selected for 5 ft. pressure drop at full open setting and design water flow.

D. Butterfly Valves 3" and Larger: ASTM A536 ductile iron body with aluminum bronze disc, EPDM or BUNA N seat, 416 stainless steel stem with extended neck.

2.3 VALVE SCHEDULE

A. Furnish valves as per the following schedule:

Service	Valve type
Domestic hot and cold-water pressures up to 200 psi	Ball - 2-1/2" and smaller, S-FP600A-LF Ball - 3" and 4", T-FP600A-LF Butterfly – 3" and larger, LD-2000 Check - 2" and smaller, T/S413Y-LF 2-1/2" and larger, 910-LF
Domestic hot water recirculation and softened cold water valves	All sizes – Bell & Gossett Model CB circuit setter.

B. Valves installed on all systems with insulated piping shall be provided with valve handle extensions and/or extended neck design to facilitate installation of insulation and make handles operable without damage to the insulation.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install valves in accessible location in general locations indicated on the drawings and as called for in other sections.

B. Install valves in equipment rooms to provide easy access to valve. Each valve installed 8'-0" above the floor shall be provided with chain operator. Bottom of chain operator shall be 7'-0" above floor.

C. Check valves shall not be installed in vertical runs of piping unless they are specifically designed for vertical operation.

END OF SECTION 22 05 23

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SECTION 22 14 29 - SUMP PUMPS

PART 1 - GENERAL

1.1 RELATED WORK

A. The requirements of Division 00 – Procurement, Contracting and Warranty Requirements, Division 01 - General Requirements and Section 22 00 10 - Plumbing General Provisions are applicable to work required of this section.

1.2 DESCRIPTION OF WORK

A. Extent of plumbing equipment work is indicated on drawings and provisions of this section, including schedules and equipment lists associated with either drawings or this section.

B. Types of plumbing equipment required for project include the following:

1. Sump Pumps

1.3 QUALITY ASSURANCE

A. UL and NEMA Compliance: Provide electric motors and electrical components required as part of plumbing equipment, which have been listed and labeled by Underwriters Laboratories and comply with NEMA standards.

B. NEC Compliance: Comply with National Electrical Code (ANSI/NFPA 70) as applicable to installation and electrical connections of ancillary electrical components of plumbing equipment.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's plumbing equipment specifications, installation and start up instructions, and capacity and ratings, with selection points clearly marked.

B. Shop Drawings: Submit assembly type shop drawings indicating dimensions, weights, required clearances, and methods of assembly of all components.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Submersible Sump Pumps

1. Weil Pump Co.
2. Myers Pumps, Inc.
3. Zoeller
4. Stancor Pumps

2.2 SUMP PUMPS

A. Submersible Sump Pumps

1. General: Provide submersible sump pumps as indicated, of size and capacity as scheduled.
2. Pump: Cast iron shell, thermoplastic impeller, stainless steel shaft, factory sealed grease lubricated ball bearings, ceramic mechanical seal, and perforated steel strainer.

3. Motor: Hermetically sealed, capacitor start, with built in overload protection, electrical characteristics as scheduled. Provide 20' of 3 conductor PVC breather type cord and molded grounding plug.
4. Controls: Mechanical float or diaphragm switch

2.3 PIPE:

	Material	Service
A.	Copper water tube, hard temper ASTM B88 Type L or Type M	Sump pump discharge lines.
B.	Polyvinyl Chloride Pipe (PVC) Schedule 40 DWV, ASTM D1785 and ASTM D2665.	Sump pump discharge lines.

2.4 FITTINGS:

A. PVC DWV pipe fittings: ASTM D2665 DWV Schedule 40 socket type. Provide fittings produced and recommended for the service indicated by manufacturer of piping.

B. Copper drainage tube: Cast bronze fittings, solder joint fittings, ANSI B16.23

2.5 JOINTS

A. PVC DWV pipe: Solvent cement in accordance with ASTM D2564.

B. Copper drainage tube: Use non-corrosive 50-50 solder, cut pipe square, clean, ream and polish tube ends and inner surface of fittings, apply flux and solder joint as recommended by manufacturer of solder type fittings.

PART 3 - EXECUTION

3.1 INSTALLATION OF SUMP PUMPS

A. Submersible Sump Pumps

1. General: Install submersible sump pumps as indicated, in accordance with manufacturer's installation instructions, and in compliance with applicable code.
2. Pump: Set pump in sump. Connect discharge piping with check valve and union.
3. Electrical: Plug pump cord into electrical receptacle. Refer to Division 26 for power wiring; not work of this section.

3.2 INSTALLATION OF BASIC MATERIALS AND PRODUCTS

A. General: Install basic materials and products as per manufacturers' recommendations, Uniform and International Plumbing Codes, local code requirements and as required to meet system pressure and performance requirements.

B. Valves

1. Refer to Section 22 05 23 - General Duty Valves for Plumbing Piping.
2. Locate valves for easy access and operation. Do not locate valves with stems below horizontal.
3. Shutoff Valves: Install where indicated.

4. Check Valves: Install on discharge side of each pump, and elsewhere as indicated.

C. Piping Specialties: Refer to Section 22 05 00 - Common Work Results for Plumbing.

D. Supports, Anchors and Seals: Refer to Section 22 05 29 – Hangers and Supports for Plumbing Piping and Equipment.

3.3 SUMP PUMP PIPING

A. Install pipe as indicated on drawings, as called for in other sections, and as specified herein.

B. Arrange and install piping approximately as indicated; straight, plumb, and as direct as possible; form right angles on parallel lines with building walls. Keep pipes close to walls and avoid interference with other trades. Locate groups of pipes parallel to each other; space at a distance to permit applying full insulation and to permit access for servicing valves. Most piping to be run in concealed locations unless indicated exposed, or in equipment rooms. Locate piping to avoid ductwork.

C. Install horizontal piping as high as possible without sags or humps so that proper grades can be maintained for drainage.

D. Check all piping for interference with other trades; avoid placing water pipes over electrical equipment.

E. Pipes built into masonry or concrete construction shall be wrapped with tar paper or burlap to prevent bonding to the concrete.

F. No pipe shall be located in an outside wall or other location where freezing is likely to occur.

G. No pipe shall be in contact with, or attached to, a structural member in a manner that causes the transmission of noise to the structure. Block ends of runs to prevent movement due to water hammer.

3.4 TESTING

A. General: New sump pump discharge piping shall be tested and proved tight under a static pressure of 1.5x pump discharge head. The pressure shall be maintained for (2) two hours.

END OF SECTION

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SECTION 22 34 00 - FUEL-FIRED DOMESTIC WATER HEATERS

PART 1 - GENERAL

1.1 RELATED WORK

A. The requirements of Division 00 – Procurement, Contracting and Warranty Requirements, Division 01 - General Requirements and Section 22 00 10 - Plumbing General Provisions are applicable to work required of this section.

1.2 DESCRIPTION OF WORK

A. Extent of plumbing equipment work is indicated on drawings and provisions of this section, including schedules and equipment lists associated with either drawings or this section.

B. Types of plumbing equipment required for project include the following:

1. Tank Style Gas-fired Water Heaters
2. Condensing Tankless Gas-fired Water Heater
3. Domestic Hot Water Insulated Storage Tank

1.3 QUALITY ASSURANCE

A. UL and NEMA Compliance: Provide electric motors and electrical components required as part of plumbing equipment, which have been listed and labeled by Underwriters Laboratories and comply with NEMA standards.

B. NEC Compliance: Comply with National Electrical Code (ANSI/NFPA 70) as applicable to installation and electrical connections of ancillary electrical components of plumbing equipment.

C. ANSI Compliance: Comply with ANSI Z223.1 (NFPA 54) “National Fuel Gas Code”, as applicable to installation of gas fired water heaters.

D. AGA Labels: Provide water heaters which have been listed and labeled by American Gas Association.

E. ANSI/NSF 372 Certification: Fuel-Fired Domestic Water Heaters shall meet the requirements of ANSI/NSF 372 Certification, Drinking Water System Components, Lead Content.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer’s plumbing equipment specifications, installation and start up instructions, and capacity and ratings, with selection points clearly marked.

B. Shop Drawings: Submit assembly type shop drawings indicating dimensions, weights, required clearances, and methods of assembly of all components.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Residential Gas fired Water Heaters

1. A.O. Smith, Consumer Products Div.

2. Rheem-Ruud
3. State Industries

B. Condensing Tankless Gas-fired Water Heaters

1. Navien
2. Rinnai
3. Rheem

C. Domestic Hot Water Insulated Storage Tanks

1. A.O. Smith, Consumer Products Div.
2. Rheem

2.2 WATER HEATERS

A. Residential Gas fired Water Heaters

1. General: Provide gas fired water heaters of size and capacity as indicated on schedule. Comply with ANSI/ASHRAE/IES 90A for energy efficiency.
2. Heater: Working pressure of 150 psi; 3/4" tapping for relief valve; magnesium anode rod; glass lining on internal surfaces exposed to water.
3. Safety Controls: Equip with automatic gas shutoff device to shut off entire gas supply in event of excessive temperature in tank; and pilot safety shutoff.
4. Combustion System: Equip with power venting system certified for power direct venting up to 40 equivalent feet on the intake vent arrangement and up to 40 equivalent feet on the exhaust vent arrangement, using standard PVC, class 160, schedule 40 or CPVC vent piping. Gravity direct vented or heaters that use room air for combustion are not acceptable equals. The water heater shall include a 6' plug-in power cord and provision for direct connection to a standard electrical outlet. Blower shall include pressure switches which will shut down power to the burner in case of vent system failure due to down drafts or vent blockage.
5. Jacket: Provide outer steel jacket with tank insulation and baked enamel finish.
6. Warranty: Furnish 1 year limited warranty for tank leakage.
7. Accessories: Provide brass drain valve; 3/4" relief valve; cold water dip tube.
8. Controls: Provide gas pressure regulator; pilot gas regulator adjustable thermostat.

B. Condensing Tankless Gas-fired Water Heaters

1. General: Provide commercial gas fired water heaters of size and capacity as indicated on schedule. Comply with ANSI/ASHRAE/IES 90A for energy efficiency. Provide certification of design by CSA under Volume III tests for commercial water heaters for delivery of 180 degrees F (82 degrees C) water. Water heater pressure vessel shall be constructed and tested in accordance with Section IV HLW of the ASME Pressure Vessel Code.
2. Water heater shall be of gas fired, condensing fire tube design with a modulating power burner and positive pressure discharge. Burner shall be capable of 14:1 turndown of firing rate without loss of combustion efficiency. Heat exchanger/combustion chamber shall incorporate a helical fire tube design that will be self supporting, baffle free, and warranted to withstand thermal shock.
3. Heat exchanger shall be ASME stamped for a working pressure of not less than 150 psig. Unit shall have an ASME approved temperature/pressure relief valve with a setting of 150 psig.

4. Exhaust manifold shall be of corrosion resistant porcelain enameled cast iron, with a 6" diameter flue connection. Exhaust manifold shall have a gravity drain for the elimination of condensation.
5. The flame monitoring system shall incorporate a UL recognized combustion safeguard system utilizing interrupted spark ignition and a rectification type flame sensor. An electrohydraulic double seated safety shutoff valve shall be an inherent part of the gas train.
6. Water heater shall incorporate electric probe type low water cutoff and dual over temperature protection including a manual reset in accordance with ASME and CSD-1. Remote fault alarm contacts and sensor failure detection shall be standard equipment.
7. Warranty: Pressure vessel shall carry an unconditional 10-year warranty against leakage due to defects in materials or workmanship or corrosion. The heat exchanger tubes/combustion chamber assembly shall be warranted against failure due to thermal stress failure or condensate corrosion for a prorated five-year period.
8. Accessories: Provide brass drain valve; 3/4" pressure and temperature relief valve; radiant floor shield.
9. Controls: Heater shall include integral factory wired operating controls to control all operation and energy input. Control of discharge water temperature shall be sent through an internal setpoint with a field adjustment of 100F to 200F. Unit shall maintain discharge temperature within specified range through domestic water flow variations from 0 to 100%. Heater shall be capable of maintaining the outlet temperature within an accuracy of +/-4F.

C. Domestic Hot Water Insulated Storage Tank

1. General: Provide domestic hot water storage tanks of size and capacity as indicated on schedule. Jacketed and insulated tank shall meet R12.5 minimum thermal insulation requirements of the U.S. Department of Energy and current edition of ASHRAE/IESNA 90.1.
2. Tank: Constructed and stamped according to ASME specification for working pressure of 150 psi; magnesium anode rod; glass lining on internal surfaces exposed to water. Inspection openings shall be installed in accordance with ASME code requirements and manufacturer's standard practice.
3. Jacket: Provide outer steel jacket with tank insulation and baked enamel finish.
4. Warranty: Furnish 1 year limited warranty for tank leakage.
5. Accessories: Provide ring base, brass drain valve; port for tank sensor/aquastat connection.

PART 3 - EXECUTION

3.1 INSTALLATION OF WATER HEATERS

A. Gas fired Water Heaters

1. General: Install gas fired water heaters as indicated, in accordance with manufacturer's installation instructions, and in compliance with applicable codes.
2. Support: Set units and orient so controls and devices needing service and maintenance have adequate access. Level and plumb unit.
3. Gas Supply: Connect to gas line with drip leg, tee, gas cock and union; full size of unit inlet connection. Locate piping so as not to interfere with service of unit.
4. Piping: Connect hot and cold water piping to units with shutoff valves and unions.
5. Flue/Intake: Install according to manufacturer's recommendations to be consistent with sealed system or draft hood.
6. Start Up: Start up, test and adjust gas fired water heaters in accordance with manufacturer's start up instructions, and Utility Company's requirements. Check and calibrate controls, adjust burner for maximum efficiency.

7. Pressure and Temperature Relief: Route pipe to nearest indirect sanitary drain. Pipe size to match relief connection size.

B. Domestic Hot Water Insulated Storage Tank

1. General: Install domestic hot water storage tanks as indicated, in accordance with manufacturer's installation instructions, and in compliance with applicable codes.
2. Support: Set units and orient so controls and devices needing service and maintenance have adequate access. Level and plumb unit.

END OF SECTION 22 34 00

SECTION 22 45 00 - EMERGENCY PLUMBING FIXTURES

PART 1 - GENERAL

1.1 RELATED WORK

A. The requirements of Division 00 – Procurement, Contracting and Warranty Requirements, Division 01 - General Requirements and Section 22 00 10 - Plumbing General Provisions are applicable to work required of this section.

1.2 DESCRIPTION OF WORK

A. Provide material, equipment, labor and supervision necessary for the plumbing fixture installation as required by the drawings and this section.

B. Fixtures, trim and accessories shall be of type and model numbers as scheduled on the drawings.

1.3 QUALITY ASSURANCE

A. ANSI Compliance: Comply with ANSI Z358.1 - 2009 "Emergency Eyewash and Shower Equipment," as applicable to the provision and installation of emergency fixtures.

1.4 SUBMITTALS

A. Submit catalog cuts giving manufacturer's model numbers, fixture and rough in dimensions, and construction material for each type of fixture, trim and accessory scheduled.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Emergency Fixtures

1. Bradley
2. Guardian
3. Haws

B. Thermostatic Mixing Valves

1. Bradley
2. Guardian
3. Haws
4. Leonard
5. Powers
6. Symmons
7. Lawler

C. Emergency Fixtures shall meet or exceed requirements and features of fixtures indicated on schedule on the plans.

D. Thermostatic mixing valves shall include all features indicated on the schedule on the plans. Mixing valves shall meet all requirements of ASSE Standard 1071 for emergency fixture mixing valves.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install fixtures and make water supply, waste and vent connections as indicated on the drawings.

B. Fixtures shall be covered after they are set to prevent damage during the balance of construction. At the conclusion of work, the covering shall be removed and the fixtures properly cleaned.

C. Contractor shall be responsible for the protection of the fixtures until acceptance by Owner. Damaged fixtures shall be replaced at no additional cost to Owner.

END OF SECTION

SECTION 23 36 00 - AIR TERMINAL UNITS

PART 1 - GENERAL

1.1 RELATED WORK

A. The requirements of Division 00 – Procurement, Contracting and Warranty Requirements, Division 01 - General Requirements and Section 23 00 10 - HVAC General Provisions are applicable to work required of this Section.

1.2 DESCRIPTION OF WORK

A. Provide material, equipment, labor and supervision necessary to install air terminal units as required by the drawings and this section.

1.3 TERMINAL UNITS

A. Air Terminal units shall include the following:

1. VAV Boxes

1.4 SUBMITTALS

A. Submit shop drawings and/or catalog cuts showing technical data necessary to evaluate the equipment, to include color charts, dimensions, wiring diagrams, performance data and other descriptive data necessary to describe fully the air terminal units.

1.5 COMMISSIONING

A. Commissioning of a system or systems specified in this section is part of the construction process. Documentation and testing of these systems, as well as training of the Owner's operation and maintenance personnel, is required in cooperation with the Owner's Representative and the Commissioning Agent. Project Closeout is dependent on successful completion of all commissioning procedures, documentation, and issue closure. Refer to Division 01 for detailed commissioning requirements.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. VAV Boxes

1. Carnes
2. Titus
3. E.H. Price
4. Metal Aire
5. Krueger
6. Nailor
7. Tuttle & Bailey
8. Johnson Controls
9. Trane

2.2 VAV BOXES

A. General: Ceiling mounted variable air volume supply air for connection to single, medium pressure duct, central air systems, with heating coils (where scheduled) and air flow measuring station. Direct digital controls and actuation to be provided by DDC Controls Contractor.

B. Casing: 22-gauge galvanized steel housing, mechanically sealed and gasketed. Provided with round stub inlet duct connection and S and drive outlet duct connection. Hanger holes to be provided on four corners for installation. Leak rate not greater than two percent at 0.5 inch wg. for sizes up through 14 inch and not greater than three percent for sizes 16 inch and above.

C. Lining: Fiber free foam insulation system which complies with NFPA 90A and UL 181. Fiber free foam insulation thickness to be a minimum of 3/4" (R value = 3).

D. Control Damper:

1. Locate air volume damper assembly inside unit casing. Construct from extruded aluminum or 20 gauge galvanized steel components with peripheral gasket and solid steel shaft, pivoted in self-lubricating bearings.
2. Air volume control damper shall be factory calibrated assembly consisting of damper and damper shaft extension for connection to externally mounted control actuator.
3. Leakage rate not greater than 2% of nominal CFM at 1” 3 in. w.g. inlet static pressure when tested in accordance with ASHRAE 130.

E. Air Flow Sensor: Eight point flow sensing ring capable of sensing true airflow to within +/ 10 percent regardless of inlet duct connection. Sensor includes pressure taps on inlet cone of air valve to provide the velocity signal for volume regulator and to measure airflow through the valve when used in conjunction with calibration chart provided on unit.

F. Automatic Flow Controller: To be a thermostatically reset velocity controller which provides constant delivery air control within +/ 5 percent of rated flow down to 25 percent of unit rated cfm, independent of changes in system static pressure, with 1 1/2 diameters of straight duct at the unit inlet. Control to within +/ 10 percent to be obtained with any inlet duct connection. Factory calibrated, field adjustable setpoints shall be provided to set maximum and minimum cfm.

G. Reheat Coils (where applicable for supply air units): Coils shall have capacities and ratings as scheduled on the drawings. Coils shall consist of seamless copper tubes mechanically bonded to aluminum fins. Maximum working pressure 125 psig and test pressure of 300 psig.

H. Provide terminal unit with control enclosure.

I. VAV terminal unit with hot water reheat coil coils shall include a factory installed coil access door upstream of the coil. Access door shall be lined with the same material installed in the case and shall have cam lock latches (latches must be operable without the need for any tools); screw fasteners and non-insulated doors are not acceptable. Access doors shall be a minimum of 4” x 6-1/2”.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install units and make duct and piping connection as indicated on drawings. Multi-row coils shall be installed in counterflow arrangement relative to airflow.

B. Install shut off cocks, balancing cocks, air vents, control valves and devices as required for complete installation.

C. Controls: Install devices furnished by manufacturer but not specified to be factory mounted. Furnish copy of manufacturer's wiring diagram submittal to Electrical Contractor for power wiring.

1. Verify that wiring installation is in accordance with manufacturer's submittal and installation requirements of Division 26 sections. Do not proceed with equipment start up until wiring installation is acceptable to equipment installer.

END OF SECTION 23 36 00

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SECTION 23 64 16 - CENTRIFUGAL WATER CHILLERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The requirements of Division 00 – Procurement, Contracting and Warranty Requirements, Division 01 - General Requirements and Section 23 00 10 - HVAC General Provisions are applicable to work required of this section.

1.2 SUMMARY

A. This Section includes packaged, water-cooled, electric-motor-driven, centrifugal water chillers.

1.3 DEFINITIONS

A. EER: Energy-efficiency ratio.

B. IPLV: Integrated part-load value.

1.4 SUBMITTALS

A. Product Data: Include refrigerant, rated capacities, operating characteristics, furnished specialties, and accessories.

B. Shop Drawings: Complete set of manufacturer's certified prints of water chiller assemblies, control panels, sections and elevations, and unit isolation. Include the following:

1. Assembled unit dimensions.
2. Operating weight and load distribution.
3. Required clearances for maintenance and operation.
4. Size and location of piping and wiring connections.
5. Wiring Diagrams: Power, signal, and control wiring.

C. Coordination Drawings: Floor plans drawn to scale and coordinated with the following:

1. Structural supports.
2. Piping roughing-in requirements.
3. Wiring roughing-in requirements, including spaces reserved for electrical equipment.
4. Access requirements, including working clearances for mechanical controls and electrical equipment, and tube pull and service clearances.

D. Certificates: For certification required in "Quality Assurance" Article.

E. Source quality-control test reports.

F. Startup service reports.

G. Operation and Maintenance Data: For each water chiller to include in emergency, operation, and maintenance manuals.

H. Warranties: Special warranties specified in this Section.

1.5 COMMISSIONING

A. Commissioning of a system or systems specified in this section is part of the construction process. Documentation and testing of these systems, as well as training of the Owner's operation and maintenance personnel, is required in cooperation with the Owner's Representative and the Commissioning Agent. Project Closeout is dependent on successful completion of all commissioning procedures, documentation, and issue closure. Refer to Division 01 for detailed commissioning requirements.

1.6 QUALITY ASSURANCE

A. ASHRAE Certification: Signed by manufacturer certifying compliance with ASHRAE 15 for safety code for mechanical refrigeration. Comply with ASHRAE Guideline 3 for refrigerant leaks, recovery, and handling and storage requirements.

B. ASME Compliance: Fabricate and label water chiller heat exchangers to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.

C. Comply with NFPA 70.

D. Comply with UL 1995.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Ship water chillers from the factory fully charged with refrigerant or nitrogen.

1.8 COORDINATION

A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Daikin Applied.
2. YORK International Corporation.
3. Trane Company

2.2 PACKAGED WATER CHILLERS

A. Description: Factory-assembled and -tested water chiller complete with compressor, evaporator, condenser, controls, interconnecting unit piping and wiring, indicated accessories, and mounting frame.

2.3 COMPRESSORS

A. Description: Variable displacement.

1. Casing: Cast iron, precision ground.
2. Impeller: High strength, cast-aluminum alloy on carbon- or forged-steel shaft; dynamically balanced.

B. Capacity Control: Variable-inlet guide-vane assembly for stable operation that is free of surge, cavitation, or vibration throughout throttling range from 100 to 10 percent of full load.

C. Oil Lubrication System: Positive-displacement submersible pump with heater, oil filter, and sight glass.

D. Refrigerant and Oil: HFC-134a.

2.4 HEAT EXCHANGERS

A. Evaporator:

1. Description: Shell-and-tube design, ASME labeled.
2. Shell Material: Carbon steel.
3. Tube Construction: Individually replaceable, expanded into tube sheets.
   a. Material: Copper~~] [Copper-nickel alloy] [Titanium] [Copper, copper-nickel alloy, or titanium]~~.
   b. Minimum Size: 3/4-inch OD; 0.028-inch wall thickness.
   c. Internal Finish: Enhanced~~] [Smooth]~~.

4. Water Box: ~~[Standard] [~~Marine, with design working pressure of 150 psig, and having flanged water-nozzle connections with a thermistor-type temperature sensor factory installed in each nozzle.

B. Condenser:

1. Description: Shell-and-tube design, ASME labeled.
2. Shell Material: Carbon steel.
3. Tube Construction: Externally enhanced and individually replaceable, expanded into tube sheets.
   a. Material: Copper~~] [Copper-nickel alloy] [Titanium] [Copper or copper-nickel alloy]~~.
   b. Minimum Size: 3/4-inch OD; 0.028-inch wall thickness.
   c. Internal Finish: Enhanced~~] [Smooth]~~.

4. Water Box: ~~[Standard] [~~Marine, with design working pressure of 150 psig, and having flanged water-nozzle connections with a thermistor-type temperature sensor factory installed in each nozzle.

2.5 INSULATION

A. Cold Surfaces: Closed-cell, flexible elastomeric, thermal insulation complying with ASTM C 534, Type II, for sheet materials.

1. Thickness: 1-1/2 inches.
2. Adhesive: As recommended by insulation manufacturer.
3. Factory apply insulation over entire surfaces of water chiller components.
   a. Apply adhesive to 100 percent of insulation contact surface.
   b. Seal seams and joints.
   c. After adhesive has fully cured, apply two coats of protective coating to insulation.

2.6 ACCESSORIES

A. Pressure Relief Valve: Single- or multiple-reseating-type, spring-loaded relief valve.

2.7 CONTROLS

A. Control Panel: Stand-alone, microprocessor based.

B. Enclosure: Unit-mounted, NEMA 250 enclosure, hinged or lockable; factory wired with a single-point power connection and a separate control circuit.

C. Status Display: Multiple-character liquid-crystal display or light-emitting diodes and keypad.

D. Control Functions:

1. Manual or automatic startup and shutdown time schedule.
2. Entering and leaving chilled-water temperatures, control set points, and motor load limit.
3. Current limit and demand limit.
4. Condenser-water temperature.
5. External water chiller emergency stop.

E. Manually Reset Safety Controls: The following conditions shall shut down water chiller and require manual reset:

1. Low evaporator [pressure] [temperature]; high condenser pressure.
2. Low chilled-water temperature.
3. Low oil differential pressure.
4. High or low oil pressure.
5. High oil temperature.
6. High compressor-discharge temperature.
7. Loss of chilled- or condenser-water flow.
8. Electrical overload.
9. Sensor- or detection-circuit fault.
10. Processor communication loss.
11. Starter fault.
12. Extended compressor surge.
13. Excessive air-leakage detection.

F. Building Management System Interface: Factory-installed hardware and software to enable building management system to monitor and control chilled-water set point and chiller-control displays and alarms.

2.8 MOTORS

A. Comply with requirements in Division 23 Section 23 0513 - Common Motor Requirements for HVAC Equipment.

1. Open-drive motors shall have flanged or flexible coupling suitable for direct connection to compressor.

2.9 VARIABLE-FREQUENCY CONTROLLERS

A. Description: NEMA ICS 2; listed and labeled as a complete unit and arranged to provide variable speed by adjusting output voltage and frequency.

1. Enclosure: Unit mounted, NEMA 250, Type 1, with hinged access door with lock and key.

B. Output Rating: 3-phase; 6 to [60 Hz, with voltage proportional to frequency throughout voltage range] [66 Hz, with torque constant as speed changes] [120 Hz, with horsepower constant throughout speed range].

C. Provide Short Circuit Current Rating (SCCR) and AIC rating (if applicable) of 65,000. The Short Circuit Rating is the rating of the panel to withstand a short circuit of the specified amps. This rating is separate from the AIC rating of Circuit Breakers.

D. Unit Operating Requirements:

1. Input AC Voltage Tolerance: [460-V ac, plus 10 percent or 506 V maximum] <Insert other voltage and tolerance>.
2. Input frequency tolerance of 60 Hz, plus or minus 2 Hz.
3. Capable of driving full load, under the following conditions, without derating:
   a. Ambient Temperature: 0 to 40 deg C.
   b. Humidity: Less than 90 percent (noncondensing).
   c. Altitude: 3300 feet.

4. Minimum Efficiency: 96 percent at 60 Hz, full load.
5. Minimum Displacement Primary-Side Power Factor: 95 percent without optional harmonic filter, and 98 percent with optional filter.
6. Overload Capability: 1.05 times the full-load current for 7 seconds.
7. Starting Torque: 100 percent of rated torque or as indicated.
8. Speed Regulation: Plus or minus 1 percent.
9. Isolated control interface to allow controller to follow control signal over an 11:1 speed range.

E. Internal Adjustability Capabilities:

1. Minimum Speed: 50 percent of maximum rpm.
2. Maximum Speed: 100 percent of maximum rpm.
3. Acceleration: 2 to a minimum of 12 seconds.
4. Current Limit: 50 to a minimum of 110 percent of maximum rating.

F. Self-Protection and Reliability Features:

1. Input transient protection by means of surge suppressors.
2. Snubber networks to protect against malfunction due to system voltage transients.
3. Under- and overvoltage trips; inverter overtemperature, overload, and overcurrent trips.
4. Motor Overload Relay: Adjustable and capable of NEMA 250, Class [10] [20] [30] performance.
5. Instantaneous line-to-line and line-to-ground overcurrent trips.
6. Loss-of-phase protection.
7. Reverse-phase protection.
8. Short-circuit protection.
9. Motor overtemperature fault.

G. Automatic Reset and Restart: To attempt three restarts after controller fault or on return of power after an interruption and before shutting down for manual reset or fault correction.

1. Maximum Restarts per Hour: 15.

H. Power-Interruption Protection: To prevent motor from re-energizing after a power interruption until motor has stopped.

~~I. Input Line Conditioning: <Insert requirements.>~~

J. Status Lights: Door-mounted, liquid-crystal-display or light-emitting-diode indicators shall indicate the following conditions:

1. Power on.
2. Run.
3. Overvoltage.
4. Line fault.

5. Overcurrent.
6. External fault.

K. Panel-Mounted Operator Station: Start-stop and auto-manual selector switches with manual speed control potentiometer and elapsed time meter.

L. Indicating Devices: Meters or digital readout devices and selector switch, mounted flush in controller door and connected to indicate the following controller parameters:

1. Output frequency (Hz).
2. Motor speed (rpm).
3. Motor status (running, stop, fault).
4. Motor current (amperes).
5. Fault or alarming status (code).
6. DC-link voltage (V dc).
7. Motor output voltage (V).

M. Control Signal Interface:

1. Electric Input Signal Interface: A minimum of 2 analog inputs (0 to 10 V or 0/4-20 mA) and 6 programmable digital inputs.
2. Remote Signal Inputs: Keypad display for local hand operation. Capability to accept the following speed-setting input signals from building management system or other control systems through an RS485 interface:
   a. 0 to 10-V dc.
   b. 0-20 or 4-20 mA.
   c. Potentiometer using up/down digital inputs.
   d. Fixed frequencies using digital inputs.

3. Output Signal Interface:
   a. A minimum of 1 analog output signal (0/4-20 mA) that can be programmed to any of the following:
      1) Output frequency (Hz).
      2) Output current (load).
      3) DC-link voltage (V dc).
      4) Motor speed (rpm).

4. Remote Indication Interface: A minimum of 2 dry circuit relay outputs (120-V ac, 1 A) for remote indication of the following:
   a. Motor running.
   b. Fault and warning indication (overtemperature or overcurrent).
   c. High or low speed limits reached.
   d. Power-interruption protection.

N. Integral Disconnecting Means: NEMA AB 1, instantaneous-trip circuit breaker with lockable handle.

O. Harmonic Distortion Filter: Factory mounted and wired and complying with IEEE 519.

P. Accessories: Devices shall be factory installed in controller enclosure, unless otherwise indicated.

1. Control Relays: Auxiliary and adjustable time-delay relays.

2.10 SOURCE QUALITY CONTROL

~~A. Factory test and rate water chillers, before shipping, according to ARI 550/590, "Water Chilling Packages Using the Vapor Compression Cycle." Stamp with ARI label.~~

B. Factory test heat exchangers hydrostatically at 1.50 times the design pressure.

C. Factory test and inspect evaporator and water cooled-condenser according to ASME Boiler and Pressure Vessel Code: Section VIII, Division 1. Stamp with ASME label.

D. Factory test and inspect water boxes at 150 percent of working pressure.

E. Rate sound power level according to ARI 575 procedure.

F. Allow Owner access to places where water chillers are being source quality-control tested. Notify Design Professional 14 days in advance of testing.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Before water chiller installation, examine roughing-in for concrete equipment bases, anchor-bolt sizes and locations, piping, and electrical to verify actual locations, sizes, and other conditions affecting water chiller performance, maintenance, and operations.

1. Final water chiller locations indicated on Drawings are approximate. Determine exact locations before roughing-in for piping and electrical connections.

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

3.2 WATER CHILLER INSTALLATION

A. Install water chillers on concrete base. Concrete base is specified in Division 23 Section "Common Work Results for HVAC," and concrete materials and installation requirements are specified in Division 03.

B. Concrete Bases: Anchor chiller mounting frame to concrete base.

1. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.
2. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
3. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
4. Install anchor bolts to elevations required for proper attachment to supported equipment.
5. Cast-in-place concrete materials and placement requirements are specified in Division 03.

C. Vibration Isolation: Rubber pads with a minimum deflection of [0.25 inch] <Insert deflection>. Vibration isolation devices and installation requirements are specified in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment."

D. Vibration Isolation: Restrained neoprene isolators with a minimum deflection of <Insert deflection>. Vibration isolation devices and installation requirements are specified in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment."

E. Vibration Isolation: Mount water chiller on vibration isolation equipment base as specified in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment."

F. Maintain manufacturer's recommended clearances for service and maintenance.

G. Charge water chiller with refrigerant if not factory charged.

H. Install separate devices furnished by manufacturer.

3.3 CONNECTIONS

A. Chilled- and condenser-water piping installation requirements are specified in Division 23 Section "Hydronic Piping." Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to water chillers to allow service and maintenance.

C. Evaporator Connections: Connect inlet to evaporator with controller-bulb well, shutoff valve, thermometer, strainer, pressure gage, and union or flange. Connect outlet to evaporator with shutoff valve, flow switch, balancing valve, thermometer, pressure gage, and union or flange.

D. Condenser Connections: Connect inlet to condenser with shutoff valve, thermometer, plugged tee, and pressure gage. Connect outlet to condenser with shutoff valve, thermometer, drain line and shutoff valve, strainer, and plugged tee.

E. Install shutoff valves at chilled-water and condenser-water inlet and outlet connections.

F. Refrigerant Pressure Relief Valve Connections: Extend vent piping to the outside without valves or restrictions.

G. Ground water chillers according to Division 26 Section "Grounding and Bonding for Electrical Systems."

H. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

I. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.4 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.

B. Inspect field-assembled components, equipment installation, and piping and electrical connections for proper assemblies, installations, and connections.

C. Complete installation and startup checks according to manufacturer's written instructions and perform the following:

1. Verify that refrigerant charge is sufficient and water chiller has been leak tested.
2. Verify that pumps are installed and functional.
3. Verify that thermometers and gages are installed.
4. Operate water chiller for run-in period according to manufacturer's written instructions.
5. Check bearing lubrication and oil levels.
6. Verify that refrigerant pressure relief is vented outside.
7. Verify proper motor rotation.
8. Verify static deflection of vibration isolators, including deflection during water chiller startup and shutdown.
9. Verify and record performance of chilled- and condenser-water flow and low-temperature interlocks.

10. Verify and record performance of water chiller protection devices.
11. Test and adjust controls and safeties. Replace damaged or malfunctioning controls and equipment.

D. Prepare a written startup report that records results of tests and inspections.

E. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to site outside normal occupancy hours for this purpose.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain water chillers. Refer to Division 01 Section "Demonstration and Training."

END OF SECTION 23 64 16

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SECTION 23 73 13 - MODULAR INDOOR CENTRAL STATION AIR HANDLING UNITS

PART 1 - GENERAL

1.1 RELATED WORK

A. The requirements of Division 00 – Procurement, Contracting and Warranty Requirements, Division 01 - General Requirements and Section 23 00 10 - HVAC General Provisions are applicable to work required of this section.

1.2 DESCRIPTION OF WORK

A. Provide material, equipment, labor and supervision necessary to install air handling units as required by the drawings and this section.

1.3 QUALITY ASSURANCE

A. ARI Compliance: Units shall have certified ratings complying with ARI Standard 430.

1.4 SUBMITTALS

A. Submittal data shall consist of drawings and/or catalog cuts giving dimensions, arrangement, construction materials, fan performance curves, coil capacity, horsepower, electrical characteristics and installation instructions.

1.5 COMMISSIONING

A. Commissioning of a system or systems specified in this section is part of the construction process. Documentation and testing of these systems, as well as training of the Owner's operation and maintenance personnel, is required in cooperation with the Owner's Representative and the Commissioning Agent. Project Closeout is dependent on successful completion of all commissioning procedures, documentation, and issue closure. Refer to Division 01 for detailed commissioning requirements.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Air Handling Units

1. Daikin Applied
2. Trane Company – M Series
3. JCI/York International - Solution

2.2 GENERAL

A. Units shall be factory built and assembled with arrangements as indicated on the drawings.

B. Units shall have capacities, ratings and performance as scheduled.

2.3 CASINGS

A. Unit casings shall be fabricated of heavy gauge steel reinforced with steel angle framework as required for smooth operation for pressure rating. Casings shall be sectionalized with separate fan and coil sections. Units casing shall be of double-wall construction.

B. Casing insulation shall be spray-injected foam. Casing panel shall be a minimum of R-13.

~~C. Fan sections shall have perforated, galvanized inner liners. Perforated panel shall be a minimum of R-11.~~

D. Casings shall have hinged panels to provide access to all internal components. All access doors shall have a minimum clear opening dimension of 10".

E. IAQ drain pans shall be provided under the complete coil section and double pitched to the drain connection to promote positive drainage. Drain pans shall be double-wall insulated. Drain pans shall be constructed of stainless steel. Drain pans shall comply with ASHRAE 62.1.

2.4 FANS

A. Fans shall be plenum type..

B. Bearings shall be grease lubricated ball bearings selected for 200,000 hours average life.

C. Fans shall be statically and dynamically balanced and factory run tested, in the unit.

D. Fan and motor assembly shall be internally isolated from unit casing with factory mounted rubber pad ~~spring~~ isolators. ~~Fan scroll shall be attached to the unit by a flexible canvas duct.~~

E. Fan and sheave combinations shall be selected to operate at design conditions without exceeding variable frequency drive speeds of 100 Hz. Combinations requiring operation above 100 Hz are not acceptable.

F. Fan wheel classification must be capable of maximum rpm achievable based on the motor horsepower provided.

G. Backdraft Dampers

1. Counter-balanced backdraft damper Ruskin model CBD6 or equal.
   a. Frame: Heavy duty 0.125" thick aluminum
   b. Blades: 0.070 thick aluminum with extruded vinyl edge seals
   c. Bearings: Zytel
   d. Linkage: 0.125" thick aluminum tie bars
   e. Counterbalance: Zinc plated bar mounted on blades with adjustability for job site final setting
   f. Temperature: -40 deg F to 200 deg F
   g. Back Pressure:
      1) 48" section width – up to 4" wc
      2) 36" section width – up to 8" wc
      3) 24" section width – up to 12" wc
      4) 12" section width – up to 16" wc
   h. Operation: blades start to open at 0.01" wc and are fully open at0.05" wc

2.5 COILS

A. Coils shall be furnished for heating and/or cooling media as scheduled on the drawings.

B. Coils shall be aluminum fin, copper tube type. Fins shall have drawn, belled collars bonded to the tubes by means of mechanical expansion of the tubes. Coil casings shall be galvanized steel.

C. Steam coils shall be non-freeze, double tube, steam distribution type to assure even steam distribution over the full length of each tube.

D. Hot water heating coils shall be of the metering type with metering orifices in the supply header to insure equal distribution of water to each tube.

E. Chilled water cooling coils shall be completely drainable, and shall be pitched in the unit casing for proper drainage.

2.6 MOTORS AND DRIVES

A. Motors shall be NEMA Premium Efficiency, normal torque, 40 deg. C rise, splash proof, of horsepower rating and electrical characteristics as scheduled on the drawings. Motors shall be suitable for use with variable frequency drives.

B. Drives shall be rated at 1.25 times the motor horsepower rating. Drives up to and including 40 horsepower shall be adjustable speed drives (don't use on over 50 HP) for adjustment within plus or minus 10% of specified RPM. Units shall be furnished with approved drive guards.

C. Motor shall be mounted on an adjustable mount, suitable for adjusting belt tension and drive alignment.

D. ECM motors are an acceptable alternate to standard motors and drives.

2.7 FILTER MODULES

A. Filter modules shall be furnished with face area and performance as scheduled on drawings. Modules shall consist of side-access filter racks, access doors, and filter blank-offs. Filter module requirements shall be coordinated with filter media specified in separate section.

B. 4” Cartridge Filters: Provide Gasketted side-access filter racks suitable to support 4” deep high efficiency cartridge type filters with 7/8” headers. Filters to be MERV-11.

C. 12" HEPA Cartridge Filters: Provide Gasketted side-access filter racks suitable to support 12" deep HEPA cartridge type filters.

D. Gas-Phase Filters: Provide Gasketted side-access filter racks suitable to support activated carbon absorbers with 7/8” headers. Module shall include filter rack for 2" pleated media throw-away pre-filters and post-filters.

2.8 FILTER MIXING BOXES

A. Combination filter mixing boxes shall have parallel damper blades for internal merging of airstreams. Leaving side shall have bolt holes compatible with unit and other accessories. Mixing box shall be designed to hold 2" pleated throw-away filters, MERV 8A minimum or as scheduled. Provide with full size access door. Dampers shall be low leak type construction with metal compressible jamb seals and extruded vinyl blade edge seals, mechanically locked into the blade edge, on both the outdoor air and return air. Leakage shall not exceed 5 cfm/sf at one-inch wg. All leakage testing and pressure ratings will be based on AMCA Publication 500.

2.9 INLET, RELIEF AND MIXED AIR DAMPER

A. Provide low leak type dampers with metal compressible jamb seals and extruded vinyl blade edge seals. Leakage shall not exceed five cfm per square foot at one-inch wg. All leakage testing and pressure ratings will be based on AMCA Publication 500.

2.10 AIR BLENDER

A. Manufacturer: Blender Products Inc or approved equal.

1. Units shall be not less than 0.08" aluminum of all welded construction.
2. Units shall be completely fixed devices capable of providing mixed air temperatures within 6°F of theoretical values.
3. Refer to drawings for units that require air blenders.

2.11 VARAIBLE FREQUENCY DRIVES

A. Variable frequency drives (VFDs) to be provided by air handling unit manufacturer. VFDs to be mounted on air handling unit. Where multiple supply fans serve one air handling unit, one VFD shall operate all fans in the fan array. Where multiple return fans serve one air handling unit, one VFD shall operate all fans in the fan array.

B. Base VFD type on results of IEEE-519 study with minimum configuration as follows (NOTE: total horsepower connected to a VFD shall be used when calculating harmonic mitigating technology, e.g. (4) 15HP fans = 60HP.:

1. Less than 40 HP – 6 pulse drive with 5% reactor.
2. 40HP up to 75HP – 6 pulse drive with 5% reactor and passive harmonic filter or 12 pule drive.
3. Larger than 75HP – 18 pulse drive or active front end filter.
4. Engineered solution specific to the project requirements that employs harmonic mitigation equipment and is submitted for Engineer approval prior to bidding.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install units and make piping and duct connections as indicated on the drawings.

B. For units with water heating and/or cooling coils, install balancing cock, pressure and temperature test stations and shut off valve in return lines. In supply line, install shut off valve, and automatic control valve. Install flexible piping connectors at steam coil connections.

C. Extend condensate drain line to nearest floor drain and elbow into drain. Condensate waste shall be trapped at drain pan, with screwed cleanout plug in low point of trap. Multiple condensate discharges shall be trapped separately, as close to the unit as possible. The effective trap seal shall be two (2) times the suction pressure of the fan in inches for draw through units, but not less than three (3) inches.

D. Provide equipment base rail or housekeeping pad as required to maintain required height for installation of all piping and ductwork connections to unit including condensate traps.

E. Provide one complete extra set of filters for each air handling system. If system is designed to include pre-filters and after-filters, provide only pre-filters. Install new filters at completion of air handling system and prior to testing, adjusting and balancing work. Obtain receipt from Owner that new filters have been installed.

END OF SECTION 23 73 13

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SECTION 23 74 13 - PACKAGED, OUTDOOR, CENTRAL STATION AIR HANDLING UNITS

PART 1 - GENERAL

1.1 RELATED WORK

A. The requirements of Division 00 – Procurement, Contracting and Warranty Requirements, Division 01 - General Requirements and Section 23 00 10 - HVAC General Provisions are applicable to work required of this section.

1.2 DESCRIPTION OF WORK

A. Provide material, equipment, labor and supervision necessary to install air handling units as required by the drawings and this section.

1.3 QUALITY ASSURANCE

A. ARI Compliance: Units shall have certified ratings complying with ARI Standard 430.

1.4 SUBMITTALS

A. Submittal data shall consist of drawings and/or catalog cuts giving dimensions, arrangement, construction materials, fan performance curves, coil capacity, horsepower, electrical characteristics and installation instructions.

1.5 COMMISSIONING

A. Commissioning of a system or systems specified in this section is part of the construction process. Documentation and testing of these systems, as well as training of the Owner's operation and maintenance personnel, is required in cooperation with the Owner's Representative and the Commissioning Agent. Project Closeout is dependent on successful completion of all commissioning procedures, documentation, and issue closure. Refer to Division 01 for detailed commissioning requirements.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Acceptable Manufacturers and Models

1. Daikin Applied
2. Trane Company
3. JCI/York International

B. Acceptable Manufacturers and Models

1. Trane Company - T Series Modular Penthouse Climate Changes

2.2 AIR HANDLING UNITS

A. Units shall be factory built and assembled with arrangements as indicated on the drawings.

B. Units shall have capacities, ratings and performance as scheduled.

2.3 CASINGS (INTERIOR UNITS)

A. Unit casings shall be fabricated of heavy gauge steel reinforced with steel angle framework as required for smooth operation for pressure rating. Casings shall be sectionalized with separate fan and coil sections. Units casing shall be of double-wall construction.

B. Fan and coil sections shall be ~~insulated with 1", 3/4 pound, mat-faced fiberglass blanket insulation~~2" injected foam panels, R-13.

C. Casings shall have removable panels to provide access to all internal components.

D. IAQ drain pans shall be provided under the complete coil section and double pitched to the drain connection to promote positive drainage. Drain pans shall be double-wall insulated.

2.3 CASINGS (EXTERIOR UNITS)

A. Unit panels shall be solid double wall construction with insulation of minimum R-12. Exterior panels shall be galvanized steel. All panels shall be fabricated of heavy gauge steel reinforced with steel angle framework as required for smooth operation for pressure rating. Casings shall be sectionalized with separate fan and coil sections.

B. Unit design shall allow unit to be installed on roof curb. Entire base of unit shall be sealed water tight. Provide unit with roof curb.

C. Unit exterior shall have enamel finish. Finish shall withstand ASTM B117 salt spray test for a minimum of 500 hrs.

D. Unit shall be provided with two piece roof. Inner roof shall seal airflow within unit, and have minimum insulation of R-12. Outer roof shall have 1/4"/ft. slope and 2" overhang.

E. Roof system outer layer shall have no points of penetration, shall us no fasteners, shall have no metal-to-metal seam joints, shall not use or require caulking. Roof system shall be warranted by manufacturer against water penetration for a period of 10 years.

F. Unit shall be provided with external piping cabinet of the same construction as the unit panels. Piping cabinet shall be provided with access doors.

G. IAQ drain pans shall be provided under the complete coil section and double pitched to the drain connection to promote positive drainage. Drain pans shall be double-wall insulated.

2.4 FANS

A. Fans shall be plenum type.

B. Bearings shall be grease lubricated ball bearings selected for 200,000 hours average life.

C. Fans shall be statically and dynamically balanced and factory run tested, in the unit.

~~D.~~ Fan and motor assembly shall be internally isolated from unit casing with factory mounted rubber pad ~~spring~~ isolators. ~~Fan scroll shall be attached to the unit by a flexible canvas duct.~~

E. Fan and sheave combinations shall be selected to operate at design conditions without exceeding variable frequency drive speeds of 100 Hz. Combinations requiring operation above 100 Hz are not acceptable. Fan wheel classification must be capable of maximum rpm achievable based on the motor horsepower provided.

2.5 COILS

A. Coils shall be furnished for heating and/or cooling media as scheduled on the drawings.

B. Coils shall be aluminum fin, copper tube type. Fins shall have drawn, belled collars bonded to the tubes by means of mechanical expansion of the tubes. Coil casings shall be galvanized steel.

C. Steam coils shall be non-freeze, double tube, steam distribution type to assure even steam distribution over the full length of each tube.

D. Hot water heating coils shall be of the metering type with metering orifices in the supply header to insure equal distribution of water to each tube.

E. Chilled water cooling coils shall be completely drainable, and shall be pitched in the unit casing for proper drainage.

2.6 MOTORS AND DRIVES

A. Motors shall be NEMA Standard, normal torque, 40 deg. C rise, splash proof, of horsepower rating and electrical characteristics as scheduled on the drawings.

B. Drives shall be rated at 1.25 times the motor horsepower rating. Drives up to and including 40 horsepower shall be adjustable speed drives (don't use on over 50 HP) for adjustment within plus or minus 10% of specified RPM. Units shall be furnished with approved drive guards.

C. Motor shall be mounted on an adjustable mount, suitable for adjusting belt tension and drive alignment.

2.7 FILTER MODULES

A. Filter modules shall be furnished with face area and performance as scheduled on drawings. Modules shall consist of side-access filter racks, access doors, and filter blank-offs. Filter module requirements shall be coordinated with filter media specified in separate section.

B. 12” Cartridge Filters: Provide Gasketed side-access filter racks suitable to support 12” deep high efficiency cartridge type filters with 7/8” headers.

C. 12" HEPA Cartridge Filters: Provide Gasketed side-access filter racks suitable to support 12" deep HEPA cartridge type filters.

D. Gas-Phase Filters: Provide Gasketed side-access filter racks suitable to support activated carbon absorbers with 7/8” headers. Module shall include filter rack for 2" pleated media throw-away pre-filters and post-filters.

2.8 FILTER MIXING BOXES

A. Combination filter mixing boxes shall have parallel damper blades for internal merging of airstreams. Leaving side shall have bolt holes compatible with unit and other accessories. Mixing box shall be designed to hold 2" pleated throw-away filters, MERV 8A minimum or as scheduled. Provide with full size access door. Dampers shall be low leak type construction with metal compressible jamb seals and extruded vinyl blade edge seals, mechanically locked into the blade edge, on both the outdoor air and return air. Leakage shall not exceed 5 cfm/sf at one-inch wg. All leakage testing and pressure ratings will be based on AMCA Publication 500.

2.9 INLET HOOD AND DAMPER

A. Provide inlet weatherhood with moisture eliminator and bird screen.

B. Provide low leak type dampers with metal compressible jamb seals and extruded vinyl blade edge seals. Leakage shall not exceed five cfm per square foot at one-inch wg. All leakage testing and pressure ratings will be based on AMCA Publication 500.

2.10 AIR BLENDER

A. Manufacturer: Blender Products Inc or approved equal.

1. Units shall be not less than 0.08” aluminum of all welded construction.
2. Units shall be completely fixed devices capable of providing mixed air temperatures within 6°F of theoretical values.
3. Refer to drawings for units that require air blenders.

2.11 VARAIBLE FREQUENCY DRIVES

A. Variable frequency drives (VFDs) to be provided by air handling unit manufacturer. VFDs to be mounted on air handling unit. Where multiple supply fans serve one air handling unit, one VFD shall operate all fans in the fan array. Where multiple return fans serve one air handling unit, one VFD shall operate all fans in the fan array.

B. Base VFD type on results of IEEE-519 study with minimum configuration as follows (NOTE: total horsepower connected to a VFD shall be used when calculating harmonic mitigating technology, e.g. (4) 15HP fans = 60HP.:

1. Less than 40 HP – 6 pulse drive with 5% reactor.
2. 40HP up to 75HP – 6 pulse drive with 5% reactor and passive harmonic filter or 12 pule drive.
3. Larger than 75HP – 18 pulse drive or active front end filter.
4. Engineered solution specific to the project requirements that employs harmonic mitigation equipment and is submitted for Engineer approval prior to bidding.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install units and make piping and duct connections as indicated on the drawings.

B. For units with water heating and/or cooling coils, install balancing cock, pressure and temperature test stations and shut off valve in return lines. In supply line, install shut off valve, and automatic control valve. Install flexible piping connectors at steam coil connections.

C. Extend condensate drain line to nearest floor drain and elbow into drain. Condensate waste shall be trapped at drain pan, with screwed cleanout plug in low point of trap. Multiple condensate discharges shall be trapped separately, as close to the unit as possible. The effective trap seal shall be two (2) times the suction pressure of the fan in inches for draw through units, but not less than three (3) inches.

D. Provide equipment base rail or housekeeping pad as required to maintain required height for installation of all piping and ductwork connections to unit including condensate traps.

E. Provide one complete extra set of filters for each air handling system. If system is designed to include pre-filters and after-filters, provide only pre-filters. Install new filters at completion of air handling system and prior to testing, adjusting and balancing work. Obtain receipt from Owner that new filters have been installed.

END OF SECTION 23 74 13

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SECTION 27 50 00 – INTERCOM SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The requirements of Division 00 – Procurement, Contracting and Warranty Requirements, Division 01 - General Requirements and Section 27 00 10 – Communications General Provisions are applicable to work required of this section.

1.2 DESCRIPTION OF WORK

A. The work included under this specification consists of furnishing all labor, equipment, materials, and supplies and performing all operations necessary to complete the installation of an intercom system in compliance with the specifications and drawings. Contractor will provide and install all of the required material to form a complete system whether specifically addressed in the technical specifications or not.

1.3 SUBMITTALS

A. Submittal data for intercom cabling and components shall consist of catalog cuts showing technical data necessary to evaluate the materials.

1.4 WORK BY OTHERS

A. Unless noted otherwise, the building's Electrical Contractor will provide field device backboxes if needed, and conduit paths for use by Contractor.

1.5 FIRESTOPPING

A. Contractor shall be responsible for firestopping all conduit sleeves and cable tray where required to maintain integrity of fire walls. Contractor shall see architectural drawings for walls that require fire rating.

1.6 ACCEPTABLE PAGING CONTRACTORS

A. The contractor shall be one of the following:

1. The Contractor shall be a manufacturer authorized dealer in good standing (for at least six months before project bid date with verifiable documentation) for the products listed below in 2.01.B, ACCEPTABLE MANUFACTURERS.

PART 2 - PRODUCTS

2.1 INTERCOM SYSTEMS

A. Intercom systems shall be provided with all applicable accessories as a system.

B. Acceptable Manufacturers:

1. Window Intercom:
   a. Norcon Communications: Talk Thru Unit
   b. Approved Equal

2. SIP Compatible Wall Unit
   a. Aiphone
   b. Viking
   c. Approved Equal

3. LEC Overhead Intercom
   a. Viking
   b. Approved Equal

C. Additional Paging System Requirements:

1. Intercom field units must meet or include attachment to meet ADA requirements.
2. Intercom field units must meet minimum standards for a detention facility.

2.2 INTERCOM SYSTEMS EQUIPMENT

A. Intercom systems shall be provided with all applicable accessories as a system.

HARDWARE	PART #
Window or Desk Mounted Station	**Norcon**: TTU-1AX
SIP Compatible Wall Station	**Aiphone**: IX-SS-2G **Viking:** E-32TF-IP
Overhead Intercom	
1. IP Ceiling Speaker for SIP Endpoint Paging	**Viking**: 40-IP
2. Tile Bridge for Ceiling Speakers	**Viking**: SA-TBA
3. Secure Remote Relay Controller	**Viking**: DOD 582
4. SIP/Multicast Paging Adapter	**Viking**: PA-IP
5. Speaker Volume Control	**Viking**: SV-5W

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install Paging systems cables, equipment, and auxiliary materials as indicated in accordance with manufacturer's written instructions, and recognized industry practices.

1. Contractor shall use hook and loop type fasteners on all paging cable. Tie wraps shall not be used.
2. Contractor shall use provided raceways or Contractor install J-hooks for all cabling. No fastening cabling to conduits, piping, equipment, or anything other than Contractor installed J-hooks.
3. All paging cabling shall be homerun, no splicing.

B. Identify all paging cables as to field location.

1. Provide manufacturer’s standard vinyl-cloth self-adhesive cable/conductor markers of wrap-around type; either pre-numbered plastic-coated type or write-on type with clear plastic self-adhesive cover flap; numbered to show cable identification. Install within 6" of cable end.

C. After completion, all cables shall be thoroughly tested.

1. Contractor shall provide all instruments for testing the cables.
2. Contractor shall work with the Owner to ensure the SIP application is programmed with existing phone system.
3. Contractor shall demonstrate in the presence of Owner's representative that the intercom system is complete and operational.
4. Contractor shall complete and submit the Certificate of System Demonstration.

D. After completion, comprehensive As-Builts will be created and provided to Owner within 3 days.

1. Two hard copies shall be provided to Owner detailing the entire paging system after installation. Each field position shall be labeled and cross referenced to the appropriate head end position for ease of troubleshooting.

3.2 COMMISSIONING

A. The Contractor shall coordinate a date/time with the Engineer after the system is fully operational, but before final payment, for the Contractor to provide a full system demonstration. This shall include all aspects of system operation that the user might encounter.

END OF SECTION 27 50 00

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