SECTION 001100 – INVITIATION TO BID

PART 1 – GENERAL

1.1 INVITITATION TO BID

A. The advertised Notice to Bidders follows this page.

NOTICE TO BIDDERS

Notice is hereby given that the Sullivan County Commissioners will receive sealed bids for the listed items. Said bids will be received by the **County Auditor located at 100 Courthouse Square, Sullivan, IN 47882 until 2:00 PM (local time) on Thursday, February 10th, 2022.** Bids will be immediately transferred to the **Sullivan County EMA Building, 60 West Harris Street, Sullivan, IN 47882** at which time they will be publicly opened.

SULLIVAN COUNTY SHERIFF'S OFFICE AND CORRECTIONAL FACILITY
2357 North Section Street, Sullivan, IN 47882

1. **Bid Package No. 01 – General Trades** *(general clean up, concrete foundations, slab on grade and topping slabs; precast, casework and cabinetry, carpentry, cold-formed framing, rough carpentry, sheathing, insulation, non-structural metal framing, metal stud roof truss system, metal roof deck, gypsum board, acoustic ceilings, security ceilings, waterproofing, perimeter insulation, EIFS, firestopping, caulking, doors, frames and hardware, overhead doors, detention doors and door hardware, storefront, glass and glazing, skylights, fiberglass wall panels, tiling, resilient base and accessories, resilient tile, athletic flooring, resinous flooring, shower coatings, tile carpeting, sound panels, visual display units, plaques, interior signage, dimensional lettering, pylon signage, specialties, projection screens, blinds, seating, site furnishings, site clearing, earthwork, site concrete paving and sealants, fencing, turf and grasses, plantings, site storm)*
2. **Bid Package No. 02 – Earthwork, Sitework & Site Utilities**
3. **Bid Package No. 03 – Masonry** *(masonry grouting, accessories, brick, concrete unit masonry, stone masonry, cast stone masonry)*
4. **Bid Package No. 04 – Structural & Misc. Steel** *(metal fastenings, security fastenings, structural steel framing, architecturally exposed steel framing, deck, metal fabrications, metal stairs, railings, loading dock equipment)*
5. **Bid Package No. 05 – Roofing** *(metal roofing, sheet metal flashing and trim, roof specialties, hatches, roof expansion, snow guards, metal wall panels)*
6. **Bid package No. 06 – Painting** *(painting of architecturally exposed steel, wall coverings, exterior painting, interior painting)*
7. **Bid Package No. 07 – Detention Equipment** *(security fastenings, security access doors, detention doors, frames, and hardware, security glazing, wire mesh partitions, plank ceilings, detention accessories, security equipment, gun lockers, detention furniture, institutional furniture, prefabricated cells, cell padding, access control, video communication, security automation, graphic interface, fire alarm systems, audio communications)*
8. **Bid Package No. 08 – Fire Protection** *(firestopping, sleeves, valves, piping and equipment, fire department connections, wet-pipe sprinkler system, dry chemical fire-extinguishing system, site connection to utility)*
9. **Bid Package No. 09 – Mechanical and Plumbing** *(firestopping, plumbing piping, meters and gages, valves, piping, pipe insulation, site water connection to utility, final hookups to kitchen equipment, site sanitary connection to utility, sanitary piping and vents, sanitary specialties, pumps, gas piping, site gas piping to utility, water heaters, plumbing fixtures, security fixtures, HVAC piping, HVAC piping insulation, test and balancing, duct, duct insulation, direct digital controls, HVAC equipment, HVAC specialties)*
10. **Bid Package No. 10 – Electrical Systems** *(firestopping, low voltage electrical, conduit and wire, arc-flash analysis, lighting controls, distribution transformers, switchboards, panelboards, wiring devices, final hookups to kitchen equipment, switches and circuit breakers, motor controllers,*

generators, transfer switches, interior and exterior lighting, emergency lighting, light poles, communications systems, site connection to utility, access control, fire alarm, radio tower)

11. **Bid Package No. 11 – Asphalt Paving** *(asphalt paving, bumpers, and pavement markings)*
12. **Bid Package No. 12 – Kitchen Equipment**

Drawings & Specifications will be available on **Wednesday, January 12, 2022**, and may be obtained from:

- www.garmong.net > Projects Bidding > Public Jobs
- www.rapidplanroom.com
- Rapid Reproductions, 12 S 11th St, Terre Haute, IN 47807 (For Purchase)

A voluntary pre-bid meeting will be held Thursday, January 27th at 10:00 AM (local time) at the Sullivan County EMA Building, 60 West Harris Street, Sullivan, IN 47882. All bidders are encouraged to attend. Request virtual meeting link by emailing dwhalen@garmong.net.

All bids must be submitted on the prescribed State Board of Accounts Bid Form 96, which includes the completed execution of a non-collusion affidavit. Bids shall be valid for ninety (90) days.

Bid Security: Bidders shall include with their bid, a bid deposit in the amount of 5% of the total bid in the form of a bank draft, certified check, money order or bid bond.

After an award has been made to the successful bidder(s), the bid securities will be returned within ninety (90) days. The bid security of the lowest acceptable bidder will be returned on request after the Commissioners have made an award to the successful bidder and if satisfactory Payment and Performance Bonds have been delivered to the Sullivan County Commissioners.

The successful bidders will be required to furnish a satisfactory Payment and Performance Bond in the sum equal to the full amount of the Contract.

The Sullivan County Commissioners reserve the right to reject any or all bids presented and waive technicalities as to procedures and to award a contract on the bid that, in its judgment, is the most advantageous to the Sullivan County Commissioners.

SECTION 004350 - SUBCONTRACTORS AND PRODUCTS LIST

PART 1 - GENERAL

1.1 DESCRIPTION

A. The two (2) low responsive Bidders in each Bid Category shall furnish electronically, the following Subcontractors and Products List to the Construction Manager within two (2) working days (48 hrs.) of bid opening, unless submitted with Bid. The blanks appropriate to the Bid Category(ies) on which they bid shall be completed.

1. The Owner, Architect/Engineer, and Construction Manager shall have the right to select any material or equipment named in the Specifications for any particular item where the Bidder either fails to list same or lists more than one name for the item in question.

2. It is intended that this list will show the manufacturer and supplier of major items of work that will be subcontracted and to whom.

1.2 INSTRUCTIONS FOR SUBCONTRACTORS AND PRODUCTS LISTS

A. Each Bidder shall submit a copy of their list of subcontractors and manufacturers of products and equipment proposed for work indicated as required above.

B. The list shall be submitted on forms provided and shall be completely executed. "As Specified" or "With Equipment" type of terminology will not be accepted.

C. Under "Subcontractor", insert the name of the firm which the Bidder proposes to have perform the respective work. If work will be done by the Bidder and no subcontract will be awarded, state "By Own Forces".

D. Submission does not constitute acceptance for use of listed manufacturers' products. Materials and subcontractors are subject to the provisions of the General Conditions and "Standard of Product Acceptability" and must be formally reviewed and adjudged acceptable by the Construction Manager and Architect/Engineer.

E. Construction Manager, Architect/Engineer, and Owner reserves the right to reject submissions of materials, work, or subcontractors that do not, in their opinion, meet the requirements of Drawings, Specifications or job conditions.

F. Materials and subcontractors used for work on the Project shall be in accordance with accepted material list.

1. The list is intended to assure use of materials and vendors acceptably equivalent to those specified and is not a substitution sheet or complete listing of required materials or services.

2. Substitutions for listed items will not be allowed, except when termed acceptable, in writing by the Construction Manager and Architect/Engineer, provided that substitution will result in a cost savings to the Owner, determined by the Owner to be a better product, or is made necessary due to unavailability of listed item. Unavailability shall be confirmed in writing by manufacturer named on accepted list.

1.3 SUBCONTRACTORS AND PRODUCTS LIST

BID CATEGORY NO. _____

(Insert Category No. and Name)

NAME OF BIDDER _____

The undersigned hereby submits the following Subcontractors and Products List which becomes a part of the undersigned Contract proposal. Subcontractor purchased material, equipment, and labor shall be under the direct management and control of the Prime Subcontractor. If a dual listing of manufacturers and subcontractors is herein made, it is understood the Architect/Engineer (not the Subcontractor) will select the manufacturer or subcontractor of his choice.

Section	Description	Subcontractor	Manufacturer

Name of Bidder:	Date:
Address:	
City/State/Zip:	
Telephone:	
By:	

PART 2 – NOT USED

PART 3 – NOT USED

END OF SECTION 004350

SECTION 034100 - PRECAST STRUCTURAL CONCRETE

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. Structural design, fabrication and erection of precast structural concrete work including wall panels with an architectural finish. Also included are accessories for anchoring to the building framework and the design, installation and fabrication for permanent and temporary anchors and brackets for these panels and planks.

B. Related Sections:

1. Section 033000 - "Cast-in-Place Concrete" for concrete topping and placing connection anchors in concrete.
2. Section 054400 - "Cold-Formed Metal Trusses" for furnishing and installing connections attached to metal trusses.
3. Section 055000 - "Metal Fabrications" for kickers and other miscellaneous steel shapes.
4. Section 072119 - "Foamed-In-Place Insulation for insulating exterior vertical joints between precast structural concrete wall panels.
5. Section 076200 - "Sheet Metal Flashing and Trim" for flashing receivers and reglets.
6. Section 078413 - "Penetration Firestopping" for joint-filler materials for fire-resistance-rated construction.
7. Section 078443 - "Joint Firestopping" for firestopping vertical joints between fire-rated precast structural concrete wall panels.
8. Section 079200 - "Joint Sealants" for elastomeric joint sealants and sealant backings.
9. Division 22 - "Plumbing" for plumbing embed items and openings including piping, hose bibbs, downspout nozzles and any other miscellaneous items located on the interior and exterior faces of the precast panels.
10. Division 26 - "Electrical" for electrical embed items and openings relating to conduit, lighting control devices, receptacles and lighting located on the interior and exterior faces of the precast concrete panels.
11. Division 27 - "Communications" for communications embed items relating to cable, controls, devices and equipment located on the interior and exterior faces of the precast concrete panels.
12. Division 28 - "Electronic Safety and Security" for embed security items relating to wire, cable and equipment located on the interior and exterior faces of the precast panels.

1.3 DEFINITION

A. Design Reference Sample(s): Sample(s) of approved precast structural concrete color, finish, and texture, pre-approved by Architect and Owner which all fabricators must match.

1.4 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design precast structural concrete, including comprehensive engineering analysis by a qualified State of Indiana professional engineer, using performance requirements and design criteria indicated.

B. Structural Performance: Precast structural concrete units and connections shall withstand design criteria indicated within limits and under conditions indicated.

C. Structural Performance: Provide precast structural concrete units and connections capable of withstanding the following design loads within limits and under conditions indicated:

1. Dead Loads: See drawings.
2. Concrete Topping Load: See drawings.
3. Live Loads: See drawings.
4. Roof Loads: See drawings.
5. Snow Loads: See drawings.
6. Seismic Loads: See drawings.
7. Wind Loads: See drawings.
8. Design precast structural concrete framing system and connections to maintain clearances at openings, to allow for fabrication and construction tolerances, to accommodate live-load deflection, shrinkage and creep of primary building structure, and other building movements. Maintain precast structural concrete deflections within limits of ACI 318.

    a. Thermal Movements: Allow for in-plane thermal movements resulting from annual ambient temperature changes of minus 18 to plus 120 deg F.

9. Design Standards: Comply with ACI 318 (ACI 318M) and the design recommendations of PCI MNL 120, "PCI Design Handbook – Precast and Prestressed Concrete".

    a. The precast concrete panels shall be a minimum nominal thickness 4-inches, minimum strength of 5,000 psi and reinforced with minimum W4.0 (MW 26) welded wire fabric at 4-inches on center in both directions conforming to ASTM A185.

10. Design Standards: Comply with PCI "Fire Resistance of Architectural Precast Concrete Envelopes" for fire resistant precast concrete panel joints.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Design Mixtures: For each precast concrete mixture. Include compressive strength and water-absorption tests.

C. Shop Drawings: Include member locations, plans, elevations, dimensions, shapes and sections, openings, support conditions, and types of reinforcement, including special reinforcement. Detail fabrication and installation of precast structural concrete units.

1. Indicate joints, reveals, and extent and location of each surface finish.
2. Indicate separate face and backup mixture locations and thicknesses.
3. Indicate welded connections by AWS standard symbols. Show size, length, and type of each weld.
4. Detail loose and cast-in hardware, lifting and erection inserts, connections, and joints.
5. Indicate locations, tolerances, and details of anchorage devices to be embedded in or attached to structure or other construction.
6. Include and locate openings larger than by 10-inches.
7. Indicate location of each precast structural concrete unit by same identification mark placed on panel.
8. Indicate routing and placement of embed items and openings for conduit, cable, wiring, equipment, controls, devices, light fixtures, etc. within the precast concrete panels in areas designated on the drawings to be concealed. All trades must submit coordinated drawings.
9. Indicate relationship of precast structural concrete units to adjacent materials.
10. Indicate estimated camber for precast floor slabs with concrete toppings.
11. Indicate shim sizes and grouting sequence.
12. Indicate electrical, security and low voltage devices, boxes and conduit to be embedded in precast concrete.
13. Design Modifications: If design modifications are proposed to meet performance requirements and field conditions, submit design calculations and Shop Drawings. Do not adversely affect the appearance, durability, or strength of units when modifying details or materials and maintain the general design concept.

D. Samples:

1. For each type of finish indicated on exposed surfaces of precast structural concrete units with architectural finish, in sets of 3, illustrating full range of finish, color, and texture variations expected; approximately 12 by 12 by 2-inches.

a. Where other faces of precast concrete unit are exposed, include Samples illustrating workmanship, color, and texture of backup concrete as well as facing concrete.

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

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and fabricator.

B. Welding certificates.

C. Material Certificates: For the following, from manufacturer:

1. Cementitious materials.
2. Reinforcing materials.
3. Admixtures.
4. Bearing pads.
5. Structural-steel shapes and hollow structural sections.

D. Material Test Reports: For aggregates.

E. Source quality-control reports.

F. Field quality-control reports.

1.7 QUALITY ASSURANCE

A. Listed Fabricator Qualifications: A firm that assumes responsibility for engineering precast structural concrete units to comply with performance requirements. Responsibility includes preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.

B. Installer Qualifications: A precast concrete erector qualified, as evidenced by PCI's Certificate of Compliance, to erect Category S1 - Simple Structural Systems and Category S2 - Complex Structural Systems.

C. Installer Qualifications: An experienced precast concrete erector who, before erection of precast concrete, has retained a "PCI-Certified Field Auditor" to conduct a field audit of a project installed by erector in Category S1 - Simple Structural Systems and Category S2 - Complex Structural Systems and who produces an Erectors' Post Audit Declaration, according to PCI MNL 127, "PCI Erector's Manual - Standards and Guidelines for the Erection of Precast Concrete Products."

D. Testing Agency Qualifications: Qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

E. Design Standards: Comply with ACI 318 and design recommendations in PCI MNL 120, "PCI Design Handbook - Precast and Prestressed Concrete," applicable to types of precast structural concrete units indicated.

F. Quality-Control Standard: For manufacturing procedures and testing requirements, quality-control recommendations, and dimensional tolerances for types of units required, comply with PCI MNL 116, "Manual for Quality Control for Plants and Production of Structural Precast Concrete Products."

G. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D.1.1M, "Structural Welding Code - Steel."
2. AWS D1.4, "Structural Welding Code - Reinforcing Steel."

H. Sample Panels: After sample approval and before fabricating precast structural concrete units with architectural finish, produce a minimum of two (2) sample panels approximately 32 sq. ft. in area for review by Architect. Incorporate full-scale details of all architectural features, finishes, textures, and transitions in sample panels.

1. Locate panels where indicated or if not indicated, as directed by Architect.
2. Damage part of an exposed-face surface for each finish, color, and texture, and demonstrate adequacy of repair techniques proposed for repair of surface blemishes for Architect's approval.
3. After approval of repair technique, maintain one sample panel at fabricator's plant and one at Project site in an undisturbed condition as a standard for judging the completed Work.
4. Demolish and remove sample panels when directed.

I. Mockups: After sample panel approval but before production of precast structural concrete units with architectural finish, construct mockup to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockups showing all the various precast panel architectural treatments and elements including textures, patterns, colors, window openings and details for both exterior and interior faces. Mockups shall also include anchors, connections, flashings, and joint fillers.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
4. If necessary, the mockup foundation and support frame are to be by others.

J. Preinstallation Conference: Conduct conference at Project site.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Support units during shipment on non-staining shock-absorbing material in same position as during storage.

B. Store units with adequate bracing and protect units to prevent contact with soil, to prevent staining, and to prevent cracking, distortion, warping or other physical damage.

1. Store units with dunnage across full width of each bearing point unless otherwise indicated.
2. Place adequate dunnage of even thickness between each unit.
3. Place stored units so identification marks are clearly visible, and units can be inspected.

C. Handle and transport units in a position consistent with their shape and design in order to avoid excessive stresses that would cause cracking or damage.

D. Lift and support units only at designated points shown on Shop Drawings.

1.9 COORDINATION

A. Furnish loose connection hardware and anchorage items to be embedded in or attached to other construction before starting that Work. Provide locations, setting diagrams, templates, instructions, and directions, as required, for installation.

B. Embedded Item and Opening Coordination:

1. Identify and locate all embedded items and openings within the panels including but not limited to, receptacles, conduits, wiring, cable, devices, controls, equipment and light fixtures. Coordinate all embedded items and openings with the various trades as required in all the areas designated on the drawings to be concealed

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Fabricators: Subject to compliance with requirements, available fabricators offering products that may be incorporated into the Work include, but are not limited to, the following:

1. ATMI Precast.
2. Coreslab Structures, Inc.
3. Fabcon Precast.
4. Gate Precast Company.
5. High Concrete Group, LLC.
6. International Precast Solutions, LLC.
7. Kerkstra Precast, Inc.

2.2 MOLD MATERIALS

A. Molds: Rigid, dimensionally stable, non-absorptive material, warp and buckle free, that will provide continuous and true precast concrete surfaces within fabrication tolerances indicated; nonreactive with concrete and suitable for producing required finishes.

1. Mold-Release Agent: Commercially produced liquid-release agent that will not bond with, stain or adversely affect precast concrete surfaces and will not impair subsequent surface or joint treatments of precast concrete.

2.3 REINFORCING MATERIALS

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

B. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed.

C. Steel Bar Mats: ASTM A 184/A 184M, fabricated from ASTM A 615/A 615M, Grade 60, deformed bars, assembled with clips.

D. Plain-Steel Welded Wire Reinforcement: ASTM A 185, fabricated from wire into flat sheets.

E. Deformed-Steel Welded Wire Reinforcement: ASTM A 497/A 497M, flat sheet.

F. Supports: Suspend reinforcement from back of mold or use bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place according to PCI MNL 116.

2.4 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type I or Type III, white or gray, unless otherwise indicated below.

1. For exterior wythe on exterior walls or use white cement with white silica sand, of same type, brand, and mill source.
2. For the interior wythe on exterior walls and both sides of all interior walls use gray cement.

B. Supplementary Cementitious Materials:

1. Fly Ash: ASTM C 618, Class C or F, with maximum loss on ignition of 3 percent.
2. Metakaolin Admixture: ASTM C 618, Class N.
3. Silica Fume Admixture: ASTM C 1240, with optional chemical and physical requirement.
4. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.

C. Normal-Weight Aggregates: Except as modified by PCI MNL 116, ASTM C 33, with coarse aggregates complying with Class 5S. Stockpile fine and coarse aggregates for each type of exposed finish from a single source (pit or quarry) for Project.

D. Lightweight Aggregates: Except as modified by PCI MNL 116, ASTM C 330, with absorption less than 11 percent.

E. Coloring Admixture: ASTM C 979, synthetic or natural mineral-oxide pigments or colored water-reducing admixtures, temperature stable, and nonfading.

F. Water: Potable; free from deleterious material that may affect color stability, setting, or strength of concrete and complying with chemical limits of PCI MNL 116.

G. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.

H. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and to not contain calcium chloride, or more than 0.15 percent chloride ions or other salts by weight of admixture.

1. Water-Reducing Admixtures: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. Water-Reducing and Accelerating Admixture: ASTM C 494/C 494M, Type E.
5. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
6. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
7. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M.

I. Corrosion-Inhibiting Admixture: Commercially formulated, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete.

2.5 STEEL CONNECTION MATERIALS

A. Carbon-Steel Shapes and Plates: ASTM A 36/A 36M.

B. Carbon-Steel-Headed Studs: ASTM A 108, AISI 1018 through AISI 1020, cold finished, AWS D1.1/D1.1M, Type A or B, with arc shields and with minimum mechanical properties of PCI MNL 116.

C. Carbon-Steel Plate: ASTM A 283/A 283M.

D. Malleable-Iron Castings: ASTM A 47/A 47M.

E. Carbon-Steel Castings: ASTM A 27/A 27M, Grade 60-30.

F. High-Strength, Low-Alloy Structural Steel: ASTM A 572/A 572M.

G. Carbon-Steel Structural Tubing: ASTM A 500, Grade B.

H. Wrought Carbon-Steel Bars: ASTM A 675/A 675M, Grade 65.

I. Deformed-Steel Wire or Bar Anchors: ASTM A 496 or ASTM A 706/A 706M.

J. Carbon-Steel Bolts and Studs: ASTM A 307, Grade A; carbon-steel, hex-head bolts and studs; carbon-steel nuts, ASTM A 563; and flat, unhardened steel washers, ASTM F 844.

K. High-Strength Bolts and Nuts: ASTM A 325, Type 1, heavy hex steel structural bolts; heavy hex carbon-steel nuts, ASTM A 563; and hardened carbon-steel washers, ASTM F 436.

1. Do not zinc coat ASTM A 490 bolts.

L. Zinc-Coated Finish: For exterior steel items, steel in exterior walls, and items indicated for galvanizing, apply zinc coating by hot-dip process according to ASTM A 123/A 123M.

1. For steel shapes, plates, and tubing to be galvanized, limit silicon content of steel to less than 0.03 percent or to between 0.15 and 0.25 percent or limit sum of silicon and 2.5 times phosphorous content to 0.09 percent.
2. Galvanizing Repair Paint: High-zinc-dust-content paint with dry film containing not less than 94 percent zinc dust by weight and complying with DOD-P-21035B or SSPC-Paint 20.

M. Shop-Primed Finish: Prepare surfaces of nongalvanized-steel items, except those surfaces to be embedded in concrete, according to requirements in SSPC-SP 3, and shop apply lead- and chromate-free, rust-inhibitive primer, complying with performance requirements in MPI 79 according to SSPC-PA 1.

N. Welding Electrodes: Comply with AWS standards.

O. Precast Accessories: Provide clips, hangers, plastic or steel shims, and other accessories required to install precast structural concrete units.

2.6 BEARING PADS

A. Provide one of the following bearing pads for precast structural concrete units as recommended by precast fabricator for application:

1. Elastomeric Pads: AASHTO M 251, plain, vulcanized, 100 percent polychloroprene (neoprene) elastomer, molded to size or cut from a molded sheet, 60 to 70 Shore, Type A durometer hardness, ASTM D 2240; minimum tensile strength 2250 psi, ASTM D 412.
2. Random-Oriented, Fiber-Reinforced Elastomeric Pads: Preformed, randomly oriented synthetic fibers set in elastomer. 70 to 90 Shore, Type A durometer hardness, ASTM D 2240; capable of supporting a compressive stress of 3000 psi with no cracking,

splitting, or delaminating in the internal portions of pad. Test 1 specimen for every 200 pads used in Project.

3. Cotton-Duck-Fabric-Reinforced Elastomeric Pads: Preformed, horizontally layered cotton-duck fabric bonded to an elastomer; 80 to 100 Shore, Type A durometer hardness, ASTM D 2240; complying with AASHTO's "AASHTO Load and Resistance Factor Design (LRFD) Bridge Specifications," Division II, Section 18.10.2; or with MIL-C-882E.
4. Frictionless Pads: Tetrafluoroethylene, glass-fiber reinforced, bonded to stainless- or mild-steel plate, of type required for in-service stress.
5. High-Density Plastic: Multi-monomer, non-leaching, plastic strip.

2.7 GROUT MATERIALS

A. Nonmetallic, Non-shrink Grout: Premixed, nonmetallic, noncorrosive, non-staining grout containing selected silica sands, Portland cement, shrinkage-compensating agents, plasticizing and water-reducing agents, complying with ASTM C 1107, Grade A for drypack and Grades B and C for flowable grout and of consistency suitable for application within a 30-minute working time.

2.8 INSULATED FLAT WALL PANEL ACCESSORIES

A. Extruded-Polystyrene Board Insulation: ASTM C 578, Type IV, 1.60 lb./cu. ft. square edges; with R-value of 20 and thickness of 4-inches.

1. Maximum flame-spread and smoke developed indexes of 75 and 450 respectively per ASTM E 84.

B. Wythe Connectors: Non-conductive type metal connectors-conductive types are prohibited.

1. Basis-of-Design Types: Provide low-conductivity connectors from one of the following:

a. HK Composites.
b. Thermomass Connector System.

2.9 CONCRETE MIXTURES

A. Basis-of-Design Control Panel Sample: Subject to compliance with requirements provide 'Mix #27" as manufactured by Coreslab Structures or a comparable product approved by Architect for all exterior wall faces.

1. Composition:

a. Coarse Aggregate: #9 Limestone.
b. Fine Aggregate: Woodville Sand.
c. Cement: White.
d. Coloring: BASF 1.12 BL, .4LR, 3.6Y.

e. Finishes: Light Acid Etch Field and Exposed Aggregate Accent.

B. Prepare design mixtures for each type of precast concrete required.

1. Use fly ash, pozzolan, ground granulated blast-furnace slag, and silica fume as needed to reduce the total amount of Portland cement, which would otherwise be used, by not less than 40 percent.
2. Limit use of fly ash to 25 percent replacement of Portland cement by weight and granulated blast-furnace slag to 40 percent of Portland cement by weight; metakaolin and silica fume to 10 percent of Portland cement by weight.

C. Design mixtures may be prepared by a qualified independent testing agency or by qualified precast plant personnel at precast structural concrete fabricator's option.

D. Limit water-soluble chloride ions to maximum percentage by weight of cement permitted by ACI 318 or PCI MNL 116 when tested according to ASTM C 1218/C 1218M.

E. Normal-Weight Concrete Mixtures: Proportion face mixtures or face and backup mixtures or full-depth mixture or face and backup mixtures or full-depth mixtures, at fabricator's option by either laboratory trial batch or field test data methods according to ACI 211.1, with materials to be used on Project, to provide normal-weight concrete with the following properties:

1. Compressive Strength (28 Days): 5000 psi.
2. Maximum Water-Cementitious Materials Ratio: 0.45.

F. Water Absorption: 6 percent by weight or 14 percent by volume, tested according to PCI MNL 116.

G. Lightweight Concrete Backup Mixtures: Proportion mixtures by either laboratory trial batch or field test data methods according to ACI 211.2, with materials to be used on Project, to provide lightweight concrete with the following properties:

1. Compressive Strength (28 Days): 5000 psi.
2. Unit Weight: Calculated equilibrium unit weight of 115 lb./cu. ft., plus or minus 3 lb./cu. ft., according to ASTM C 567.

H. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content complying with PCI MNL 116.

I. When included in design mixtures, add other admixtures to concrete mixtures according to manufacturer's written instructions.

J. Concrete Mix Adjustments: Concrete mix design adjustments may be proposed if characteristics of materials, Project conditions, weather, test results, or other circumstances warrant.

2.10 MOLD FABRICATION

A. Molds: Accurately construct molds, mortar tight, of sufficient strength to withstand pressures due to concrete-placement operations and temperature changes and for pre-stressing and de-tensioning operations. Coat contact surfaces of molds with release agent before reinforcement is placed. Avoid contamination of reinforcement and prestressing tendons by release agent.

B. Maintain molds to provide completed precast structural concrete units of shapes, lines, and dimensions indicated, within fabrication tolerances specified.

1. Form joints are not permitted on faces exposed to view in the finished work.
2. Edge and Corner Treatment: Uniformly chamfered.

2.11 FABRICATION

A. Cast-in Anchors, Inserts, Plates, Angles, and Other Anchorage Hardware: Fabricate anchorage hardware with sufficient anchorage and embedment to comply with design requirements. Accurately position for attachment of loose hardware, and secure in place during precasting operations. Locate anchorage hardware where it does not affect position of main reinforcement or concrete placement.

1. Weld-headed studs and deformed bar anchors used for anchorage according to AWS D1.1/D1.1M and AWS C5.4, "Recommended Practices for Stud Welding."

B. Furnish loose hardware items including steel plates, clip angles, seat angles, anchors, dowels, cramps, hangers, and other hardware shapes for securing precast structural concrete units to supporting and adjacent construction.

C. Cast-in reglets, slots, holes, and other accessories in precast structural concrete units as indicated on the Contract Drawings.

D. Cast-in openings larger than 10-inches in any dimension. Do not drill or cut openings or reinforcement bars without Architect's approval.

E. Cast-in electrical, security and communication services conduit and receptacles in areas as indicated on the drawings where surface-mount conduit, devices, controls and receptacles are not acceptable. Surface mounted, exposed conduit and plumbing is not acceptable on the building exterior. Conduit and receptacles are to be provided to the precast fabricator. Refer to electrical, communications, electronic safety and security drawings for conduit and receptacle locations in these areas.

F. Reinforcement: Comply with recommendations in PCI MNL 116 for fabricating, placing, and supporting reinforcement.

1. Clean reinforcement of loose rust and mill scale, earth, and other materials that reduce or destroy the bond with concrete. When damage to epoxy-coated reinforcement exceeds limits specified, repair with patching material compatible with coating material and epoxy coat bar ends after cutting.
2. Accurately position, support, and secure reinforcement against displacement during concrete-placement and consolidation operations. Completely conceal support devices to prevent exposure on finished surfaces.
3. Place reinforcement to maintain at least 3/4-inch minimum coverage. Increase cover requirements according to ACI 318 when units are exposed to corrosive environment or severe exposure conditions. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position while placing concrete. Direct wire tie ends away from finished, exposed concrete surfaces.
4. Place reinforcing steel and pre-stressing strand to maintain at least 3/4-inch minimum concrete cover. Increase cover requirements for reinforcing steel to 1-1/2 inches when units are exposed to corrosive environment or severe exposure conditions. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position while placing concrete. Direct wire tie ends away from finished, exposed concrete surfaces.
5. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh spacing and wire tie laps, where required by design. Offset laps of adjoining widths to prevent continuous laps in either direction.

G. Reinforce precast structural concrete units to resist handling, transportation, and erection stresses.

H. Comply with requirements in PCI MNL 116 and in this Section for measuring, mixing, transporting, and placing concrete. After concrete batching, no additional water may be added.

I. Place face mixture to a minimum thickness after consolidation of the greater of 1-inch or 1.5 times the maximum aggregate size, but not less than the minimum reinforcing cover specified.

J. Place concrete in a continuous operation to prevent seams or planes of weakness from forming in precast concrete units.

1. Place backup concrete mixture to ensure bond with face-mixture concrete.

K. Thoroughly consolidate placed concrete by internal and external vibration without dislocating or damaging reinforcement and built-in items, and minimize pour lines, honeycombing, or entrapped air on surfaces. Use equipment and procedures complying with PCI MNL 116.

1. Place self-consolidating concrete without vibration according to PCI TR-6, "Interim Guidelines for the Use of Self-Consolidating Concrete in Precast/Prestressed Concrete Institute Member Plants."

L. Comply with ACI 306.1 procedures for cold-weather concrete placement.

M. Comply with PCI MNL 116 procedures for hot-weather concrete placement.

N. Identify pickup points of precast structural concrete units and orientation in structure with permanent markings, complying with markings indicated on Shop Drawings. Imprint or permanently mark casting date on each precast structural concrete unit on a surface that will not show in finished structure.

O. Cure concrete, according to requirements in PCI MNL 116, by moisture retention without heat or by accelerated heat curing using low-pressure live steam or radiant heat and moisture. Cure units until compressive strength is high enough to ensure that stripping does not have an effect on performance or appearance of final product.

P. Discard and replace precast structural concrete units that do not comply with requirements, including structural, manufacturing tolerance, and appearance, unless repairs meet requirements in PCI MNL 116 and meet Architect's approval.

2.12 INSULATED EXTERIOR PANEL FABRICATION

A. Secure Insulated Panel Composition: Panels will be 12-inches total thickness comprised as follows:

1. Interior Wythe: Minimum 5-inches solid concrete with minimum strength of 5,000 psi W4 (MW26) welded wire fabric at 4-inches o.c. both directions. Conforming to ASTM A185 and noted as Security walls on the drawings. Two-pass steel troweled finish on exposed face.
2. Insulation: Minimum 4-inches Extruded Polystyrene (R 5 per inch, R 20 total).
3. Exterior Wythe: Minimum 3-inches reinforced concrete with the mix ingredients per section 2.10 "Concrete Mixtures" A.1.

B. Panel Details:

1. Outside Corners: Outside butt corner.
2. Inside Corners: Inside butt corner.
3. Exposed Panel Returns: Finished.
4. Reveals: 1/2-inches deep.
5. Panel Joint: 3/4-inches.
6. Refer to Section – "Joint Firestopping" for precast panel joints in fire-rated walls.
7. Fire-Resistant Precast Panel Joints: Panel joints in fire-rated walls must have the same fire-resistance rating as the walls.

2.13 UNINSULATED INTERIOR PANEL FABRICATION

A. Uninsulated Panel Composition: Panels will be 8-inches total thickness comprised as follows:

1. Single Wythe: 8-inches solid concrete with minimum strength of 5,000 psi W4 (MW26) welded wire fabric at 4-inches o.c. both directions, conforming to ASTM A185 and noted as Security walls on the drawings. Two-pass steel troweled finish all exposed sides.

B. Panel Details:

1. Panel Joints: Butt joint square or angled to match adjacent panel to minimize joint width.
2. Panel Joint Width: Varies.
3. Refer to Section 078443 – "Joint Firestopping" for precast panel joints in fire rated walls.
4. Fire-Resistant Precast Panel Joints: Panel joints in fire-rated walls must have the same fire-resistance rating as the walls.

2.14 CASTING INSULATED WALL PANELS

A. Cast and screed wythe supported by mold.

B. Place insulation boards abutting edges and ends of adjacent boards. Insert wythe connectors through insulation and consolidate concrete around connectors according to connector manufacturer's written instructions.

C. Cast and screed top wythe to meet required finish.

2.15 FABRICATION TOLERANCES

A. Fabricate precast structural concrete units straight and true to size and shape with exposed edges and corners precise and true so each finished unit complies with PCI MNL 116 product dimension tolerances.

2.16 INTERIOR FINISHES

A. Finish exposed surfaces of architectural precast concrete units with smooth, two-pass steel-trowel finish.

2.17 ARCHITECTURAL FINISHES

A. Manufacture member faces free of joint marks, grain, and other obvious defects with corners, including false joints, uniform, straight, and sharp. Finish exposed-face surfaces of precast concrete units to match approved design reference sample and as follows:

1. Textured-Surface Finish Precast Treatment 2: Exposed aggregate retarded finish, using chemical retarding agents applied to forms with washing and brushing procedures to expose aggregate and surrounding matrix.
2. Acid-Etched Finish Precast Treatment 1: Use acid and hot-water solution, equipment, application techniques, and cleaning procedures to expose aggregate and surrounding matrix surfaces. Protect hardware, connections, and insulation from acid attach.
3. Provide two-sided finishes at exposed perimeter wall surfaces:

    a. Outside Finish: Acid etched and exposed aggregate.
    b. Inside Finish: Two-pass, steel troweled finish for painting.

4. Provide two-sided finishes at exposed interior wall surfaces.

    a. One Side Finish: Two-pass, steel troweled finish for painting.
    b. Other Side Finish: Two-pass, steel troweled finish for painting.

2.18 SOURCE QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to evaluate precast structural concrete fabricator's quality-control and testing methods.

    1. Allow testing agency access to material storage areas, concrete production equipment, concrete placement, and curing facilities. Cooperate with testing agency and provide samples of materials and concrete mixtures as may be requested for additional testing and evaluation.

B. Testing: Test and inspect precast structural concrete according to PCI MNL 116 requirements.

    1. Test and inspect self-consolidating concrete according to PCI TR-6.

C. Strength of precast structural concrete units will be considered deficient if units fail to comply with ACI 318 requirements for concrete strength.

D. If there is evidence that strength of precast concrete units may be deficient or may not comply with ACI 318 requirements, employ a qualified testing agency to obtain, prepare, and test cores drilled from hardened concrete to determine compressive strength according to ASTM C 42/C 42M.

    1. A minimum of three representative cores will be taken from units of suspect strength, from locations directed by Architect.
    2. Cores will be tested in an air-dry condition or, if units will be wet under service conditions, test cores after immersion in water in a wet condition.
    3. Strength of concrete for each series of three cores will be considered satisfactory if average compressive strength is equal to at least 85 percent of 28-day design compressive strength and no single core is less than 75 percent of 28-day design compressive strength.
    4. Test results will be made in writing on same day that tests are performed, with copies to Architect, Contractor, and precast concrete fabricator. Test reports will include the following:

        a. Project identification name and number.
        b. Date when tests were performed.
        c. Name of precast concrete fabricator.
        d. Name of concrete testing agency.

e. Identification letter, name, and type of precast concrete unit(s) represented by core tests; design compressive strength; type of break; compressive strength at breaks, corrected for length-diameter ratio; and direction of applied load to core in relation to horizontal plane of concrete as placed.

E. Patching: If core test results are satisfactory and precast structural concrete units comply with requirements, clean and dampen core holes and solidly fill with same precast concrete mixture that has no coarse aggregate, and finish to match adjacent precast concrete surfaces per manufacturer's standard.

F. Defective Units: Discard and replace exposed finish precast structural concrete units that do not comply with requirements, including strength, manufacturing tolerances, and color and texture range. Chipped, spalled, or cracked units may be repaired, subject to Architect's approval. Architect reserves the right to reject precast units that do not match approved samples, sample panels, and mockups.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine supporting structural frame or foundation and conditions for compliance with requirements for installation tolerances, true and level bearing surfaces, and other conditions affecting performance of the Work.

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

B. Do not install precast concrete units until supporting, cast-in-place, building structural framing has attained minimum allowable design compressive strength or until supporting steel or other structure is complete.

3.2 INSTALLATION

A. Install clips, hangers, bearing pads, and other accessories required for connecting precast structural concrete units to supporting members and backup materials.

B. Erect precast structural concrete level, plumb, and square within specified allowable tolerances. Provide temporary structural framing, supports, and bracing as required to maintain position, stability, and alignment of units until permanent connection.

1. Install temporary steel or plastic spacing shims or bearing pads as precast structural concrete units are being erected. Tack weld steel shims to each other to prevent shims from separating.
2. Maintain horizontal and vertical joint alignment and uniform joint width as erection progresses.

3. Remove projecting lifting devices and grout fill voids within recessed lifting devices flush with surface of adjacent precast surfaces when recess is exposed.
4. Ensure precast panel top elevation does not exceed elevation shown in drawings.

C. Connect precast structural concrete units in position by bolting, welding, grouting, or as otherwise indicated on Shop Drawings. Remove temporary shims, wedges, and spacers as soon as practical after connecting and grouting are completed.

1. Do not permit connections to disrupt continuity of roof flashing.

D. Field cutting of precast units is not permitted without approval of the Architect.

E. Fasteners: Do not use drilled or powder-actuated fasteners for attaching accessory items to precast, prestressed concrete units.

F. Welding: Comply with applicable AWS D1.1/D1.1M and AWS D1.4 for welding, welding electrodes, appearance, quality of welds, and methods used in correcting welding work.

1. Protect precast structural concrete units and bearing pads from damage by field welding or cutting operations, and provide noncombustible shields as required.
2. Clean weld-affected steel surfaces with chipping hammer followed by brushing and apply a minimum 4.0-mil-thick coat of galvanized repair paint to galvanized surfaces according to ASTM A 780.
3. Clean weld-affected steel surfaces with chipping hammer followed by brushing and reprime damaged painted surfaces.
4. Remove, reweld, or repair incomplete and defective welds.

G. At bolted connections, use lock washers, tack welding, or other approved means to prevent loosening of nuts after final adjustment.

1. Where slotted connections are used, verify bolt position and tightness. For sliding connections, properly secure bolt but allow bolt to move within connection slot. For friction connections, apply specified bolt torque and check 25 percent of bolts at random by calibrated torque wrench.

H. Grouting: Grout connections and joints and open spaces at keyways, connections, and joints where required or indicated on Shop Drawings. Retain grout in place until hard enough to support itself. Pack spaces with stiff grout material, tamping until voids are completely filled.

1. Place grout to finish smooth, level, and plumb with adjacent concrete surfaces.
2. Fill joints completely without seepage to other surfaces.
3. Trowel top of grout joints on roofs smooth and uniform. Finish transitions between different surface levels not steeper than 1 to 12.
4. Place grout end cap or dam in voids at ends of hollow-core slabs.
5. Promptly remove grout material from exposed surfaces before it affects finishes or hardens.
6. Keep grouted joints damp for not less than 24 hours after initial set.

3.3 ERECTION TOLERANCES

A. Minimize variations between adjacent slab members by jacking, loading, or other method recommended by fabricator and approved by Architect.

B. Erect architectural precast structural concrete units' level, plumb, square, and in alignment without exceeding the noncumulative erection tolerances of PCI MNL 117, Appendix I.

C. Erect architectural precast concrete units' level, plumb, square, and in alignment, without exceeding the following noncumulative erection tolerances:

1. Plan Location from Building Grid Datum: Plus or minus 1/2-inch.
2. Plan Location from Centerline of Steel: Plus or minus 1/2-inch.
3. Top Elevation from Nominal Top Elevation: As follows:

    a. Exposed Individual Panel: Plus or minus 1/4-inch.
    b. Non-Exposed Individual Panel: Plus or minus 1/2-inch.
    c. Exposed Panel Relative to Adjacent Panel: 1/4-inch.
    d. Non-Exposed Panel Relative to Adjacent Panel: 1/2-inch.

4. Support Elevation from Nominal Support Elevation: As follows:

    a. Maximum Low: 1/2-inch.
    b. Maximum High: 1/4-inch.

5. Maximum Plumb Variation over the Lesser of Height of Structure or 100 Feet: 1-inch.
6. Plumb in Any 10 Feet of Element Height: 1/4-inch.
7. Maximum Jog in Alignment of Matching Edges: 1/4-inch.
8. Joint Width (Governs over Joint Taper): Plus or minus 1/4-inch.
9. Maximum Joint Taper: 3/8-inch.
10. Joint Taper in 10 Feet: 1/4-inch.
11. Maximum Jog in Alignment of Matching Faces: 1/4-inch.
12. Differential Bowing or Camber, as Erected, between Adjacent Members of Same Design: 1/4-inch.
13. Opening Height between panels: Plus or minus 1/4-inch.

3.4 FIELD QUALITY CONTROL

A. Special Inspections: The Owner will engage a qualified special inspector to perform the following special inspections:

1. Erection of load bearing precast concrete members.

B. Testing Agency: The Owner will engage a qualified testing agency to perform tests and inspections.

C. Field welds will be visually inspected and nondestructive tested according to ASTM E 165 or ASTM E 709. High-strength bolted connections will be subject to inspections.

D. Testing agency will report test results promptly and in writing to Contractor and Architect.

E. Repair or remove and replace work where tests and inspections indicate that it does not comply with specified requirements.

F. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

G. Prepare test and inspection reports.

3.5 REPAIRS

A. Repair precast structural concrete units if permitted by Architect.

1. Repairs may be permitted if structural adequacy, serviceability, durability and appearance of units has not been impaired.
2. Refer to Architect approved mockup sample for repaired concrete finish.

B. Mix patching materials and repair units so cured patches blend with color, texture and uniformity of adjacent exposed surfaces and show no apparent line of demarcation between original and repaired work, when viewed in typical daylight illumination from a distance of 20 feet. Architect will determine final acceptance of panel repair.

C. Wire brush, clean, and paint damaged prime-painted components with same type of shop primer.

D. Remove and replace damaged precast structural concrete units that cannot be repaired or when repairs do not comply with requirements as determined by Architect.

3.6 CLEANING

A. Clean mortar, plaster, fireproofing, weld slag, and other deleterious material from concrete surfaces and adjacent materials immediately.

B. Clean exposed surfaces of precast concrete units after erection and completion of joint treatment to remove weld marks, other markings, dirt, and stains.

1. Perform cleaning procedures, if necessary, according to precast concrete fabricator's written recommendations. Clean soiled precast concrete surfaces with detergent and water, using stiff fiber brushes and sponges, and rinse with clean water. Protect other work from staining or damage due to cleaning operations.
2. Do not use cleaning materials or processes that could change the appearance of exposed concrete finishes or damage adjacent materials.

END OF SECTION 034100

SECTION 08 71 00 – DOOR HARDWARE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section includes:

1. Mechanical and electrified door hardware for:

a. Swinging doors.

2. Electronic access control system components, including:

a. Electronic access control devices.

3. The intent of the hardware specification is to specify the hardware for interior and exterior doors, and to establish a type, continuity, and standard of quality. However, it is the door hardware supplier's responsibility to thoroughly review existing conditions, schedules, specifications, drawings, and other Contract Documents to verify the suitability of the hardware specified.

B. Exclusions: Unless specifically listed in hardware sets, hardware is not specified in this section for:

1. Windows
2. Cabinets (casework), including locks in cabinets
3. Signage
4. Toilet accessories
5. Overhead doors

C. Related Sections:

1. Section 012300 - "Alternates" for alternates affecting this section.
2. Section 079200 - "Joint Sealants" for sealant requirements applicable to threshold installation specified in this section.
3. Section 081113- "Hollow Metal Doors and Frames" for hardware in these door and frame types.
4. Section 081416 – "Flush Wood Doors" for hardware in these door types.

5. Division 26 sections for connections to electrical power system and for low-voltage wiring.
6. Division 28 sections for coordination with other components of electronic access control system.

1.03 REFERENCES

A. UL - Underwriters Laboratories

1. UL 10B - Fire Test of Door Assemblies
2. UL 10C - Positive Pressure Test of Fire Door Assemblies
3. UL 1784 - Air Leakage Tests of Door Assemblies
4. UL 305 - Panic Hardware

B. DHI - Door and Hardware Institute

1. Sequence and Format for the Hardware Schedule
2. Recommended Locations for Builders Hardware
3. Key Systems and Nomenclature

C. ANSI - American National Standards Institute

1. ANSI/BHMA A156.1 - A156.29, and ANSI/BHMA A156.31 - Standards for Hardware and Specialties

1.04 SUBMITTALS

A. General:

1. Submit in accordance with Conditions of Contract and Division 01 requirements.
2. Highlight, encircle, or otherwise specifically identify on submittals deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.
3. Prior to forwarding submittal, comply with procedures for verifying existing door and frame compatibility for new hardware, as specified in PART 3, "EXAMINATION" article, herein.

B. Action Submittals:

1. Product Data: Technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
2. Riser and Wiring Diagrams: After final approval of hardware schedule, submit details of electrified door hardware, indicating:

a. Wiring Diagrams: For power, signal, and control wiring and including:

1) Details of interface of electrified door hardware and building safety and security systems.
2) Schematic diagram of systems that interface with electrified door hardware.
3) Point-to-point wiring.
4) Risers.

3. Samples for Verification: If requested by Architect, submit production sample or sample installations of each type of exposed hardware unit in finish indicated, and tagged with full description for coordination with schedule.

   a. Samples will be returned to supplier. Units that are acceptable to Architect may, after final check of operations, be incorporated into Work, within limitations of key coordination requirements.

4. Door Hardware Schedule: Submit schedule with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule as published by the Door and Hardware Institute. Indicate complete designations of each item required for each door or opening, include:

   a. Door Index; include door number, heading number, and Architects hardware set number.
   b. Opening Lock Function Spreadsheet: List locking device and function for each opening.
   c. Quantity, type, style, function, size, and finish of each hardware item.
   d. Name and manufacturer of each item.
   e. Fastenings and other pertinent information.
   f. Location of each hardware set cross-referenced to indications on Drawings.
   g. Explanation of all abbreviations, symbols, and codes contained in schedule.
   h. Mounting locations for hardware.
   i. Door and frame sizes and materials.
   j. Name and phone number for local manufacturer's representative for each product.
   k. Operational Description of openings with any electrified hardware (locks, exits, electromagnetic locks, electric strikes, automatic operators, door position switches, magnetic holders or closer/holder units, and access control components). Operational description should include operational descriptions for: egress, ingress (access), and fire/smoke alarm connections.
   l. Submittal Sequence: Submit door hardware schedule concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate fabrication of other work that is critical in Project construction schedule.

5. Key Schedule:

   a. After Keying Conference, provide keying schedule listing levels of keying as well as explanation of key system's function, key symbols used and door numbers controlled.
   b. Use ANSI/BHMA A156.28 "Recommended Practices for Keying Systems" as guideline for nomenclature, definitions, and approach for selecting optimal keying system.

c. Provide three (3) copies of keying schedule for review prepared and detailed in accordance with referenced DHI publication. Include schematic keying diagram and index each key to unique door designations.
d. Index keying schedule by door number, keyset, hardware heading number, cross keying instructions, and special key stamping instructions.
e. Provide one complete bitting list of key cuts and one key system schematic illustrating system usage and expansion.

1) Forward bitting list, key cuts and key system schematic directly to Owner, by means as directed by Owner.

f. Prepare key schedule by or under supervision of supplier, detailing Owner's final keying instructions for locks.

6. Templates: After final approval of hardware schedule, provide templates for doors, frames and other work specified to be factory or shop prepared for door hardware installation.

C. Informational Submittals:

1. Qualification Data: For Supplier, Installer and Architectural Hardware Consultant.
2. Product data for electrified door hardware:

a. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.

3. Certificates of Compliance:

a. UL listings for fire-rated hardware and installation instructions if requested by Architect or Authority Having Jurisdiction.
b. Installer Training Meeting Certification: Letter of compliance, signed by Contractor, attesting to completion of installer training meeting specified in "QUALITY ASSURANCE" article, herein.
c. Electrified Hardware Coordination Conference Certification: Letter of compliance, signed by Contractor, attesting to completion of electrified hardware coordination conference, specified in "QUALITY ASSURANCE" article, herein.

4. Warranty: Special warranty specified in this Section.

D. Closeout Submittals:

1. Operations and Maintenance Data: Provide in accordance with Division 01 and include:

a. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
b. Catalog pages for each product.
c. Factory order acknowledgement numbers (for warranty and service)
d. Name, address, and phone number of local representative for each manufacturer.
e. Parts list for each product.

f. Final approved hardware schedule, edited to reflect conditions as-installed.
g. Final keying schedule
h. Copies of floor plans with keying nomenclature
i. As-installed wiring diagrams for each opening connected to power, both low voltage and 110 volts.
j. Copy of warranties including appropriate reference numbers for manufacturers to identify project.

1.05 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies:

1. Furnish finish hardware to comply with the requirements of laws, codes, ordinances, and regulations of the governmental authorities having jurisdiction where such requirements exceed the requirements of the Specifications.
2. Furnish finish hardware to comply with the requirements of the regulations for public building accommodations for physically handicapped persons of the governmental authority having jurisdiction and to comply with Americans with Disabilities Act.
3. Provide hardware for fire rated openings in compliance with NFPA 80 and state and local building code requirements. Provide only hardware that has been tested and listed by UL for types and sizes of doors required and complies with requirements of door and door frame labels.

B. Supplier:

1. Mechanical Hardware

a. Shall be an established firm dealing in contract builders' hardware. Distributor must have adequate inventory, qualified personnel on staff and be located within 100 miles of the project. The distributor must be a factory-authorized dealer for all materials required. The supplier shall be or have in employment an Architectural Hardware Consultant (AHC).
b. Door Hardware distributor/supplier listed on the Bid Form shall be a factory authorized distributor for the hardware specified. This requirement will not be allowed to be med by a non-factory authorized dealer subcontracting to a factory authorized dealer. Any submitted bid that attempts to circumvent this requirement will be considered non-response and will be removed from consideration.

2. Electrified Hardware:

a. Shall be an experienced door hardware supplier who has completed projects with electrified 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. The supplier must be a factory-authorized distributor for all materials required.

b. Shall prepare data for electrified 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.
c. Shall have experience in providing consulting services for electrified door hardware installations.

C. Installer Qualifications:

1. Qualified tradesmen, skilled in application of commercial grade hardware with record of successful in-service performance for installing door hardware similar in quantity, type, and quality to that indicated for this Project.

D. Architectural Hardware Consultant Qualifications: Person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and meets these requirements:

1. For door hardware, DHI-certified, Architectural Hardware Consultant (AHC).
2. Can provide installation and technical data to Architect and other related subcontractors.
3. Can inspect and verify components are in working order upon completion of installation.
4. Capable of producing wiring diagrams.
5. Capable of coordinating installation of electrified hardware with Architect and electrical engineers.

E. Single Source Responsibility: Obtain each type of door hardware from single manufacturer.

F. Fire-Rated Door Openings: Provide door hardware for fire-rated openings that complies with NFPA 80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed products tested by Underwriters Laboratories, Intertek Testing Services, or other testing and inspecting organizations acceptable to authorities having jurisdiction for use on types and sizes of doors indicated, based on testing at positive pressure and according to NFPA 252 or UL 10C and in compliance with requirements of fire-rated door and door frame labels.

G. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction.

H. Accessibility Requirements: For door hardware on doors in an accessible route, comply with governing accessibility regulations cited in "REFERENCES" article, herein.

I. Keying Conference

1. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including:

a. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
b. Preliminary key system schematic diagram.
c. Requirements for key control system.

d. Requirements for access control.
e. Address for delivery of keys.

J. Pre-installation Conference

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

K. Coordination Conferences:

1. Installation Coordination Conference: Prior to hardware installation, schedule and hold meeting to review questions or concerns related to proper installation and adjustment of door hardware.
2. Electrified Hardware Coordination Conference: Prior to ordering electrified hardware, schedule and hold meeting to coordinate door hardware with security, electrical, doors and frames, and other related suppliers.

1.06 DELIVERY, STORAGE, AND HANDLING

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

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

1. Deliver each article of hardware in manufacturer's original packaging.

C. Project Conditions:

1. Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.
2. Provide secure lock-up for door hardware delivered to Project. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.

D. Protection and Damage:

1. Promptly replace products damaged during shipping.
2. Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work.
3. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.

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

1.07 COORDINATION

A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete.

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

C. Security: Coordinate installation of door hardware, access control, and keying with Owner's security consultant.

D. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.

1.08 WARRANTY

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

1. Warranty Period: Beginning from date of Substantial Completion, for durations indicated.

a. Closers:

1) Mechanical: Thirty (30) years.

b. Automatic Operators: Two ()2 years.
c. Exit Devices:

1) Mechanical: Three (3) years.
2) Electrified: One (1) year.

d. Locksets:

1) Mechanical: Three (3) years
2) Electrified: One (1) year.

e. Continuous Hinges: Lifetime warranty.
f. Key Blanks: Lifetime

2. Warranty does not cover damage or faulty operation due to improper installation, improper use or abuse.

1.09 MAINTENANCE

A. Maintenance Tools: Furnish complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.

PRODUCTS

2.01 MANUFACTURERS

A. The Owner requires use of certain products for their unique characteristics and project suitability to insure continuity of existing and future performance and maintenance standards. After investigating available product offerings, the Awarding Authority has elected to prepare proprietary specifications. These products are specified with the notation: "No Substitute."

1. Where "No Substitute" is noted, submittals and substitution requests for other products will not be considered.

B. Approval of manufacturers and/or products other than those listed as "Scheduled Manufacturer" or "Acceptable Manufacturers" in the individual article for the product category shall be in accordance with QUALITY ASSURANCE article, herein.

C. Approval of products from manufacturers indicated in "Acceptable Manufacturers" is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer's product.

D. Where specified hardware is not adaptable to finished shape or size of members requiring hardware, furnish suitable types having same operation and quality as type specified, subject to Architect's approval.

2.02 MATERIALS

A. Fasteners

1. Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.
2. Furnish screws for installation with each hardware item. Finish exposed (exposed under any condition) screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work including prepared for paint surfaces to receive painted finish.
3. Provide concealed fasteners for hardware units exposed when door is closed except when no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work unless thru-bolts are required to fasten hardware securely. Review door specification and advise Architect if thru-bolts are required.

4. Install hardware with fasteners provided by hardware manufacturer.

B. Provide screws, bolts, expansion shields, drop plates and other devices necessary for hardware installation.

1. Where fasteners are exposed to view: Finish to match adjacent door hardware material.

2.03 HINGES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product: Ives 5BB series.
2. Acceptable Manufacturers and Products: Hager BB series (ECBB series not approved), McKinney TA/TCA series (MacPro series not approved).

B. Requirements:

1. Provide hinges conforming to ANSI/BHMA A156.1.
2. 1-3/4-inch (44 mm) thick doors, up to and including 36-inches (914 mm) wide:

a. Exterior: Standard weight, bronze or stainless steel, 4-1/2-inches (114 mm) high
b. Interior: Standard weight, steel, 4-1/- inches (114 mm) high

3. 1-3/4-inch (44 mm) thick doors over 36-inches (914 mm) wide:

a. Exterior: Heavy weight, bronze/stainless steel, 5-inches (127 mm) high
b. Interior: Heavy weight, steel, 5-inches (127 mm) high

4. 2-inches or thicker doors:

a. Exterior: Heavy weight, bronze or stainless steel, 5-inches (127 mm) high
b. Interior: Heavy weight, steel, 5-inches (127 mm) high

5. Provide three (3) hinges per door leaf for doors 90-inches (2286 mm) or less in height, and one additional hinge for each 30-inches (762 mm) of additional door height.
6. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:

a. Steel Hinges: Steel pins
b. Non-Ferrous Hinges: Stainless steel pins
c. Out-Swinging Exterior Doors: Non-removable pins
d. Out-Swinging Interior Lockable Doors: Non-removable pins
e. Interior Non-lockable Doors: Non-rising pins

7. Width of hinges: 4-1/2-inches (114 mm) at 1-3/4-inch (44 mm) thick doors, and 5-inches (127 mm) at 2-inches (51 mm) or thicker doors. Adjust hinge width as required for door, frame, and wall conditions to allow proper degree of opening.

2.04 CONTINUOUS HINGES

A. Aluminum Geared

1. Manufacturers:

a. Scheduled Manufacturer: Ives.
b. Acceptable Manufacturers: Pemko, Select.

2. Requirements:

a. Provide aluminum geared continuous hinges conforming to ANSI/BHMA A156.26, Grade 1.
b. Provide aluminum geared continuous hinges, where specified in the hardware sets, fabricated from 6063-T6 aluminum.
c. Provide split nylon bearings at each hinge knuckle for quiet, smooth, self-lubricating operation.
d. Provide hinges capable of supporting door weights up to 450 pounds, and successfully tested for 1,500,000 cycles.
e. On fire-rated doors, provide aluminum geared continuous hinges that are classified for use on rated doors by testing agency acceptable to authority having jurisdiction.
f. Install hinges with fasteners supplied by manufacturer.
g. Provide hinges 1-inch (25 mm) shorter in length than nominal height of door, unless otherwise noted or door details require shorter length and with symmetrical hole pattern.

2.05 ELECTRIC POWER TRANSFER

A. Manufacturers:

a. Scheduled Manufacturer: Von Duprin EPT-10.
b. Acceptable Manufacturers: Precision EPT-12C, Securitron CEPT-10.

B. Provide power transfer with electrified options as scheduled in the hardware sets. Provide with number and gage of wires sufficient to accommodate electric function of specified hardware.

C. Locate electric power transfer per manufacturer's template and UL requirements, unless interference with operation of door or other hardware items.

2.06 FLUSH BOLTS

A. Manufacturers:

1. Scheduled Manufacturer: Ives.
2. Acceptable Manufacturers: Burns, Rockwood.

B. Requirements:

1. Provide automatic, constant latching, and manual flush bolts with forged bronze or stainless-steel face plates, extruded brass levers, and with wrought brass guides and strikes. Provide 12-inch (305 mm) steel or brass rods at doors up to 90-inches (2286 mm) in height. For doors over 90-inches (2286 mm) in height increase top rods by 6-inches (152 mm) for each additional 6-inches (152 mm) of door height. Provide dust-proof strikes at each bottom flush bolt.

2.07 COORDINATORS

A. Manufacturers:

1. Scheduled Manufacturer: Ives.
2. Acceptable Manufacturers: Rockwood, Trimco.

B. Requirements:

1. Where pairs of doors are equipped with automatic flush bolts, an astragal, or other hardware that requires synchronized closing of the doors, provide bar-type coordinating device, surface applied to underside of stop at frame head.
2. Provide filler bar of correct length for unit to span entire width of opening, and appropriate brackets for parallel arm door closers, surface vertical rod exit device strikes or other stop mounted hardware. Factory-prepared coordinators for vertical rod devices as specified.

2.08 MORTISE LOCKS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product: Schlage L9000 series.
2. Acceptable Manufacturers and Products: Best 45H series, Sargent 8200 series.

B. Requirements:

1. Provide mortise locks conforming to ANSI/BHMA A156.13 Series 1000, Grade 1, and UL Listed for 3 hour fire doors.
2. Indicators: Where specified, provide indicator window measuring a minimum 2-inch x 1/2-inch with 180 degree visibility. Provide messages color-coded with full text and/or symbols, as scheduled, for easy visibility.

    a. Inside Security Indicator: Provide indicator above cylinder or thumbturn for visibility during lockdown that identifies the outside trim as locked/unlocked status of the door.
    b. Outside Status Indicator: Provide indicator above cylinder for visibility that identifies the outside trim as locked/unlocked status of the door.

c. Outside Occupancy Indicator: Provide indicator above cylinder or emergency release for visibility while operating the lock that identifies an occupied/unoccupied status of the lock or latch.

3. Provide locks manufactured from heavy gauge steel, containing components of steel with a zinc dichromate plating for corrosion resistance.
4. Provide lock case that is multi-function and field reversible for handing without opening case. Cylinders: Refer to "KEYING" article, herein.
5. Verify lock functions with owner prior to ordering.
6. Install thumb turns so they are in vertical position when doors are unlocked and in horizontal position when doors are locked.
7. Install thumb turns so they are in vertical position when doors are unlocked and in horizontal position when doors are locked.
8. Provide locks with standard 2-3/4 inches (70 mm) backset with full 3/4 inch (19 mm) throw stainless steel mechanical anti-friction latchbolt. Provide deadbolt with full 1 inch (25 mm) throw, constructed of stainless steel.
9. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
10. Provide electrified options as scheduled in the hardware sets. Where scheduled, provide switches and sensors integrated into the locks and latches.
11. Provide motor based electrified locksets with electrified options as scheduled in the hardware sets and comply with the following requirements:

    a. Universal input voltage – single chassis accepts 12 or 24V DC to allow for changes in the field without changing lock chassis.
    b. Fail Safe/Fail Secure – changing mode between electrically locked (fail safe) and electrically unlocked (fail secure) is field selectable without opening the lock case
    c. Low maximum current draw – maximum 0.4 amps to allow for multiple locks on a single power supply.
    d. Low holding current – maximum 0.01 amps to produce minimal heat, eliminate "hot levers" in electrically locked applications, and to provide reliable operation in wood doors that provide minimal ventilation and air flow.
    e. Request to Exit Switch (RX) –

        1) Modular Design – provide electrified locks capable of using, adding, or changing a modular RX switch without opening the lock case.
        2) Monitoring – where scheduled, provide a request to exit (RX) switch that detects rotation of the inside lever.

    f. Deadbolt Monitor (DM) –

        1) Monitoring – where scheduled, provide a deadbolt monitor (DM) switch that Indicates the position of the deadbolt.

    g. Connections – provide quick-connect Molex system standard.

12. Lever Trim: Solid brass, bronze, or stainless steel, cast or forged in design specified, with wrought roses and external lever spring cages. Provide thru-bolted levers with 2-piece spindles.

a. Lever Design: Schlage 06A
b. Tactile Warning (Knurling): Where required by authority having jurisdiction. Provide on levers on exterior (secure side) of doors serving rooms considered to be hazardous.

2.09 AUXILIARY LOCKS

A. Deadlocks:

1. Manufacturers and Products:

a. Scheduled Manufacturer and Product: Schlage L400 series.
b. Acceptable Manufacturers and Products: Best 38H series, Sargent 4870 series.

2. Requirements:

a. Provide mortise deadlock series conforming to ANSI/BHMA A156 and function as specified.
b. Cylinders: Refer to "KEYING" article, herein.
c. Provide deadlocks with standard 2-3/4 inches (70 mm) backset. Provide deadbolt with full 1 inch (25 mm) throw, constructed of stainless steel.
d. Provide manufacturer's standard strike.

2.10 EXIT DEVICES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product: Von Duprin 99/33A series.
2. Acceptable Manufacturers and Products: Precision APEX 2000 series.

B. Requirements:

1. Provide exit devices tested to ANSI/BHMA A156.3 Grade 1 and UL listed for Panic Exit or Fire Exit Hardware.
2. Cylinders: Refer to "KEYING" article, herein.
3. Verify exit device functions with owner prior to ordering.
4. Provide touchpad type exit devices, fabricated of brass, bronze, stainless steel, or aluminum, plated to standard architectural finishes to match balance of door hardware.
5. Touchpad must extend a minimum of one half of door width. No plastic inserts are allowed in touchpads.
6. Provide exit devices with deadlatching feature for security and for future addition of alarm kits and/or other electrified requirements.
7. Provide flush end caps for exit devices.
8. Provide exit devices with manufacturer's approved strikes.
9. Provide exit devices cut to door width and height. Install exit devices at height recommended by exit device manufacturer, allowable by governing building codes, and approved by Architect.

10. Mount mechanism case flush on face of doors, or provide spacers to fill gaps behind devices. Where glass trim or molding projects off face of door, provide glass bead kits.
11. Provide cylinder or hex-key dogging as specified at non fire-rated openings.
12. Removable Mullions: 2-inches (51 mm) x 3-inches (76 mm) steel tube. Where scheduled as keyed removable mullion, provide type that can be removed by use of a keyed cylinder, which is self-locking when re-installed.
13. Provide factory drilled weep holes for exit devices used in full exterior application, highly corrosive areas, and where noted in hardware sets.
14. Provide electrified options as scheduled.
15. Concealed Vertical Cable Exit Devices: provide cable-actuated concealed vertical latch system in two-point for non-rated or fire rated wood doors up to a 90 minute rating and less bottom latch (LBL) configuration for non-rated or fire rated wood doors up to 20 minute rating. Vertical rods not permitted.

    a. Cable: Stainless steel with abrasive resistant coating. Conduit and core wire ends snap into latch and center slides without use of tools.
    b. Wood Door Prep: Maximum 1- inch x 1.1875-inch x 3.875-inches top latch pocket and 1-inch x 1.1875-inch x 5-inches bottom latch pocket which does not require the use of a metal wrap or edge for non-rated or fire rated wood doors up to a 45 minute rating.
    c. Latchbolts and Blocking Cams: Manufactured from sintered metal low carbon copper-infiltrated steel, with molybdenum disulfide low friction coating.
    d. Top Latchbolt: Minimum 0.38-inch (10 mm) and greater than 90 degree engagement with strike to prevent door and frame separation under high static load.
    e. Bottom Latchbolt: Minimum of 0.44-inch (11 mm) engagement with strike.
    f. Product Cycle Life: 1,000,000 cycles.
    g. Latch Operation: Top and bottom latch operate independently of each other. Top latch fully engages top strike even when bottom latch is compromised. Separate trigger mechanisms not permitted.
    h. Latch release does not require separate trigger mechanism.
    i. Cable and latching system characteristics:

        1) Installed independently of exit device installation, and capable of functioning on door prior to device and trim installation.
        2) Connected to exit device at single point in steel and aluminum doors, and two points for top and bottom latches in wood doors.
        3) Bottom latch height adjusted, from single point for steel and aluminum doors and two points for wood doors, after system is installed and connected to exit device, while door is hanging
        4) Bottom latch position altered up and down minimum of 2-inches (51 mm) in steel and aluminum doors without additional adjustment. Bottom latch deadlocks in every adjustment position in wood doors.
        5) Top and bottom latches in steel and aluminum doors and top latch in wood doors may be removed while door is hanging.

16. Top latch mounting: double or single tab mount for steel doors, face mount for aluminum doors eliminating requirement of tabs, and double tab mount for wood doors.

17. Provide exit devices with optional trim designs to match other lever and pull designs used on the project.

    a. Tactile Warning (Knurling): Where required by authority having jurisdiction. Provide on levers on exterior (secure side) of doors serving rooms considered to be hazardous.

2.11 POWER SUPPLIES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product: Schlage or Von Duprin PS900 series
2. Acceptable Manufacturers and Products: Precision ELR series, Securitron BPS series

B. Requirements:

1. Provide power supplies, recommended and approved by manufacturer of electrified locking component, for operation of electrified locks, electrified exit devices, magnetic locks, electric strikes, and other components requiring power supply.
2. Provide appropriate quantity and size of power supplies necessary for proper operation of electrified locking components as recommended by manufacturer of electrified locking components with consideration for each electrified component using power supply, location of power supply, and approved wiring diagrams. Locate power supplies as directed by Architect.
3. Provide appropriate option boards for power supplies necessary for proper operation of the electrified locking components as recommended by the manufacturer of the electrified locking components with consideration for each electrified component used in the system.
4. Provide regulated and filtered 24 VDC power supply and UL class 2 listed.
5. Options:

    a. Provide power supply, where specified, with internal capability of charging sealed backup batteries 24 VDC, in addition to operating DC load.
    b. Provide sealed batteries for battery back-up at each power supply where specified.
    c. Provide keyed power supply cabinet.

6. Provide power supply in an enclosure, complete, and requiring 120VAC to fused input.
7. Provide power supply with emergency release terminals, where specified, that allow release of all devices upon activation of fire alarm system complete with fire alarm input for initiating "no delay" exiting mode.

2.12 CYLINDERS

A. Manufacturers:

1. Scheduled Manufacturer: Schlage Everest 29 Patented
2. Acceptable Manufacturers: Best, Sargent

B. Requirements:

1. Provide cylinders/cores, from the same manufacturer of locksets, compliant with ANSI/BHMA A156.5; latest revision, Section 12, Grade 1; permanent cylinders; cylinder face finished to match lockset, manufacturer's series as indicated. Refer to "KEYING" article, herein.
2. Provide cylinders in the below-listed configuration(s), distributed throughout the Project as indicated.

    a. Cylinder/Core Type: Large Format or Full Size Interchangeable Core (LFIC/FSIC).
    b. Keyway/Security Type: Restricted/Patented.

3. Nickel silver bottom pins.
4. Replaceable Construction Cores.

    a. Provide temporary construction cores replaceable by permanent cores, furnished in accordance with the following requirements.
        1) 2 construction control keys.
        2) 12 construction change (day) keys.

2.13 KEYING

A. Provide a factory registered keying system, complying with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.

B. Requirements:

1. Provide keying system capable of multiplex masterkeying.
2. Permanent cylinders/cores keyed by the manufacturer according to the following key system.

    a. (Great)Grand Master Key System: Cylinders/cores operated by change (day) keys and subsequent masters (including grand/great grand) keys.

3. Forward bitting list and keys separately from cylinders, by means as directed by Owner. Failure to comply with forwarding requirements shall be cause for replacement of cylinders/cores involved at no additional cost to Owner.
4. Provide keys with the following features:

    a. Material: Nickel silver; minimum thickness of .107-inch (2.3mm).
    b. Restricted/Patented Keyway.

5. Identification:

    a. Mark permanent cylinders/cores and keys with applicable blind code per DHI publication "Keying Systems and Nomenclature" for identification. Blind code marks shall not include actual key cuts.
    b. Identification stamping provisions must be approved by the Architect and Owner.

c. Stamp keys with Owner's unique key system facility code as established by the manufacturer; key symbol and embossed or stamped with "DO NOT DUPLICATE".
d. Failure to comply with stamping requirements shall be cause for replacement of keys involved at no additional cost to Owner.
e. Verify with owner if permanent cylinders/cores and/or keys are to be shipped directly to Owner or to Contractor.

6. Quantity: Furnish in the following quantities.

a. Change (Day) Keys: 3 per cylinder/core.
b. Permanent Control Keys: 3 (if required).
c. Master Keys: 6 per master.
d. Unused balance of key blanks shall be furnished to Owner with the cut keys.

2.14 KEY CONTROL SYSTEM

A. Manufacturers:

1. Scheduled Manufacturer: Telkee.
2. Acceptable Manufacturers: HPC, Lund.

B. Requirements:

1. Provide key control system, including envelopes, labels, tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet, all as recommended by system manufacturer, with capacity for 150% of number of locks required for Project.

a. Provide complete cross index system set up by hardware supplier, and place keys on markers and hooks in cabinet as determined by final key schedule.
b. Provide hinged-panel type cabinet for wall mounting.

2.15 DOOR CLOSERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product: LCN 4040XP series.
2. Acceptable Manufacturers and Products: Sargent 281 series.

B. Requirements:

1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. ISO 9000 certify closers. Stamp units with date of manufacture code.
2. Provide door closers with fully hydraulic, full rack and pinion action with high strength cast iron cylinder, and full complement bearings at shaft.

3. Cylinder Body: 1-1/2-inch (38 mm) diameter with 3/4-inch (19 mm) diameter double heat-treated pinion journal.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and backcheck.
7. Provide closers with solid forged steel main arms and factory assembled heavy-duty forged forearms for parallel arm closers.
8. Pressure Relief Valve (PRV) Technology: Not permitted.
9. Finish for Closer Cylinders, Arms, Adapter Plates, and Metal Covers: Powder coating finish which has been certified to exceed 100 hours salt spray testing as described in ANSI Standard A156.4 and ASTM B117, or has special rust inhibitor (SRI).
10. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.16 ELECTRO-HYDRAULIC AUTOMATIC OPERATORS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product: LCN 4600 series.
2. Acceptable Manufacturers and Products: No Substitutions.

B. Requirements:

1. Provide low energy automatic operator units with hydraulic closer complying with ANSI/BHMA A156.19.
2. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
3. Provide units with conventional door closer opening and closing forces unless power operator motor is activated. Provide door closer assembly with adjustable spring size, back-check, and opening and closing speed adjustment valves to control door
4. Provide units with on/off switch for manual operation, motor start up delay, vestibule interface delay, electric lock delay, and door hold open delay.
5. Provide units with conventional door closer opening and closing forces unless power operator motor is activated. Provide door closer assembly with adjustable spring size, back-check valve, sweep valve, latch valve to control door.
6. Provide drop plates, brackets, or adapters for arms as required for details.
7. Provide hard-wired actuator switches for operation as specified.
8. Provide weather-resistant actuators at exterior applications.
9. Provide key switches with LED's, recommended and approved by manufacturer of automatic operator as required for function described in operation description of hardware group below. Cylinders: Refer to "KEYING" article, herein.

10. Provide complete assemblies of controls, switches, power supplies, relays, and parts/material recommended and approved by manufacturer of automatic operator for each individual leaf. Actuators control both doors simultaneously at pairs. Sequence operation of exterior and vestibule doors with automatic operators to allow ingress or egress through both sets of openings as directed by Architect. Locate actuators, key switches, and other controls as directed by Architect.
11. Provide units with vestibule inputs that allow sequencing operation of two units, and SPDT relay for interfacing with latching or locking devices.

2.17 DOOR TRIM

A. Manufacturers:

1. Scheduled Manufacturer: Ives.
2. Acceptable Manufacturers: Rockwood, Trimco.

B. Requirements:

1. Provide push plates 4 inches (102 mm) wide by 16-inches (406 mm) high by 0.050-inch (1 mm) thick and beveled 4 edges. Where width of door stile prevents use of 4-inches (102 mm) wide plate, adjust width to fit.
2. Provide push bars of solid bar stock, diameter and length as scheduled. Provide push bars of sufficient length to span from center to center of each stile. Where required, mount back to back with pull.
3. Provide offset pulls of solid bar stock, diameter and length as scheduled. Where required, mount back to back with push bar.
4. Provide flush pulls as scheduled. Where required, provide back-to-back mounted model.
5. Provide pulls of solid bar stock, diameter and length as scheduled. Where required, mount back to back with push bar.
6. Provide pull plates 4-inches (102 mm) wide by 16-inches (406 mm) high by 0.050-inch (1 mm) thick, beveled 4 edges, and prepped for pull. Where width of door stile prevents use of 4-inches (102 mm) wide plate, adjust width to fit.
7. Provide wire pulls of solid bar stock, diameter and length as scheduled.
8. Provide decorative pulls as scheduled. Where required, mount back to back with pull.

2.18 PROTECTION PLATES

A. Manufacturers:

1. Scheduled Manufacturer: Ives.
2. Acceptable Manufacturers: Rockwood, Trimco.

B. Requirements:

1. Provide kick plates, mop plates, and armor plates minimum of 0.050 inch (1 mm) thick, beveled four edges as scheduled. Furnish with sheet metal or wood screws, finished to match plates.
2. Sizes of plates:

    a. Kick Plates: 10 inches (254 mm) high by 2 inches (51 mm) less width of door on single doors, 1 inch (25 mm) less width of door on pairs
    b. Mop Plates: 4 inches (102 mm) high by 2 inches (51 mm) less width of door on single doors, 1 inch (25 mm) less width of door on pairs
    c. Armor Plates: 36 inches (914 mm) high by 2 inches (51 mm) less width of door on single doors, 1 inch (25 mm) less width of door on pairs

2.19 OVERHEAD STOPS AND OVERHEAD STOP/HOLDERS

A. Manufacturers:

1. Scheduled Manufacturers: Glynn-Johnson.
2. Acceptable Manufacturers: ABH, Dorma.

B. Requirements:

1. Provide heavy duty concealed mounted overhead stop or holder as specified for exterior and interior vestibule single acting doors.
2. Provide heavy duty concealed mounted overhead stop or holder as specified for double acting doors.
3. Provide heavy or medium duty and concealed or surface mounted overhead stop or holder for interior doors as specified. Provide medium duty surface mounted overhead stop for interior doors and at any door that swings more than 140 degrees before striking wall, open against equipment, casework, sidelights, and where conditions do not allow wall stop or floor stop presents tripping hazard.
4. Where overhead holders are specified provide friction type at doors without closer and positive type at doors with closer.

2.20 DOOR STOPS AND HOLDERS

A. Manufacturers:

1. Scheduled Manufacturer: Ives.
2. Acceptable Manufacturers: Rockwood, Trimco.

B. Provide door stops at each door leaf:

1. Provide wall stops wherever possible. Provide convex type where mortise type locks are used and concave type where cylindrical type locks are used.
2. Where a wall stop cannot be used, provide universal floor stops for low or high rise options.

3. Where wall or floor stop cannot be used, provide medium duty surface mounted overhead stop.

2.21 THRESHOLDS, SEALS, DOOR SWEEPS, AUTOMATIC DOOR BOTTOMS, AND GASKETING

A. Manufacturers:

1. Scheduled Manufacturer: Zero International.
2. Acceptable Manufacturers: National Guard, Reese.

B. Requirements:

1. Provide thresholds, weather-stripping (including door sweeps, seals, and astragals) and gasketing systems (including smoke, sound, and light) as specified and per architectural details. Match finish of other items.
2. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
3. Size of thresholds:
    a. Saddle Thresholds: 1/2-inch (13 mm) high by jamb width by door width
    b. Bumper Seal Thresholds: 1/2-inch (13 mm) high by 5-inches (127 mm) wide by door width
4. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.

2.22 SILENCERS

A. Manufacturers:

1. Scheduled Manufacturer: Ives.
2. Acceptable Manufacturers: Rockwood, Trimco.

B. Requirements:

1. Provide "push-in" type silencers for hollow metal or wood frames.
2. Provide one silencer per 30 inches (762 mm) of height on each single frame, and two for each pair frame.
3. Omit where gasketing is specified.

2.23 MAGNETIC HOLDERS

A. Manufacturers:

1. Scheduled Manufacturer: LCN.
2. Acceptable Manufacturers: Rixson, Sargent.

B. Requirements:

1. Provide wall or floor mounted electromagnetic door release as specified with minimum of 25 pounds of holding force. Coordinate projection of holder and armature with other hardware and wall conditions to ensure that door sits parallel to wall when fully open. Connect magnetic holders on fire-rated doors into the fire control panel for fail-safe operation.

2.24 DOOR POSITION SWITCHES

A. Manufacturers:

1. Scheduled Manufacturer: Schlage.
2. Acceptable Manufacturers: GE-Interlogix.

B. Requirements:

1. Provide recessed or surface mounted type door position switches as specified.
2. Coordinate door and frame preparations with door and frame suppliers. If switches are being used with magnetic locking device, provide minimum of 4-inches between switch and magnetic locking device.

2.25 SHUTTER LATCH MAGNET

A. Basis-of-Design Product: Subject to compliance with requirements provide Model "NMKKIT3-16 Master Magnetics Neodymium latch magnet as manufactured by The Magnetic Source or a comparable product.

B. Requirements:

1. Material: Pull Nickel Chrome Plated.

2.26 FINISHES

A. Provide finish for each item as indicated in the sets.

EXECUTION

3.01 EXAMINATION

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

B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

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

3.02 INSTALLATION

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

1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
2. Custom Steel Doors and Frames: HMMA 831.
3. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
4. Installation Guide for Doors and Hardware: DHI TDH-007-20

B. Install each hardware item in compliance with manufacturer's instructions and recommendations, using only fasteners provided by manufacturer.

C. Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.

D. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.

E. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

F. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.

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

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

1. Replace construction cores with permanent cores as indicated in keying section.

I. Wiring: Coordinate with Division 26, ELECTRICAL sections for:

1. Conduit, junction boxes and wire pulls.
2. Connections to and from power supplies to electrified hardware.
3. Connections to fire/smoke alarm system and smoke evacuation system.
4. Connection of wire to door position switches and wire runs to central room or area, as directed by Architect.

5. Testing and labeling wires with Architect's opening number.

J. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.

K. Door Closers: Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Mount closers so they are not visible in corridors, lobbies and other public spaces unless approved by Architect.

L. Closer/Holders: Mount closer/holders on room side of corridor doors, inside of exterior doors, and stair side of stairway doors.

M. Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings or in equipment room, or alternate location as directed by Architect.

N. Thresholds: Set thresholds in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."

O. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they may impede traffic or present tripping hazard.

P. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.

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

R. Door Bottoms and Sweeps: Apply to bottom of door, forming seal with threshold when door is closed.

3.03 FIELD QUALITY CONTROL

A. Architectural Hardware Consultant: Engage qualified independent Architectural Hardware Consultant to perform inspections and to prepare inspection reports.

1. Architectural Hardware Consultant will inspect door hardware and state in each report whether installed work complies with or deviates from requirements, including whether door hardware is properly installed and adjusted.

3.04 FIELD INSPECTIONS:

A. Fire Door Assembly Inspection and Testing: Provide functional testing and inspection of fire door assemblies in accordance with NFPA 80-2007/2010. Inspections shall be performed by individuals certified by Intertek as a Fire Door Assembly Inspector, using reporting forms provided by the Door and Hardware Institute (DHI). Alternatively, inspections may be performed by individuals acceptable to the Architect, who have knowledge and

understanding of the operating components of the applicable door type, and who have experience in preparing written reports of testing and inspection results.

1. Schedule fire door assembly inspection within 90 days of Substantial Completion of the Project.
2. Submit a signed, written final report as specified in Paragraph 1.4: Submittals.
3. Contractor shall correct all deficiencies and schedule a reinspection of fire door assemblies which were noted as deficient on the inspection report.
4. Inspector shall reinspect fire door assemblies after repairs are made.
5. Additional reinspections which are required due to incomplete repairs will be performed by the inspector at the expense of the Contractor.

B. Provide inspection of required egress door assemblies by a qualified person in accordance with NFPA 101.

1. Schedule egress door assembly inspection within 90 days of Substantial Completion of the Project for the required openings.
2. Submit a signed, written final report as specified in Paragraph 1.03.E.2.
3. Correct all deficiencies and schedule a reinspection of egress door assemblies noted as deficient on the inspection report.
4. Inspector to reinspect required egress door assemblies after repairs are made.

3.05 ADJUSTING

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

1. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
2. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.

B. Occupancy Adjustment: Approximately three to six months after date of Substantial Completion, Installer's Architectural Hardware Consultant must examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors and door hardware.

3.06 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.

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

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

3.07 DEMONSTRATION

A. Provide training for Owner's maintenance personnel to adjust, operate, and maintain door hardware and door hardware finishes. Refer to Division 01 Section "Demonstration and Training."

3.08 DOOR HARDWARE SCHEDULE

A. The intent of the hardware specification is to specify the hardware for interior and exterior doors, and to establish a type, continuity, and standard of quality. However, it is the door hardware supplier's responsibility to thoroughly review existing conditions, schedules, specifications, drawings, and other Contract Documents to verify the suitability of the hardware specified.

B. Discrepancies, conflicting hardware, and missing items are to be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application

C. Hardware items are referenced in the following hardware. Refer to the above-specifications for special features, options, cylinders/keying, and other requirements.

D. Hardware Sets:

HARDWARE GROUP NO. 01

FOR USE ON DOOR #(S):

A1036 A1039

PROVIDE EACH OPENING WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	PUSH PLATE	8200 4" X 16"	630	IVE
1	EA	PULL PLATE	8303 10" 4" X 16"	630	IVE
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CVX	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE GROUP NO. 02 – NOT USED

HARDWARE GROUP NO. 03

FOR USE ON DOOR #(S):

B1009B

PROVIDE EACH OPENING WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	PASSAGE SET	L9010 06A	626	SCH
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CVX	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE GROUP NO. 04

FOR USE ON DOOR #(S):

B1054

PROVIDE EACH OPENING WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	EU MORTISE LOCK	L9092TEU 06A	626	SCH
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	FIRE/LIFE WALL MAG	SEM7800 SERIES AS REQ'D	689	LCN
3	EA	SILENCER	SR64	GRY	IVE
1	EA	MULTITECH READER	MTB11/15 - BY DIV 28 (COORDINATE W/ HEAD END AND CREDENTIAL TYPE)	BLK	SCE
1	EA	POWER SUPPLY	PS902 900-4R [COORDINATE WITH ACCESS CONTROL]	LGR	SCE
1	EA	DIAGRAM	ELEVATION		DLR
1	EA	DIAGRAM	POINT TO POINT		DLR

OPERATION: DOOR NORMALLY CLOSED AND LOCKED. VALID CREDENTIAL MOMENTARILY UNLOCKS DOOR ALLOWING ENTRY. DOOR REMAINS LOCKED UPON LOSS OF POWER. FREE EGRESS AT ALL TIMES.

DOOR CAN BE HELD OPEN WITH MAGENETIC HOLD OPEN. MAGNETIC HOLD OPEN WILL RELEASE UPON LOSS OF POWER OR FIRE ALARM, ALLOWING DOOR TO CLOSE AND LATCH.

POWER SUPPLY TIED INTO FIRE/SMOKE ALARM SYSTEM.

HARDWARE GROUP NO. 05

FOR USE ON DOOR #(S):

A1003 B1004

PROVIDE EACH OPENING WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	PRIVACY W/DB & IND	L9496T 06A L583-363	626	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	GASKETING	488SCL PSA	CL	ZER

HARDWARE GROUP NO. 06

FOR USE ON DOOR #(S):

A1025 A1027

PROVIDE EACH OPENING WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	PRIVACY W/DB & IND	L9496T 06A L583-363	626	SCH
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	MOP PLATE	8400 4" X 1 1/2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CVX	626	IVE
1	EA	GASKETING	488SCL PSA	CL	ZER

HARDWARE GROUP NO. 07 – NOT USED

HARDWARE GROUP NO. 08

FOR USE ON DOOR #(S):

B1002 C2005

PROVIDE EACH OPENING WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	PRIVACY W/DB & IND	L9496T 06A L583-363	626	SCH
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CVX	626	IVE
1	EA	GASKETING	488SCL PSA	CL	ZER

HARDWARE GROUP NO. 09

FOR USE ON DOOR #(S):

A1010 B1007

PROVIDE EACH OPENING WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	OFFICE/ENTRY LOCK	L9050T 06A L583-363	626	SCH
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	WALL STOP	WS401/402CVX	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE GROUP NO. 10

FOR USE ON DOOR #(S):

A1067

PROVIDE EACH OPENING WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	CYL X TURN DEAD LOCK	L9460T L583-363	626	SCH
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	GASKETING	488SCL PSA	CL	ZER

HARDWARE GROUP NO. 11

FOR USE ON DOOR #(S):

A1002A A1002B

PROVIDE EACH OPENING WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	112XY	628	IVE
1	EA	CLASSROOM DEAD LOCK	L9463T	626	SCH
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	PUSH PLATE	8200 4" X 16"	630	IVE
1	EA	PULL PLATE	8303 10" 4" X 16"	630	IVE
1	EA	SURFACE CLOSER	4040XP SCUSH TORX	689	LCN
1	EA	PA MOUNTING PLATE	4040XP-18PA AS REQ'D	689	LCN
1	EA	CUSH SHOE SUPPORT	4040XP-30 AS REQ'D	689	LCN
1	EA	BLADE STOP SPACER	4040XP-61 AS REQ'D	689	LCN
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE GROUP NO. 12

FOR USE ON DOOR #(S):

A1045A

PROVIDE EACH OPENING WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	CLASSROOM LOCK	L9070T 06A	626	SCH
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	OH STOP & HOLDER	90H	630	GLY
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE GROUP NO. 13

FOR USE ON DOOR #(S):

A1008 A1014 A1023 A1031 A1045B

PROVIDE EACH OPENING WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	CLASSROOM LOCK	L9070T 06A	626	SCH
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	WALL STOP	WS401/402CVX	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE GROUP NO. 14

FOR USE ON DOOR #(S):

A1044

PROVIDE EACH OPENING WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	STOREROOM LOCK	L9080T 06A	626	SCH
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	OH STOP	90S	630	GLY
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE GROUP NO. 15

FOR USE ON DOOR #(S):

A1043 B1047 B1048

PROVIDE EACH OPENING WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	STOREROOM LOCK	L9080T 06A	626	SCH
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	WALL STOP	WS401/402CVX	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE GROUP NO. 16

FOR USE ON DOOR #(S):

B1053

PROVIDE EACH OPENING WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	STOREROOM LOCK	L9080T 06A	626	SCH
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER	4040XP EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CVX	626	IVE
1	EA	GASKETING	488SCL PSA	CL	ZER

HARDWARE GROUP NO. 17 – NOT USED

HARDWARE GROUP NO. 18

FOR USE ON DOOR #(S):

A1028 B1008 B1008B

PROVIDE EACH OPENING WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	STOREROOM LOCK	L9080T 06A	626	SCH
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CVX	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE GROUP NO. 19

FOR USE ON DOOR #(S):

A1005

PROVIDE EACH OPENING WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	EU MORTISE LOCK	L9092TEU 06A	626	SCH
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER	4040XP EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CVX	626	IVE
3	EA	SILENCER	SR64	GRY	IVE
1	EA	MULTITECH READER	MTB11/15 - BY DIV 28 (COORDINATE W/ HEAD END AND CREDENTIAL TYPE)	BLK	SCE
1	EA	POWER SUPPLY	PS902 900-4R [COORDINATE WITH ACCESS CONTROL]	LGR	SCE
1	EA	DIAGRAM	ELEVATION		DLR
1	EA	DIAGRAM	POINT TO POINT		DLR

OPERATION: DOOR NORMALLY CLOSED AND LOCKED. VALID CREDENTIAL MOMENTARILY UNLOCKS DOOR ALLOWING ENTRY. DOOR REMAINS LOCKED UPON LOSS OF POWER. FREE EGRESS AT ALL TIMES.

HARDWARE GROUP NO. 20

FOR USE ON DOOR #(S):

A1011 A1018

PROVIDE EACH OPENING WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	EU MORTISE LOCK	L9092TEU 06A RX	626	SCH
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	OH STOP	90S	630	GLY
3	EA	SILENCER	SR64	GRY	IVE
1	EA	MULTITECH READER	MTB11/15 - BY DIV 28 (COORDINATE W/ HEAD END AND CREDENTIAL TYPE)	BLK	SCE
1	EA	DOOR CONTACT	679-05HM/679-05WD AS REQ'D	BLK	SCE
1	EA	POWER SUPPLY	PS902 900-4R [COORDINATE WITH ACCESS CONTROL]	LGR	SCE
1	EA	DIAGRAM	ELEVATION		DLR
1	EA	DIAGRAM	POINT TO POINT		DLR

OPERATION: DOOR NORMALLY CLOSED AND LOCKED. VALID CREDENTIAL MOMENTARILY UNLOCKS DOOR ALLOWING ENTRY. DOOR REMAINS LOCKED UPON LOSS OF POWER. FREE EGRESS AT ALL TIMES. DOOR CONTACT TO MONITOR DOOR POSITION. RX SWITCH (INTEGRAL TO LOCK SET) SHUNTS DOOR CONTACT FOR VALID EGRESS.

HARDWARE GROUP NO. 21 – NOT USED

HARDWARE GROUP NO. 22

FOR USE ON DOOR #(S):

A1024 A1032 B1001

PROVIDE EACH OPENING WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	EU MORTISE LOCK	L9092TEU 06A RX	626	SCH
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CVX	626	IVE
3	EA	SILENCER	SR64	GRY	IVE
1	EA	MULTITECH READER	MTB11/15 - BY DIV 28 (COORDINATE W/ HEAD END AND CREDENTIAL TYPE)	BLK	SCE
1	EA	DOOR CONTACT	679-05HM/679-05WD AS REQ'D	BLK	SCE
1	EA	POWER SUPPLY	PS902 900-4R [COORDINATE WITH ACCESS CONTROL]	LGR	SCE
1	EA	DIAGRAM	ELEVATION		DLR
1	EA	DIAGRAM	POINT TO POINT		DLR

OPERATION: DOOR NORMALLY CLOSED AND LOCKED. VALID CREDENTIAL MOMENTARILY UNLOCKS DOOR ALLOWING ENTRY. DOOR REMAINS LOCKED UPON LOSS OF POWER. FREE EGRESS AT ALL TIMES. DOOR CONTACT TO MONITOR DOOR POSITION. RX SWITCH (INTEGRAL TO LOCK SET) SHUNTS DOOR CONTACT FOR VALID EGRESS.

HARDWARE GROUP NO. 23 – NOT USED

HARDWARE GROUP NO. 24

FOR USE ON DOOR #(S):

B1052

PROVIDE EACH OPENING WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	EU MORTISE LOCK	L9092TEU 06A RX	626	SCH
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER	4040XP EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CVX	626	IVE
1	EA	GASKETING	488SCL PSA	CL	ZER
1	EA	MULTITECH READER	MTB11/15 - BY DIV 28 (COORDINATE W/ HEAD END AND CREDENTIAL TYPE)	BLK	SCE
1	EA	DOOR CONTACT	679-05HM/679-05WD AS REQ'D	BLK	SCE
1	EA	POWER SUPPLY	PS902 900-4R [COORDINATE WITH ACCESS CONTROL]	LGR	SCE
1	EA	DIAGRAM	ELEVATION		DLR
1	EA	DIAGRAM	POINT TO POINT		DLR

OPERATION: DOOR NORMALLY CLOSED AND LOCKED. VALID CREDENTIAL MOMENTARILY UNLOCKS DOOR ALLOWING ENTRY. DOOR REMAINS LOCKED UPON LOSS OF POWER. FREE EGRESS AT ALL TIMES. DOOR CONTACT TO MONITOR DOOR POSITION. RX SWITCH (INTEGRAL TO LOCK SET) SHUNTS DOOR CONTACT FOR VALID EGRESS.

HARDWARE GROUP NO. 25

FOR USE ON DOOR #(S):

A1007A A1007B

PROVIDE EACH OPENING WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	PASSAGE SET	L9010 06A	626	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE GROUP NO. 26

FOR USE ON DOOR #(S):

B1009A C1015

PROVIDE EACH OPENING WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	630	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	EU MORTISE LOCK	L9092TEU 06A	626	SCH
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH ST-1595	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	RAIN DRIP	142AA	AA	ZER
1	EA	GASKETING	429AA	AA	ZER
1	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	655A	A	ZER
1	EA	MULTITECH READER	MTB11/15 - BY DIV 28 (COORDINATE W/ HEAD END AND CREDENTIAL TYPE)	BLK	SCE
1	EA	POWER SUPPLY	PS902 900-4R [COORDINATE WITH ACCESS CONTROL]	LGR	SCE
1	EA	DIAGRAM	ELEVATION		DLR
1	EA	DIAGRAM	POINT TO POINT		DLR

OPERATION: DOOR NORMALLY CLOSED AND LOCKED. VALID CREDENTIAL MOMENTARILY UNLOCKS DOOR ALLOWING ENTRY. DOOR REMAINS LOCKED UPON LOSS OF POWER. FREE EGRESS AT ALL TIMES.

HARDWARE GROUP NO. 27

FOR USE ON DOOR #(S):

C1010A C1012A C1017A

PROVIDE EACH OPENING WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	630	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	SET	CONST LATCHING BOLT	FB51P/FB61P (AS REQ'D)	630	IVE
1	EA	DUST PROOF STRIKE	DP2	626	IVE
1	EA	EU MORTISE LOCK	L9092TEU 06A	626	SCH
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	COORDINATOR	COR X FL (MB AS REQ'D)	628	IVE
2	EA	SURFACE CLOSER	4040XP SCUSH ST-1595	689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	630	IVE
1	EA	RAIN DRIP	142AA	AA	ZER
1	SET	MEETING STILE	328AA-S	AA	ZER
1	EA	GASKETING	429AA	AA	ZER
2	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	655A	A	ZER
1	EA	MULTITECH READER	MTB11/15 - BY DIV 28 (COORDINATE W/ HEAD END AND CREDENTIAL TYPE)	BLK	SCE
1	EA	POWER SUPPLY	PS902 900-4R [COORDINATE WITH ACCESS CONTROL]	LGR	SCE
1	EA	DIAGRAM	ELEVATION		DLR
1	EA	DIAGRAM	POINT TO POINT		DLR

OPERATION: DOOR NORMALLY CLOSED AND LOCKED. VALID CREDENTIAL MOMENTARILY UNLOCKS DOOR ALLOWING ENTRY. DOOR REMAINS LOCKED UPON LOSS OF POWER. FREE EGRESS AT ALL TIMES.

HARDWARE GROUP NO. 28

FOR USE ON DOOR #(S):

A1066B A1068

PROVIDE EACH OPENING WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	STOREROOM LOCK	L9080T 06A	626	SCH
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	GASKETING	488SCL PSA	CL	ZER

HARDWARE GROUP NO. 29 – NOT USED

HARDWARE GROUP NO. 30

FOR USE ON DOOR #(S):

B1044A B1044D B1044G

PROVIDE EACH OPENING WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	630	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	EU MORTISE LOCK	L9095TEU 06A	626	SCH
2	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH ST-1595	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	RAIN DRIP	142AA	AA	ZER
1	EA	GASKETING	429AA	AA	ZER
1	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	655A	A	ZER
2	EA	MULTITECH READER	MTB11/15 - BY DIV 28 (COORDINATE W/ HEAD END AND CREDENTIAL TYPE)	BLK	SCE
1	EA	POWER SUPPLY	PS902 900-4R [COORDINATE WITH ACCESS CONTROL]	LGR	SCE
1	EA	DIAGRAM	ELEVATION		DLR
1	EA	DIAGRAM	POINT TO POINT		DLR

OPERATION: DOOR NORMALLY CLOSED AND LOCKED FROM BOTH SIDES. VALID CREDENTIAL AT EITHER CARD READER MOMENTARILY UNLOCKS DOOR ALLOWING ENTRY. DOOR REMAINS LOCKED UPON LOSS OF POWER.

HARDWARE GROUP NO. 31 – NOT USED

HARDWARE GROUP NO. 32

FOR USE ON DOOR #(S):

A1001A

PROVIDE EACH OPENING WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	ELEC FIRE EXIT HARDWARE	RX-QEL-99-L-NL-F-06 24 VDC	626	VON
1	EA	RIM HOUSING	20-079	626	SCH
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	GASKETING	488SCL PSA	CL	ZER
1	EA	MULTITECH READER	MTB11/15 - BY DIV 28 (COORDINATE W/ HEAD END AND CREDENTIAL TYPE)	BLK	SCE
1	EA	DOOR CONTACT	679-05HM/679-05WD AS REQ'D	BLK	SCE
1	EA	POWER SUPPLY	PS902 900-4R [COORDINATE WITH ACCESS CONTROL]	LGR	SCE
1	EA	DIAGRAM	ELEVATION		DLR
1	EA	DIAGRAM	POINT TO POINT		DLR

OPERATION: DOOR NORMALLY CLOSED AND LOCKED. VALID CREDENTIAL MOMENTARILY UNLOCKS DOOR ALLOWING ENTRY. DOOR REMAINS LOCKED UPON LOSS OF POWER. DOOR CONTACT TO MONITOR DOOR POSITION. RX SWITCH SHUNTS DOOR CONTACT FOR VALID EGRESS. FREE EGRESS AT ALL TIMES.

HARDWARE GROUP NO. 33

FOR USE ON DOOR #(S):

A1020 A1049

PROVIDE EACH OPENING WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	EU MORTISE LOCK	L9095TEU 06A	626	SCH
2	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CVX	626	IVE
1	EA	GASKETING	488SCL PSA	CL	ZER
2	EA	MULTITECH READER	MTB11/15 - BY DIV 28 (COORDINATE W/ HEAD END AND CREDENTIAL TYPE)	BLK	SCE
1	EA	POWER SUPPLY	PS902 900-4R [COORDINATE WITH ACCESS CONTROL]	LGR	SCE
1	EA	DIAGRAM	ELEVATION		DLR
1	EA	DIAGRAM	POINT TO POINT		DLR

OPERATION: DOOR NORMALLY CLOSED AND LOCKED FROM BOTH SIDES. VALID CREDENTIAL AT EITHER CARD READER MOMENTARILY UNLOCKS DOOR ALLOWING ENTRY. DOOR REMAINS LOCKED UPON LOSS OF POWER.

HARDWARE GROUP NO. 34

FOR USE ON DOOR #(S):

A1000B A1033B

PROVIDE EACH OPENING WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONT. HINGE	112XY EPT	628	IVE
2	EA	POWER TRANSFER	EPT10	689	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-9949-EO 24 VDC	626	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-99-NL-OP-110MD 24 VDC	626	VON
1	EA	RIM HOUSING	20-079	626	SCH
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
2	EA	90 DEG OFFSET PULL	8190HD 10" A	630	IVE
1	EA	OH STOP	100S	630	GLY
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	SURF. AUTO OPERATOR	4642	689	LCN
1	EA	PA MOUNTING PLATE	4040XP-18PA AS REQ'D	689	LCN
1	EA	CUSH SHOE SUPPORT	4040XP-30 AS REQ'D	689	LCN
1	EA	BLADE STOP SPACER	4040XP-61 AS REQ'D	689	LCN
2	EA	ACTUATOR, JAMB MOUNT	8310-818T	630	LCN
1	EA	MULTITECH READER	MTB11/15 - BY DIV 28 (COORDINATE W/ HEAD END AND CREDENTIAL TYPE)	BLK	SCE
2	EA	DOOR CONTACT	7764	628	SCE
1	EA	POWER SUPPLY	PS904 900-4RL [COORDINATE WITH ACCESS CONTROL]	LGR	SCE
1	EA	DIAGRAM	ELEVATION		DLR
1	EA	DIAGRAM	POINT TO POINT		DLR

OPERATION: DOORS NORMALLY CLOSED AND LOCKED. DOORS CAN BE LEFT UNLOCKED AS PROGRAMMED BY ACCESS CONTROL.

WHEN LOCKED, VALID CREDENTIAL MOMENTARILY RETRACTS ELECTRIC LATCH, ALLOWING ENTRY AND ACTIVATES EXTERIOR ACTUATOR. WHEN ACTIVE, PRESSING EXTERIOR ACTUATOR CYCLES AUTOMATIC OPERATOR AND MOMENTARILY OPENS DOOR. DOORS REMAIN LOCKED UPON LOSS OF POWER. DOOR CONTACTS TO MONITOR DOOR POSITION. RX SWITCHES IN PANIC DEVICES SHUNT DOOR CONTACTS FOR VALID EGRESS. FREE EGRESS AT ALL TIMES.

HARDWARE GROUP NO. 35

FOR USE ON DOOR #(S):

A1033A

PROVIDE EACH OPENING WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	112XY	628	IVE
1	EA	CONT. HINGE	112XY EPT	628	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	PANIC HARDWARE	CD-9949-EO	626	VON
1	EA	ELEC PANIC HARDWARE	CD-LX-9949-NL-OP-110MD	626	VON
2	EA	MORTISE CYLINDER	20-059 X K510-730 XQ11-948	626	SCH
1	EA	RIM HOUSING	20-079	626	SCH
3	EA	FSIC CORE	23-030 EV29 T	626	SCH
2	EA	90 DEG OFFSET PULL	8190HD 10" A	630	IVE
1	EA	OH STOP	100S	630	GLY
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	SURF. AUTO OPERATOR	4642	689	LCN
1	EA	PA MOUNTING PLATE	4040XP-18PA AS REQ'D	689	LCN
1	EA	CUSH SHOE SUPPORT	4040XP-30 AS REQ'D	689	LCN
1	EA	BLADE STOP SPACER	4040XP-61 AS REQ'D	689	LCN
1	EA	ACTUATOR KIT	8310-3836T	630	LCN
1	EA	ACTUATOR, JAMB MOUNT	8310-818T	630	LCN
1	EA	RAIN DRIP	142AA	AA	ZER
1			WEATHERSTRIP BY ALUM DOOR SUPPLIER		
2	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	655A	A	ZER
1	EA	DIAGRAM	ELEVATION		DLR
1	EA	DIAGRAM	POINT TO POINT		DLR

OPERATION: DOORS CAN BE DOGGED DOWN (PUSH/PULL OPERATION) BY CYLINDER DOGGING. WHEN PANIC DEVICES ARE DOGGED DOWN, PUSHING EITHER ACTUATOR WILL CYCLE AUTOMATIC OPERATOR AND MOMENTARILY OPEN DOOR.
BOTH ACTUATORS ARE DISABLED WHEN DOORS ARE UNDOGGED (LOCKED).
FREE EGRESS AT ALL TIMES.

HARDWARE GROUP NO. 36 – NOT USED

HARDWARE GROUP NO. 37

FOR USE ON DOOR #(S):

A1000A

PROVIDE EACH OPENING WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONT. HINGE	112XY	628	IVE
2	EA	DUMMY PUSH BAR	330	626	VON
2	EA	90 DEG OFFSET PULL	8190HD 10" A	630	IVE
1	EA	OH STOP	100S	630	GLY
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	SURF. AUTO OPERATOR	4642	689	LCN
1	EA	PA MOUNTING PLATE	4040XP-18PA AS REQ'D	689	LCN
1	EA	CUSH SHOE SUPPORT	4040XP-30 AS REQ'D	689	LCN
1	EA	BLADE STOP SPACER	4040XP-61 AS REQ'D	689	LCN
1	EA	ACTUATOR KIT	8310-3836T	630	LCN
1	EA	ACTUATOR, JAMB MOUNT	8310-818T	630	LCN
1	EA	RAIN DRIP	142AA	AA	ZER
1			WEATHERSTRIP BY ALUM DOOR SUPPLIER		
2	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	655A	A	ZER
1	EA	DIAGRAM	ELEVATION		DLR
1	EA	DIAGRAM	POINT TO POINT		DLR

OPERATION: PRESSING EITHER ACTUATOR CYCLES AUTOMATIC OPERATO AND MOMENTARILY OPENS DOOR. FREE EGRESS AT ALL TIMES.

HARDWARE GROUP NO. 38

FOR USE ON DOOR #(S):

A1042

PROVIDE EACH OPENING WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	112XY	628	IVE
1	EA	PANIC HARDWARE	99-L-06	626	VON
1	EA	RIM HOUSING	20-079	626	SCH
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER	4040XP SHCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE GROUP NO. 39

FOR USE ON DOOR #(S):

A1045C B1044B B1044C B1044E B1044F

PROVIDE EACH OPENING WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CYLINDER	RIM/MORTISE CYLINDER AS REQ'D	626	SCH
		NOTE	BALANCE OF HARDWARE BY DOOR SUPPLIER		

HARDWARE GROUP NO. 40

PROVIDE EACH OPENING WITH THE FOLLOWING:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
	NOTE	ALL HARDWARE BY OTHERS		

HARDWARE GROUP NO. 41

FOR USE ON DOOR #(S):

A1047 A1050

PROVIDE EACH OPENING WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	EU MORTISE LOCK	L9095TEU 06A	626	SCH
2	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	WALL STOP/HOLDER	WS40	626	IVE
3	EA	SILENCER	SR64	GRY	IVE
2	EA	MULTITECH READER	MTB11/15 - BY DIV 28 (COORDINATE W/ HEAD END AND CREDENTIAL TYPE)	BLK	SCE
1	EA	POWER SUPPLY	PS902 900-4R [COORDINATE WITH ACCESS CONTROL]	LGR	SCE
1	EA	DIAGRAM	ELEVATION		DLR
1	EA	DIAGRAM	POINT TO POINT		DLR

OPERATION: DOOR NORMALLY CLOSED AND LOCKED FROM BOTH SIDES. VALID CREDENTIAL AT EITHER CARD READER MOMENTARILY UNLOCKS DOOR ALLOWING ENTRY. DOOR REMAINS LOCKED UPON LOSS OF POWER.

HARDWARE GROUP NO. 42

FOR USE ON DOOR #(S):

A1019 A1030 C2001

PROVIDE EACH OPENING WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	EU MORTISE LOCK	L9092TEU 06A	626	SCH
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CVX	626	IVE
3	EA	SILENCER	SR64	GRY	IVE
1	EA	MULTITECH READER	MTB11/15 - BY DIV 28 (COORDINATE W/ HEAD END AND CREDENTIAL TYPE)	BLK	SCE
1	EA	POWER SUPPLY	PS902 900-4R [COORDINATE WITH ACCESS CONTROL]	LGR	SCE
1	EA	DIAGRAM	ELEVATION		DLR
1	EA	DIAGRAM	POINT TO POINT		DLR

OPERATION: DOOR NORMALLY CLOSED AND LOCKED. VALID CREDENTIAL MOMENTARILY UNLOCKS DOOR ALLOWING ENTRY. DOOR REMAINS LOCKED UPON LOSS OF POWER. FREE EGRESS AT ALL TIMES.

HARDWARE GROUP NO. 42A

FOR USE ON DOOR #(S):

C2000A

PROVIDE EACH OPENING WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	EU MORTISE LOCK	L9092TEU 06A	626	SCH
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
3	EA	SILENCER	SR64	GRY	IVE
1	EA	MULTITECH READER	MTB11/15 - BY DIV 28 (COORDINATE W/ HEAD END AND CREDENTIAL TYPE)	BLK	SCE
1	EA	POWER SUPPLY	PS902 900-4R [COORDINATE WITH ACCESS CONTROL]	LGR	SCE
1	EA	DIAGRAM	ELEVATION		DLR
1	EA	DIAGRAM	POINT TO POINT		DLR

OPERATION: DOOR NORMALLY CLOSED AND LOCKED. VALID CREDENTIAL MOMENTARILY UNLOCKS DOOR ALLOWING ENTRY. DOOR REMAINS LOCKED UPON LOSS OF POWER. FREE EGRESS AT ALL TIMES.

HARDWARE GROUP NO. 43

FOR USE ON DOOR #(S):

C2002

PROVIDE EACH OPENING WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	STOREROOM LOCK	L9080T 06A	626	SCH
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CVX	626	IVE
1	EA	GASKETING	488SCL PSA	CL	ZER

HARDWARE GROUP NO. 44

FOR USE ON DOOR #(S):

A1065 C1010B C1017B

PROVIDE EACH OPENING WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	CYL X TURN DEAD LOCK	L9460T L583-363	626	SCH
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CVX	626	IVE
3	EA	SILENCER	SR64	GRY	IVE
1	EA	DOOR CONTACT	679-05HM/679-05WD AS REQ'D	BLK	SCE

OPERATION: DOOR CONTACT TO MONITOR DOOR POSITION.

HARDWARE GROUP NO. 45 – NOT USED

HARDWARE GROUP NO. 46

FOR USE ON DOOR #(S):

A1066A

PROVIDE EACH OPENING WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 5 X 4.5 (NRP AS REQ'D)	630	IVE
1	EA	CYL X TURN DEAD LOCK	L9460T L583-363	626	SCH
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH ST-1595	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	RAIN DRIP	142AA	AA	ZER
1	EA	GASKETING	429AA	AA	ZER
1	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	655A	A	ZER

HARDWARE GROUP NO. 48

FOR USE ON DOOR #(S):

A1012 A1016 A1017 A1021

PROVIDE EACH OPENING WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	EU MORTISE LOCK	L9092TEU 06A	626	SCH
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	WALL STOP	WS401/402CVX	626	IVE
3	EA	SILENCER	SR64	GRY	IVE
2	EA	MULTITECH READER	MTB11/15 - BY DIV 28 (COORDINATE W/ HEAD END AND CREDENTIAL TYPE)	BLK	SCE
1	EA	POWER SUPPLY	PS902 900-4R [COORDINATE WITH ACCESS CONTROL]	LGR	SCE
1	EA	DIAGRAM	ELEVATION		DLR
1	EA	DIAGRAM	POINT TO POINT		DLR

OPERATION: DOOR NORMALLY CLOSED AND LOCKED. VALID CREDENTIAL MOMENTARILY UNLOCKS DOOR ALLOWING ENTRY. DOOR REMAINS LOCKED UPON LOSS OF POWER. FREE EGRESS AT ALL TIMES.

HARDWARE GROUP NO. 49

FOR USE ON DOOR #(S):

A1022

PROVIDE EACH OPENING WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	PASSAGE SET	L9010 06A	626	SCH
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	WALL STOP/HOLDER	WS40	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

END OF SECTION 087100

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SECTION 111900 - DETENTION EQUIPMENT CONTRACTOR

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the contract including General Conditions and Division 1 Specifications, apply to this Section.

1.2 SUMMARY

A. The Detention Equipment Contractor (DEC) shall be responsible for the coordination, furnishing and installation of the work of all sections listed in the project manual summary of work.

B. Coordinate procurement schedules for accurate and timely delivery of all materials necessary for this bid category.

C. The DEC shall provide a minimum of 50% of the labor performed by direct employees of the DEC company. The DEC shall provide in writing a work plan noting the employees providing the labor.

D. REFERENCES: The following organizations have standards which are referenced in this section:

1. ANSI - American National Standards Institute
2. ASTM - American Standard Testing Materials
3. AWS - American Welding Society
4. BHMA - Builders Hardware Manufacturers Association
5. DHI - Door and Hardware Institute.
6. NFPA-70 - National Electrical Code.
7. NFPA-80 - Fire Doors, Windows.
8. NFPA-101 - Life Safety Code
9. UL - Underwriters Laboratories.

1.3 SUBMITTALS

A. Shop drawings: Submit in accordance with Division 01 requirements.

1. Provide templates for hardware and detailed drawings of equipment showing construction methods, type and gauge of metal, hardware and fittings; with plan elevation, and cross sections as required.
2. Show service roughing-in connections, characteristics, and wiring diagrams for control systems.
3. For concrete, precast concrete, or masonry embedded items, provide to the appropriate trade the setting drawings and templates showing anchorage.

B. Detention Hardware Schedule:

1. Submit final detention hardware schedule signed by an Architectural Hardware Consultant who is certified by the Door Hardware Institute (DHI). Coordinate hardware with doors, frames and related work to ensure proper size, thickness, hand, function and finish of hardware. Organize hardware schedule into hardware sets, indicating complete designations of every item required for each door or opening; and include the following information:

    a. Type, style, function, size and finish of each hardware item.
    b. Name and manufacturer of each item.
    c. Fastenings and other pertinent information.
    d. Location of hardware set cross-referenced to indications on drawings both on floor plans and in door and frame schedule.
    e. Explanation of all abbreviations, symbols, codes, etc.
    f. Mounting locations for hardware.

2. Submit schedule at earliest possible date, particularly where acceptance of hardware schedule must precede fabrication of other work (e.g., door and frame metal work which is critical to the construction schedule).

C. Total Submittal Package: Include with the detention hardware schedule, product data, samples, shop drawings, templates, and other descriptive data for proper coordination purposes.

D. Samples: Prior to final ordering of finish hardware, submit one sample of each type of exposed detention hardware unit with required finish for Architects approval.

E. Embedded Item: Detention equipment to be set in concrete, precast concrete, or CMU, by other Contractors shall be furnished and delivered by the Detention Equipment Contractor (DEC) to the building site. DEC shall furnish other Contractors with reviewed shop drawings and setting diagrams for these embedded items, such as including but not limited to, secure steel doors, frames, windows, brackets, inserts, etc., to which detention equipment attaches.

F. Embedded items shall be set in strict accordance with reviewed shop drawings. Embedded items that do not comply with reviewed shop drawings because of improper embedment procedure or incorrect building construction or location, shall be replaced and repaired by General Contractor at no cost to the Owner or DEC.

G. Keying Schedule for Locks: Submit a proposed keying schedule prepared in accordance with the Door and Hardware Institutes Manual Keying Procedures, Systems and Nomenclature. Coordinate keying with the Architect and the Owner.

1. DEC shall prepare and submit a drawing for each unit floor plan. The plan shall color code each lock required for review by Owner and Architect. Each lock type shall be color coded with a different color. Provide a legend for the colors and cut sheets for the locks.
2. The Owner must approve the keying schedule in writing.

H. Substitutions and Equivalents: Any product submitted as a substitution or equivalent shall fulfill the requirements of the specifications and have passed the same testing agency (ANSI,

UL, ASTM, etc.) as referenced with the product, and include with the package an itemized list showing manufacturer, model number, sizes, finishes, noting any differences from the specified products. Also, include a sample with a written list showing the names, location, and Architects of a minimum of ten (10) institutions for which similar products have been installed.

1. No substitution will be allowed after the bid date.

I. Maintenance Manuals: Furnish two (2) hard copies of maintenance manuals in three (3) ring binders covering all of the detention equipment for this project. Include the current name, address, and phone number of the detention equipment contractor, maintenance instructions and parts list for each type of hardware.

1. Also provide two (2) flash drives with all maintenance manual information in PDF format. PDFs shall be in color.

J. Templates: Detention Equipment Contractor shall furnish hardware templates to the door and frame manufacturer to insure proper preparation for the installation of hardware. Check approved shop drawings to confirm adequate provisions have been made for the proper installation of items.

K. Wiring Diagrams: Complete system wiring diagrams for all electric locks and controls shall be prepared and provided by the detention hardware manufacturer, and include lock functions, monitoring requirements, color coded conductor locations, and conductor connections.

1.4 QUALITY ASSURANCE

A. The following DEC's are approved to submit a bid on this project:

1. Pauly Jail Building Company

B. Bid submittal requirements for bidders seeking to gain pre-qualification: The owner wants to confirm that the Detention Equipment Manufacturer has the experience, management, testing, engineering, quality control, schedule compliance, and ability to adequately perform prior to award. The Owner reserves the right to waive any informalities.

1. Submitted information must be received two (2) weeks prior to published bid date and time. Late information will not be considered.
2. Submit the following information:

a. Provide a narrative and historical description of the firm from inception, including history of ownership, partnership, incorporation, and/or other organizational information. Include information on the growth of the firm over time to include the number of employees, relocation(s) of the firm, major production equipment purchases and replacements. Use only the current corporate or business entity, intending on bidding and performing the work, should it be awarded the work.
b. List the firm's business volume (dollar amount) for the last five (5) fiscal years.

c. Provide a statement that the firm has been in business for a minimum of ten (10) continuous years, and the principals and key personnel that have been engaged in successfully providing procurement, management, installation and commissioning of security detention projects.

d. Provide a list of all employees in a supervisory capacity, stating their area of responsibility and their years of experience in that capacity.

   1) Number of years as a full-time employee of the Detention company
   2) Minimum years of Jail experience
   3) Completed training program for iron workers (if involved with equipment installation)

e. Submit a list of ALL detention projects completed in the last ten (10) years.

f. Submit a list of ten (10) projects that this corporation under its current name and management, has built in the last five (5) years comparable in size and construction (list only projects which prefabricated modular steel cell units were installed by your firm). Include in this list:

   1) Project Name, Owner, Contract Name, Address, Phone Number, and email address;
   2) Project Manager Name, Address, Phone Number and email address;
   3) User Agency or Government entity Name, Address, Phone Number and email address;
   4) Architect and Engineer of Record Name, Address, Phone Number and email address;
   5) General Contractor and/or Construction Manager Name, Address, Telephone Number and email address;
   6) Project delivery method (traditional, design/bid/build, design/build, Partnering, or other);
   7) Scope of the Project including total number of cells, total project square footage;
   8) Identify projects that used Modular Steel Cells, name of the cell manufacturer, note if cells were made with galvanized or galvanneal coated steel, and interior finish of cells (epoxy, polyurea or powder coat);
   9) Square Footage, scope of products and services provided on that project by your company;
   10) Total dollar amount of the DEC contract;
   11) List the name(s) of the key installation foremen that are employees of your company, for each project.
   12) List the key installation foreman for steel cell projects that work for your firm.
   13) Include their names, contact information and the list of projects they have completed as an employee of your firm.
   14) Date of final completion and occupancy.

g. Provide a complete list of ALL current project and highlight those which utilize prefabricated modular steel cell units installed by your firm. For each project, provide the project name, location, architect name and contact info,

Construction Manager or General Contractor name and contact info, quantity of modular units (if applicable), date of contract or purchase order, start date and current status including the quantity of modular units that have been delivered/installed, and the projected completion date for the remaining balance of prefab modular units.

h. Provide an audited financial statement from a recognized Certified Public Accountant for the three (3) past fiscal years. The format of the financial statement must be acceptable to surety for purpose of obtaining performance and payment bonds in an amount equal to at least $3 million dollars, or the anticipated amount of the bid, whichever is less.

i. Provide a financial statement for the current fiscal year. The format of the financial statement must be acceptable to surety for purpose of obtaining performance and payment bonds in an amount equal to at least $3 million dollars or the anticipated amount of the bid, whichever is less.

j. Provide a letter directly from a qualified Best Rated A+ surety company, licensed in the project state, that your firm will be able to provide 100% performance/payment bond for this project if awarded the project, but not less than $3 million.

k. Submit a listing of all projects in which the company is presently or has been involved in litigation, as either plaintiff or defendant within the past five (5) years, and the status thereof. In addition to this statement, please respond to the following questions 1 through 8. For any "YES" answer to the following questions, please attach a separate sheet, which provides a brief explanation of the facts, names of the parties involved, dollar amount being claimed from your firm, and the present status of the case. Attach explanations of any lawsuit alleging negligent of defective work, or breach of contract on part of the firm. Do not include lien matters, automobile accident cases, or workman's compensation cases:

1) Has a court issued a judgment of $100,000 or more against the firm or its predecessors in the past five (5) years?
_____ YES _____ NO

2) Has the firm or its predecessors been party to the settlement of a lawsuit with a potential value of $100,000 or more?
_____ YES _____ NO

3) Is the firm or its predecessors currently a party to a pending lawsuit with a potential value of $100,000 or more?
_____ YES _____ NO

4) Within the past five years, has any key person, the firm or its predecessors defaulted on a loan?
_____ YES _____ NO

5) Has the firm or its predecessors or any person of the firm or its predecessors ever been suspended or debarred by a state, federal or municipal agency?

_____ YES _____ NO

6) Within the past five (5) years, has the firm or its predecessors been terminated on or failed to complete any contract?
_____ YES _____ NO

7) Within the past five (5) years has the firm or the predecessors been responsible for significant delays in completion of a project (over 3 weeks)?
_____ YES _____ NO

8) Has the firm or its predecessor firm(s) been in Bankruptcy or receivership at any time during the past five (5) years?
_____ YES _____ NO

l. Provide a complete list of any projects wherein your company has been involved in a bond claim against your company for non-performance. Include the amount of claim, details of the claim, contact information (name, phone number, email address) for the Architect, Construction Manager/General Contractor, and the Owner.

m. Provide a complete list of any manufacturers, suppliers or installers that have ever filed a claim against your company, any predecessor companies, or company principals for either non-performance or non-payment on any detention project. Include the dollar amount of the claim and the name of the company(s) and a contact name, phone number and email address.

n. Submit for approval the names of the detention equipment manufacturers that you intend to purchase materials from. The manufacturers must be chosen from the design specifications or addendums. Alternate manufacturers will not be considered.

1) Submit a current letter from the detention hardware manufacturer stating that your company is a trained, fully authorized distributor and installer of their complete line of products;
2) Submit a current letter from the detention hollow metal door and frame manufacturer stating that you are a factory-trained, fully authorized distributor and installer for their complete line of products;
3) Submit a current letter from the Modular Steel Cell Manufacturer stating that you are a factory-trained, fully authorized distributor and installer for their steel cells;
4) Submit a current letter from the Security Window Manufacturer stating that you are a factory-trained, fully authorized distributor and installer for their windows;
5) Submit a current letter from the Security Glass Manufacturer stating that you are a factory-trained, fully authorized distributor and installer for their windows;
6) Submit a current letter from the Detention Furnishings Manufacturer stating that you are a factory-trained, fully authorized distributor and installer for their furnishings;

7) Submit a letter directly from each manufacturer you intend to include in your bid, stating that you have a customary credit relationship with that manufacturer such that you may purchase equipment directly from that manufacturer.

o. Submit a letter from an approved and A-15 rated bonding company that your firm can be bonded 100% for the DEC portion of this project (complete) if awarded this contract.

p. Provide a letter from the International Ironworkers Union or another vocational training program that your firm employs trained, bona-fide ironworkers as permanent full-time employees to install the specified security products on this project. Use of unapproved installers, or second tier sub-contractors, shall be just cause for rejection of the Bid or termination of the DEC from the project.

q. All decisions will be final.

C. Approval of a firm as a DEC does not relieve that DEC from furnishing all materials from the manufacturers as herein specified.

D. All materials and labor specified in this Section of the Specifications shall be furnished by a single qualified DEC who shall assume responsibility for the detailing, coordinating, erecting, performance, and warranty of this work, in accordance with this specification section.

E. Approved manufacturer list.

1. Manufacturers listed as approved to bid, are required to provide proof of compliance for all items listed.

F. Code Compliance: The work of this section shall comply with the latest requirements of the Federal, State, and local codes or ordinances, and other agencies having jurisdiction. In the event of conflict, the more stringent requirements shall apply.

1. The work shall conform to applicable sections of the Life Safety Code NFPA-101, and the National Electric code NFPA-70.
2. Fire-rated openings shall comply with NFPA Standard Number 80. Provide only hardware which has been tested and listed by Underwriters Laboratories for these openings.

G. Field Welding

1. Welder Qualifications: Employ only welders and tackers who are qualified by American Welding Society's testing procedure.
2. Quality: Repairing of defective welds by adding new material over the defects will not be permitted.
3. Welds: Shall be of neat and clean appearance, and deep penetration in accordance with AWS. Joints shall be tight and true with members ground where necessary to assure a correct fit.

H. Detention Door Testing: Upon completion of installation and before project is turned over to the Owner, the detention equipment manufacturer shall provide a factory representative to

test each door. Each door shall be tested for correct installation, fit, finish and electric control if required. Upon completion of testing the manufacturers representative shall turn over to the Architect a written account of each door with deficiencies noted.

1. Notify the Construction Manager in writing at least fourteen (14) days prior to inspection.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Packaging and Delivery

1. Mark or tag each item of hardware, with identification related to final hardware schedule, and include basic installation instructions with each item or package.
2. Wrap and crate finished components and assemblies to prevent damage to finished items.
3. Deliver individually packaged hardware items at the proper time and location (shop or project site) for installation.
4. Deliver pertinent items requiring to be built-in to the General Contractor or trades in accordance with construction progress to prevent any delay.
5. Determine and coordinate the openings for delivery and installation of equipment.

B. Storage and Protection

1. Hardware received, but not installed shall be placed in secured storage. Control handling to prevent losses and delays before and after installation.
2. Lay panels and flat sections flat and blocked clear of floor in a manner to prevent warping, twisting or sagging.
3. Immediately upon delivery, inspect components and assemblies for damage. Advise manufacturer no later than two days after receipt of damaged items, the quantity and description of the items. Remove all damaged items from the site.

C. Key Delivery: Keys shall be sent direct to the person and address as directed by the Owner, via direct mail with restricted delivery, and return receipt requested.

D. Off-site Storage: If off-site storage is required, the following requirements apply:

1. Protect stored items from diversion, destruction, theft, and damage.
2. Stored items shall be marked for use on the project.
3. Stored items shall be available for inspection by Architect and Owner.
4. Copies of bill of sale for stored items shall be submitted to Architect and Owner.
5. Certificates of property insurance for stored items, protecting against damage and theft while in storage, certifying said coverage, and indicating the nature, quantity, and exact location of stored items shall be submitted to Architect and the Owner.
6. A waiver of lien shall be provided in Accordance with the Contract Documents.

1.6 JOB CONDITIONS

A. Coordination:

1. Coordinate the work of this section with other work, and the progress schedule.
2. Provide items of proper design for use on this project as indicated and in accordance with the approved hardware schedule, door schedule, and control schedule, regardless of omissions or conflicts specified or indicated.
3. Coordinate the delivery and location of items to meet the progress schedule.
4. To the manufacturers of related equipment and trades affected by the work of this section, provide copies of the approved hardware schedule and drawings of other work to confirm adequate provisions have been made for the proper location and installation of detention equipment.

B. Scheduling:

1. Refer to Division 01 for specific scheduling requirements.
2. The work of this section shall be scheduled and coordinated with the Construction Manager and Owner to ensure that all detention restrictions, rules, regulations, and security measures will be maintained throughout the course of the work.

1.7 WARRANTY AND SERVICE

A. Detention Equipment Contractor shall warrant the material and workmanship on this project for a period of one (1) year after substantial completion as specified in Division 1 - General Requirements, as well as any system/equipment/material period of warranty as specified in the Project Manual. Detention Equipment Contractor agrees to repair or replace any defective detention materials or work when given written notice during Warranty period.

B. Manufacturer of detention hardware shall warrant that replacement parts shall be available for locking mechanisms for a minimum of twenty (20) years from the date of purchase of original equipment.

C. Detention Equipment Contractor shall provide emergency service during the 12-month warranty period, should a major breakdown occur. Response time shall be within a 24-hour period from written notification. Reference the Project Manual for specific requirements concerning the Security Electronics emergency service warranty period.

1.8 MAINTENANCE

A. Spare Parts:

1. Furnish the Owner with the following maintenance/spare parts:

Spare Parts	Quantity
a. Electric limit switches	6 each
b. Electric lock motor assembly	2 each
c. Torx tamper-resistant screws	100 each
d. Torx Tool Sets	6 each

2. Parts shall be packed in suitable containers clearly labeled. Deliver and store maintenance/spare parts material where directed by Owner.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install in strict accordance with the manufacturers written installation instruction, reviewed shop drawings, and as shown on the drawings.

1. All anchors and fasteners shall be tamper-proof.

3.2 EXAMINATION

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

1. Examine roughing-in for embedded, built-in and cast-in anchors to verify actual locations of detention work connections before detention work installation
2. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of detention work.

B. Verify locations of detention work with those indicated on Coordination Drawings.

3.3 FIELD QUALITY CONTROL

A. Ensure quality of field welding of detention work and anchorages

B. Verify that detention work is installed and connected according to the Contract Documents.

C. Observe startup service of detention work.

D. Observe installation and startup checks of detention work according to manufacturer's written instructions.

E. Inspect installed detention work to verify compliance with requirements. Prepare inspection reports and indicate compliance with and deviations from the Contract Documents.

1. Perform additional inspections to determine compliance of replaced or additional work.
2. Prepare field quality control certification that states installed detention work and its installation complies with requirements in the Contract Documents

F. Testing: After installing electrified detention work and after electrical circuitry has been installed and energized, test detention work for compliance with requirements.

1. When testing reveals detention work not in compliance with requirements, perform additional random testing to determine extent of noncompliance.
2. Where test results indicate that detention work does not comply with specified requirements, retest after repairs or replacements are made.

3. Perform additional testing and inspecting, at this Contractor's expense, to determine compliance of replaced or additional work.

3.4 DEMONTRATION/TRAINING

A. Demonstrate to the Owner operations and maintenance of all Detention Work. Coordinate dates for training sessions with the Owner prior to scheduling dates.

B. On-site and Detention Hardware Factory Training: Provide qualified personnel for instruction and a training period involving the Owner's designated personnel. Representatives must be capable of training Owner's personnel in the adjustment, operation and repair of detention work, including pertinent safety requirements. Instruction shall be given during the first week after detention work has been accepted and turned over to the Owner for regular operation, except if adjustment and/or repairs have been satisfactorily completed.

1. Video record all training.

C. During the warranty period, if significant changes or modifications take place in the equipment or system, additional instruction shall be provided at no cost to the Owner.

END OF SECTION 111900

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SECTION 111901 – DETENTION FURNISHINGS AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Detention Equipment Contractor (DEC) shall furnish plant and field labor, equipment, appliances, services and materials, perform work and otherwise assume all responsibility related to fabrication and installation of detention equipment indicated in this section.

1.2 SECTION INCLUDES

A. Detention furnishings and accessories.

B. Miscellaneous steel embedded anchoring plates, bars, angles or channels required to anchor detention equipment to concrete or masonry.

1.3 RELATED WORK TO BE PERFORMED BY GENERAL CONTRACTOR

A. Division 3 – Concrete:

1. Receive, unload, place into building and cast into place:

    a. Miscellaneous steel embedded anchoring plates, bars, angles or channels required to anchor detention equipment to concrete work in strict compliance with drawings and setting diagrams provided by DEC.
    b. Other detention metal fabrications to be cast into concrete.

2. Closely coordinate delivery of embedded items and other detention metal fabrications with DEC and unload promptly to prevent unnecessary delay in departure of delivering carrier.
3. Complete concrete work in connection with detention equipment after installation and final adjustment.

B. Division 4 – Masonry:

1. Receive, unload, place into building and set or build into place:

    a. Miscellaneous steel embedded anchoring plates, bars, angles or channels required to anchor detention equipment to masonry work in strict compliance with drawings and setting diagrams provided by DEC.
    b. Other detention metal fabrications to be built into masonry.

2. Closely coordinate delivery of embedded items and other detention metal fabrications, and hollow metal frames with DEC, and unload promptly to prevent unnecessary delay in departure of delivering carrier.

C. Division 9 – Finishes:

1. Remove foreign materials such as mortar, plaster, concrete, waterproofing and dust from surfaces of detention equipment prior to finish painting.
2. Retouch factory finish paint as required on detention equipment after installation and final adjustment.
3. Complete floor finishes, waterproofing, plastering and painting on or near detention equipment after installation and final adjustment.

D. Division 22 – Plumbing:

1. Furnish and install finished plumbing in detention areas.
2. Closely coordinate plumbing work with DEC. Provide drawings, templates or other information required to identify requirements for plumbing penetrations through detention partitions in time for DEC to shop-cut holes prior to shipment to job site. Plumbing Contractor responsible for accuracy of layout information.
3. If layout information not received in time to shop-cut holes, DEC shall field-cut holes for plumbing requirements according to Plumbing Contractor's layout at Plumbing Contractor's expense. Additionally, any changes or additions required after these holes have been cut shall be made at Plumbing Contractor's expense.

E. Division 23 - Heating, Ventilating and Air Conditioning:

1. Install heating, ventilating and air conditioning (HVAC) ductwork required in detention area after installation of detention equipment.
2. Closely coordinate HVAC work with DEC. Provide drawings, templates or other information required to identify requirements for HVAC penetrations through detention partitions in time for DEC to shop-cut holes prior to shipment to job site. HVAC Contractor responsible for accuracy of layout information.
3. If layout information not received in time to shop-cut holes, DEC shall field-cut holes for HVAC requirements according to HVAC Contractor's layout at HVAC Contractor's expense. Additionally, any changes or additions required after these holes have been cut shall be made at HVAC Contractor's expense.

F. Division 26, 27 and 28 – Electrical:

1. Coordinate electrical power requirements with Security Automation Systems Contractor and General Contractor.
2. Furnish and install required conduit and standard back boxes for systems and equipment. This conduit system to be installed per approved conduit drawings.
3. Install special back boxes, cabinets and enclosures furnished by Security Automation Systems Contractor including, but not limited to, speaker back boxes, equipment racks and cabinets.

1.4 SYSTEM DESCRIPTION

A. Design requirements: Detention equipment shall be designed specifically for detention use, simple in construction and operation, and free from parts susceptible to unusual wear or maintenance requirements.

B. Performance Requirements: Detention equipment shall be use-proven through satisfactory performance under actual jail or prison conditions.

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 detention furniture.

B. Shop Drawings: For detention furniture.

1. Include plans, elevations, sections, and attachment details.
2. Indicate locations, dimensions, and profiles of wall and floor reinforcements.
3. Indicate locations and installation details of built-in anchors.
4. Show elevations of detention furniture and indicate dimensions of furniture, preparations for receiving anchors, and locations of anchorage.
5. Show details of attachment of detention furniture to built-in anchors.

C. Samples for Initial Selection: For detention furniture with factory-applied color finishes.

D. Samples for Verification: For each type of detention furniture indicated.

1. Furniture: Full-size units. Approved Samples may become part of the completed Work.

1.6 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Product Certificates: For each type of detention furniture from manufacturer.

C. Other Informational Submittals:

1. Examination reports documenting inspections of substrates, areas and conditions.
2. Anchor inspection reports documenting inspections of built-in and cast-in anchors.
3. Field quality-control reports documenting inspections of installed products.
4. Field quality-control certification signed by Contractor and Detention Specialist.

1.7 TEST REPORTS

A. Testing Laboratory:

1. Independent testing laboratory capable of compliance with specifications of American Society for Testing and Materials (ASTM).
2. Furnish certification and reports directly to DEC with copies for transmittal to Architect.

1.8 REGULATORY REQUIREMENTS

A. Perform work in compliance with latest editions of:

1. Federal, state and local codes and ordinances, or agencies having jurisdiction.
2. National Electric Code, NFPA 70.
3. Standard for Fire Doors and Windows, NFPA 80.
4. Life Safety Code, NFPA 101-88.

B. In cases where Specifications call for materials or construction of better quality or larger size than codes require, Specifications shall take preference. Codes shall govern in cases of direct conflict with Specifications or Contract Drawings.

1.9 DELIVERY, STORAGE AND HANDLING

A. Packing and shipping:

1. Wrap and crate finished components and assemblies at factory to prevent damage or marring of surface finishes during shipping and handling.
2. Handle and transport detention equipment to job site carefully to prevent damage.

B. Acceptance at site:

1. Coordinate delivery of detention equipment embedded items with GC in accordance with construction progress and schedule to avoid delays.
2. Coordinate size of building access and route to location of equipment installation with GC.
3. Upon delivery, immediately inspect components and assemblies for damage and remove damaged items from job site. Damaged components will be rejected and will not be incorporated into the work.
4. General Contractor:

    a. Receive from carrier, unload, and store materials furnished under this section but not installed by DEC.
    b. Install embedded items, if any, in correct locations, plumb, true, and to tolerances prescribed by DEC.

C. Storage and protection:

1. Provide adequate protection for products and materials during storage and installation.
2. General Contractor:

    a. Provide adequate protection for materials furnished under this section but not installed by DEC during storage and after installation.

b. Provide secure, dry storage area or room for DEC storage in each building and on each floor.

1.10 SEQUENCING AND SCHEDULING

A. Submit detailed schedule of field installation activities to Architect or GC, as applicable at least two months before field installation is to begin. Activities to describe all aspects of field installation.

B. Submit revised schedule to Architect or GC, as applicable each month showing status of each activity and revised project completion date.

1.11 WARRANTY

A. Prior to final acceptance, provide Owner with written warranty covering devices furnished under this section for period of one (1) year from date of substantial completion. During this period, make necessary repairs and corrections to defects in Work and replace defective parts at no cost to Owner.

B. Warranty does not cover consequential or incidental damages. Work made necessary by abuse, misuse, accidents, or negligence of using personnel is excluded from this agreement.

C. Provide emergency service during warranty period, including maximum twenty-four (24) hour response time for emergency calls requiring visits to facility.

1.12 MAINTENANCE MANUALS/SPARE PARTS

A. Operating and maintenance manuals: Provide Owner with two (2) operating and maintenance manuals for items furnished and installed under this section. Clearly identify all parts and include manufacturer's standard part number for each component of various mechanisms

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Norix Group Inc., West Chicago, Illinois (1-800-234-4900) – Basis of Design.

B. Southern Folger Detention, San Antonio, TX (1-800-966-6739).

C. Willo Products, AL (1-256-353-7161).

D. Imperial Fastener Company; Pompano Beach, FL (954-782-7130).

E. Maximum Security Products, Waterford, NY.

F. Real Time Furniture (Sherman 24 hr Seating) (317) 441-2358.

G. Products shall be supplied as listed specifically in each description. The architect must pre-approve, in writing, by addendum, other manufacturers at least fourteen (14) days prior to the bid date, through submission of samples, testing and evidence showing that the bidder has been fabricating detention products of this specific type and quality for at least ten (10) years. Pre-approval shall not authorize a given manufacture to supply their standard products, each supplier shall supply as specified. Verbal pre-approval shall not be given or accepted.

2.2 EQUIPMENT

A. Tables: Eight (8)-person Floor Mounted Dayroom Tables with Attached Seats.

1. Description: Norix Max Master Series.

2. Types:

a. Eight (8) Person – Model # MX3096-8M – (one leg removable per table for ADA, requires flush mounting at floor.)
b. Supply # of units as shown on drawings.

3. Materials:

a. Tops: 304 Stainless-Steel Inlay #4 finish, with sound deadening core.
b. Seats: 13" Slammer Stone: Color to be selected from mfg. standard options.
c. Seat bracket and leg support, 3/16 gage steel, painted black.
d. All painted surfaces to be factory finished, powder coat painted.
e. Game top option as shown on drawings: Checkerboard per mfg. standard.

B. Tables: Four (4)-person floor Mounted Dayroom Tables with Attached Seats.

1. Description: Norix Max Master Series.
2. Types:

a. Four (4) Person – Model # MX4200-4M – ADA, compliant.
b. Supply # of units as shown on drawings.

3. Materials:

a. Tops: Stainless-Steel Quiet Core.
b. Seats: 13" Slammer Stone: Color to be selected from mfg. standard options.
c. Seat bracket and leg support, 3/16 gage steel, painted black.
d. All painted surfaces to be factory finished, powder coat painted.
e. Game top option as shown on drawings: Checkerboard per mfg. standard

C. Steel Bunks: Double & Single Bunks: Floor and/or Wall mounted: As detailed and shown on drawings. DEC to field verify all sizes:

1. Description: NORIX Ironman® steel bunks designed and engineered for use in cells and sleeping areas in a correctional environment.

2. Types:

    a. Type B510-200W-M, Fully Welded Free-standing double bunk, 27" x 80".
    b. Type B510-160W-M, Fully Welded Free-standing single bunk, 27" x 80".
    c. Type B520-101W-M, Fully Welded Wall Mounted Single Bunk, 27" x 80".
    d. DEC to verify room and equipment dimensions to ensure proper sizes for installation of all bunks as shown on drawings.
    e. Under-Bunk Storage: Norix Tank Box PB300 property storage box on rails. 1 per sleeping surface.
    f. Each bunk to have 2 ITH-110 Towel Hooks welded as shown on drawings.
    g. Provide Norix Custody Mattresses– Custody Silver Secure (General Population & Trustee) Black Max (Medical, Booking - Holding) Mattresses sized to fit specific bunk pan sizes. Provide 1 per sleeping surface.
    h. Provide a bunk end ladder rail for all bunks perpendicular to the wall.
    i. Provide a side bunk ladder for bunks parallel to the wall.

3. Method of Installation: Concrete: Weld or bolt to pre-installed inserts, thru legs at floor and wall. Two (2) connections per leg when adjacent to wall and 1 connect per leg at floor.
4. Materials:

    a. Pan: Universal formed 12 gage steel.
    b. Legs: 2"x 2" x 3/16" standard angle.

5. Fabrication:

    a. Universal pan assembly: Weld unit to legs.
    b. Color/Finish: Factory TGIC polyester powder coat.

D. Wall Mounted Stainless-Steel Towel Hooks and Hooks with Shelf Types:

1. Norix model #S565-529: Four (4) strip towel hooks with shelf. Formed and welded, 14 gage type 304 Stainless-Steel with Brush Satin finish. Bolt to wall. Mounting hardware not included.
2. Norix model #ITH-110: Wall mount towel hook. Formed and welded, 14 gage type 304 Stainless-Steel with Brush Satin finish. Bolt to wall. Mounting hardware not included.

E. Detention Mirrors – (Norix Ironman Model # R565-420).

1. Construction:

    a. Mirror shall be formed from 18-gage type 304 Stainless-steel polished for high reflectivity #8 finish.
    b. Mirror frame shall be formed from one piece with raised frame.
    c. DM-2 Size: 11.25-inches wide by 38-inches high.
    d. DM-1 Size: 11-inches wide by 17-inches high.

2. Installation:

a. Mounting holes shall be extruded to prevent distortion.
b. Provide eight (8) each stainless-steel button head screws for mounting mirror.
c. Mirror embed shall be 3/16" steel plate with 1/4" holes for attaching mirror to embed. Embeds shall have countersunk holes for attaching to existing structure.
d. Masonry or pre-cast anchorage tabs shall be applied to plate for incorporation into new construction.

F. Pistol Lockers: (Norix Model # IPL-600-M).

1. Construction:

a. Cut, formed, welded and ground smooth steel.
b. Body front and sides: 7 gage steel.
c. Body back: 10 gage steel.
d. Drawer fronts: 7 gage steel.
e. Drawer sides and backs: 10 gage steel.
f. Mounting flange: 2 x 2 x 3/16" steel.
g. Hinge: 14 gage steel. *Units to be side hinged.
h. Compartment size is 15 1/2" W x 8 1/2" H x 5" D with individually keyed and master keyed pin tumbler snap lock. Three (3) keys per compartment, Two (2) master keys per locker. 1/8" thick felt lining in drawers.
i. Provide a recessed unit. Finished: Primed.
j. Number of Compartments: Six (6).

G. Key Cabinet (Norix # IKC-300): Cut, formed and welded 10 gage steel, including two hinged inside panels to accommodate 300 keys. Provide lock with institutional lever tumbler dead bolt. Lock is to be coordinated with the same brand of Security Hardware used throughout the project. Supply with 1 key. Finish: Primed.

H. Fixed Beam Seating - NORIX Gibraltar Seating series, bolt down: Supply # of units as shown on drawings.

1. Base Frame: 2" diameter, 14 gage steel with 11 gage steel seat supports. Tubular steel, bent and welded to provide in-line seating with arms. Flat steel plate welded to the frame at each seat location to provide strength, support and a mounting platform on which the seat is securely attached. Powder coat painted.
2. Seats: Rotationally molded, specially formulated, fire-retardant, high impact polyethylene with ultraviolet stabilizers (to reduce fading.) Chemically resistant to blood, vinegar, urine, feces, salt solution and chlorine solution. One-piece seat and back. Smooth, non-absorbent surface. Molded-in threaded steel inserts provide for tamper-resistant, "steel-to-steel" attachment to base frame.
3. Number of Seats per Beam: Three (3) individual arms.
4. Color: Architect's choice from manufacturer's standard colors.
5. Product must be UL Green Guard Gold. DEC to provide mfg. testing certification.

I. 24/7 Operations Seating (Nightingale Sherman Series by Real Time Furniture).

1. Description: Sherman rated for 24/7 use.

2. Models: Chair or Stool as shown on drawings.

    a. Heavy Duty Task Chair #HD9000.
    b. Heavy Duty Stool #HD900DS.
    c. Caster or Glides per Architect's selection.
    d. Quantity: Provide (3-Central Control, 4- Dispatch, 2-Booking).

J. ADA Shower Seat

1. Recessed Shower Seats (**DSS**): Double-pan retractable, recessed L-shape shower seat. Approximately 34-inch wide by 28-inch high by 3-5/8-inch deep formed from 0.062-inch (16 gage) thick, stainless-steel sheet. Seat pivots on solid 0.500-inch-diameter stainless-steel rod and self-latches when closed. Minimum 750-lb. loading capacity. Back cover formed from 0.038-inch (20 gage) stainless steel. C-channels formed from 0.125-inch (11 gage) stainless steel.
2. Basis-of-Design Product: Subject to compliance with requirements, provide Norix Group, Inc.; Recessed Shower Seat, Model No. ISS-220 or a comparable product.
3. Lock: Provide stainless steel padlock hasp or locking mechanism to lock the seat in the closed position.
4. Materials:

    a. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666 or ASTM A 240/A 240M, austenitic stainless steel, Type 304.
    b. Stainless-Steel Finish:

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

K. Secure Shower Curtain System:

1. Detention-grade, recessed ADA and ANSI Compliant L-Shaped Shower Seat. Meet ADA 4.21.3 & 4.26.3 requirements for L-Shaped Shower Seats. Meet ANSI 610.3.2 & 610.4 requirements for L-Shaped Shower Seats.
2. Fabrication: Cut, formed and welded steel and stainless-steel frame to fit wall opening, with 1/2" diameter solid stainless-steel hinge.
3. Seat to include option to lock in closed position. DEC to field modify to accommodate.
4. Installation: wall mount assembly unit to be provided with CMU straps. DEC shall coordinate best method for field conditions.

L. Security Grab Bar Suicide Resistant: (Norix No.IGS-Length as indicated)

1. Construction:

a. 3-1/8" dia. 11 gage stainless steel flanges are heliarc welded to 1-1/2" O.D.
b. 18 gage seamless tube.
c. Suicide preventive 11 gage closure plate is also heliarc welded to edge between tube and wall.
d. Options: DGB-3 IGS-18 (18" length)
DGB-3 IGS-36 (36" length)
DGB-1 IGS-42 (42" length)
DGB-4 IGS- "L Shape (18" x 32" Shower)

2. Installation:

a. Use bar as template to locate mounting holes.
b. Attach with torx-head screws.

M. Security Shower Curtain System (Imperial Fastener Company).

1. Installer shall provide field measuring for final verification of dimensions of all components at each location.
2. Curtain shall be Sure-Chek by Imperial Fastener: Flame resistant, Anti-bacterial, Anti-fungal, Self-Deodorizing and Mildew resistant. Top of curtain shall be durable vinyl-coated mesh. Clear portion of curtain shall be clear vinyl. Privacy portion of the curtain shall be reinforced with polyester scrim.

N. Detention Deal Tray - Norix Model # IDT-100

1. Stainless-steel drop-in model deal tray. Recessed into countertop opening for flush appearance. Level I bullet resistant.
2. 16 gage brushed stainless-steel.

O. Flat Screen Television Mounting Bracket (Peerless Model: ESA746PU).

1. Mount bracket where indicated on Drawings.
2. Provide tamper security fasteners for mounting and installation.

P. General Purpose Security Table (NORIX Multi-Purpose & Leg Style Table)

1. Description:

a. NORIX Multi-Purpose & Leg Style security enhanced tables.
b. Tamper resistant construction suitable for supervised inmate areas.
c. Tops: Architect to select from manufacturer's standard options.

2. Types: MP3060: 30" width x 60" length x 29" high.

a. Quantity: Supply Three (3) tables (Classroom).

3. Types: MP2460: 24" width x 60" length x 29" high.

a. Quantity: Supply sixteen (16) tables (Training Room).

4. Types: LS4242: 42" width x 42" length x 29" high.

a. Quantity: Supply Two (2) tables (Video Arraignment).

Q. Security Multiuse Recreation & Classroom Chairs (Norix).

1. Description:

a. NORIX Integra series, stackable, one-piece molded construction, multi-use chairs.
b. Designed for severe contract applications.
c. Engineered for institutional durability and suitable for continuous daily use in a correctional environment.

2. Types:

a. Type C110 Armless chair:

1) Size: 17-3/4" wide x 19-3/4" deep x 32" high.
2) Stacking capability: Fifteen (15) chairs in 88".
3) Color: Architect's choice from manufacturer's standard colors.

3. Quantity: Supply sixty (60) chairs (10 – Classroom, 15-Misc. Secure Areas).

R. Security Multiuse Training & Interview Room Chairs (Norix).

1. Description:

a. NORIX Progress series, stackable chair. Seat: molded construction. Legs: Aluminum Black powder coated.
b. Designed for severe contract applications.
c. Engineered for institutional durability and suitable for continuous daily correctional environment.

2. Types:

a. Type C920 Armless chair:

1) Size: 23-1/4" deep x 19-3/4" wide x 32-1/2" high.
2) Stacking capability: Twelve (12) chairs in 80".
3) Color: Architect's choice from manufacturer's standard colors.
4) Upholstered: Architect's choice from manufacturer's standard. Minimum Grade D.

3. Quantity: Supply thirty (30) chairs (18-Training, 10-Misc. Use – Visitation, Arraignment, Interview)

S. Open Style Cubicle: **(C-1)**

1. Basis-of-Design Product: Subject to compliance with requirements, provide Norix Group, Inc.; InteleStation Open Style Cubicle, Model No. CUBE36LB.
2. Description: Open style cubicle.

    a. Size: 38-1/2-inches wide by 57-inches high by 48-inches deep.
    b. Sides and Writing Surface: High pressure laminate with "T" mold vinyl edges
    c. Product shall meet or exceed UL Greenguard Gold. Supplier to provide testing certification documentation.
    d. Color: Manufacturer's standard laminate and edge color.
    e. Warranty: Ten (10) years
    f. Quantity: 5.

T. Inmate Property Storage (Norix – PB 300 Tank Box)

1. Ribbed injection molded construction from high impact polypropylene copolymer. Certified to pass CAL TB 133 flammability test.
2. Unit designed for use with under bunk rail system or loose.
3. Ten (10)-year warranty.
4. Quantity – provide one per sleeping surface under all steel bunks. Rails by modular cell provider.

U. Tables: Breakroom with swivel seating (Norix Oasis series)

1. Model OT3048, four (4) swivel seats, 30"x48".
2. Top: Laminate – with "Slammer Stone" edges.
3. Seats: Rotationally molded, one-piece seat and back. Color to be selected by architect from manufacturer's standard colors.
4. Legs: 14 gage steel, Square Tubing, Powder Coated. Free Standing Leg Glides.
5. Product must be UL Green Guard Gold. DEC to provide mfg. testing certification.
6. Quantity: Provide 1.

V. Security Mattresses: Detention grade, sealed seam mattresses (Norix Custody series).

1. Provide Norix Custody Mattresses– Custody Silver Secure (General Population & Trustee) Black Max (Booking - Holding) Mattresses sized to fit specific bunk pan sizes.
2. Provide 1 per sleeping surface.

W. Floor Mounted Stool (NORIX # S561-100)

1. Description: NORIX multi-purpose pedestal base, floor mounted stool.
2. Types: Type S561-100, steel Super Slammer Stone® Seat.
3. Material:

    a. Base Pedestal: 2 1/2" diameter, 14-gage steel.
    b. Base top and bottom mounting plates: 6" x 6" x 1/4" steel plates.
    c. Seats: "Super Slammer Stone®: 13" diameter, high density color. impregnated compression molded composite that is highly scratch and stain resistant. Provide four 5/16" diameter molded-in threaded inserts

4. Fabrication: Fully weld base pedestal to top and bottom plates.
5. Color/Finish:

    a. "Super Slammer Stone®: Architect's choice of manufacturer's standard colors.
    b. Base: Grey powder coat.

X. DETENTION TOILET TISSUE DISPENSER DTTD-1

1. Recessed, Detention Toilet Tissue Dispenser: Minimum 5-inch diameter by 4-inches deep; formed from 16 gage thick, stainless-steel sheet welded to 14 gage flange.
2. Basis-of-Design Product: Subject to compliance with requirements, provide Norix Group, Inc.; Toilet Paper Holder, "Model ITP-110" (front mount) or a comparable product by one of the following:

    a. American Specialties, Inc.
    b. Bobrick Washroom Equipment, Inc.
    c. Willoughby Industries.

3. Face: 7-inch-square face flange.
4. Location: At all ADA combination security water closet and lavatory units and water closets in the secure areas.
5. Mounting:

    a. Front mounting with security fasteners.

6. Materials:

    a. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666 or ASTM A 240/A 240M, austenitic stainless steel, Type 304.

7. Stainless-Steel Finish:

    a. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
    b. Polished Finish: Grind and polish surfaces to produce uniform finish, free of cross scratches.
    c. Run grain of directional finishes with long dimension of each piece.
    d. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

    e. Directional Satin Finish: No. 4.

Y. Handcuff/Shackle Cabinet

1. Basis-of-Design Product: Subject to compliance provide "GS5056" handcuff cabinet as manufactured by The G-S Company or a comparable product.
2. Description: Handcuff/Shackle Cabinet with hinged door
3. Size: 24-1/2-inches wide by 66-inches long by 5" deep.
4. Material:

a. Cabinet: 10-gage steel.
b. Door: 10 gage steel bent plate pan with flanges.
c. Hooks: 1/2-inch by ½-inch square bar 4-inches long with 1-inch bent end.

5. Hinge: heavy-duty continuous hinge.
6. Lock: Detention deadbolt lock.
7. Capacity: (48) handcuffs.
8. Finish: one coat standard red primer.

Z. Table: Café Table.

4. Description: Norix Forte Series FT4200.
5. Type:

a. Size 42-inches round.
b. Height: 30.5-inches.

6. Materials:

a. Tops: Titanium Evolve.
b. Molded Base: Molded polyethylene; Color: Raven
c. Ballasting: Factory
d. Warranty Ten (10) years.

PART 3 - EXECUTION

3.1 VERIFICATION OF CONDITIONS

A. Examine areas and surfaces to receive materials, assemblies and equipment furnished and installed under this section:

1. Verify proper location of embeds, frames and items installed by others.
2. Check rough-ins and field dimensions of building construction.
3. Inspect concrete and masonry to ensure construction within required tolerances.
4. Confirm locations of materials ingress openings in building.

B. Report unsatisfactory conditions to Architect in writing. Do not begin installation of detention equipment until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General Contractor:

1. Provide openings through exterior and interior building walls to accommodate ingress of detention equipment. Coordinate sizes and locations of openings with DEC.
2. Ensure accuracy of building construction, including sizes and locations of beams and columns, concrete and masonry walls, evenness of concrete and dimensional consistency.

a. Concrete floors and ceilings should be level and true.
b. Where concrete is uneven, chip or grout as required for proper fit between detention equipment steel and concrete.

3. Broom clean, properly light and heat areas of building where detention equipment is to be installed.
4. Prior to installation of electrical and mechanical hardware or locking and operating devices and controls, exterior closing walls should be in place, exterior windows glazed, and roof completely installed to prevent weather damage to components.

3.3 INSTALLATION

A. General:

1. Install fixtures, materials, assemblies and equipment listed in Articles 1.2 and 1.4 in strict compliance with Specifications, Contract Drawings and manufacturers' recommendations and instructions.
2. Provide necessary drawings, setting diagrams or other information required to Contractor responsible for installation of DEC-furnished items to be installed by others.

B. Attachment and connection of detention equipment:

1. Secure detention equipment permanently in place with minimum of exposed fasteners and free from warp, twists, bends, rough edges, cracks or open joints. Exposed fasteners shall be uniform in size, spacing and appearance and shall be tamper-resistant.
2. Punch bolt holes not more than 1/16-inch larger in diameter than bolts to be used. Accurately space and align holes to permit insertion of bolts. When bolts are used, nuts shall be tightly drawn and bolt threads battered to prevent removal.
3. Remove loose scale, rust, oil and other foreign matter from surfaces to be welded. Welds shall show uniform cross-sections, good penetration of base metals, smoothness of weld metal with a minimum of craters, porosity and clinkers.
4. Thoroughly clean burns, welds and welding spatter on detention equipment resulting from fabrication and installation.
5. Welds that are neat in appearance and evenly spaced shall not require grinding.

C. Supervision:

1. Work shall be performed under direct supervision of competent, experienced, factory-trained project superintendent who shall be full-time employee of DEC.
2. DEC's superintendent shall be present at job site during all phases of installation of detention equipment.
3. DEC shall be responsible for conduct and performance of jobsite personnel and shall ensure that Work progresses without serious conflict with related work being performed simultaneously by other trades.

3.4 FIELD QUALITY CONTROL

A. Upon completion of installation of detention equipment and electronic security systems, perform and document detailed quality assurance inspection confirming proper installation and operation of equipment/systems and provide confirmation in writing to architect. Include written request to architect to inspect Work.

3.5 DEMONSTRATION

A. Provide designated personnel instruction in proper operation of detention equipment and systems for a period of time not less than two (2) working days.

END OF SECTION 111901

SECTION 236423.13 - AIR-COOLED, SCROLL WATER CHILLERS

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 packaged, air-cooled, electric-motor-driven, scroll water chillers.

1.3 DEFINITIONS

A. BAS: Building automation system.

B. COP: Coefficient of performance. The ratio of the rate of heat removal to the rate of energy input using consistent units for any given set of rating conditions.

C. DDC: Direct digital control.

D. EER: Energy-efficiency ratio. The ratio of the cooling capacity given in Btu/h to the total power input given in watts at any given set of rating conditions.

E. GFI: Ground fault interrupt.

F. IPLV: Integrated part-load value. A single-number part-load efficiency figure of merit for a single chiller calculated per the method defined by AHRI 550/590 and referenced to AHRI standard rating conditions.

G. I/O: Input/output.

H. kW/Ton: The ratio of total power input of the chiller in kilowatts to the net refrigerating capacity in tons at any given set of rating conditions.

I. NPLV: Nonstandard part-load value. A single number part-load efficiency figure of merit for a single chiller calculated per the method defined by AHRI 550/590 and intended for operating conditions other than the AHRI standard rating conditions.

J. SCCR: Short-circuit current rating.

K. TEAO: Totally enclosed air over.

L. TENV: Totally enclosed nonventilating.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include refrigerant, rated capacities, operating characteristics, and furnished specialties and accessories.
2. Performance at AHRI standard conditions and at conditions indicated.
3. Performance at AHRI standard unloading conditions.
4. Minimum evaporator flow rate.
5. Refrigerant capacity of water chiller.
6. Oil capacity of water chiller.
7. Fluid capacity of evaporator.
8. Characteristics of safety relief valves.
9. Force and moment capacity of each piping connection.

B. Shop Drawings: Complete set of manufacturer's prints of water chiller assemblies, control panels, sections and elevations, and unit isolation. Include the following:

1. Assembled unit dimensions.
2. Weight and load distribution.
3. Required clearances for maintenance and operation.
4. Size and location of piping and wiring connections.
5. Diagrams for power, signal, and control wiring.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings:

1. Plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

a. Structural supports.
b. Piping roughing-in requirements.
c. Wiring roughing-in requirements, including spaces reserved for electrical equipment.
d. Access requirements, including working clearances for mechanical controls and electrical equipment, and tube pull and service clearances.

2. Each view to show screened background with the following:

a. Column grids, beams, columns, and concrete housekeeping pads.
b. Layout with walls, floors, and roofs, including each room name and number.
c. Equipment and products of other trades that are located in vicinity of chillers and part of final installation, such as plumbing systems.

B. Certificates: For certification required in "Quality Assurance" Article.

C. Installation instructions.

D. Source quality-control reports.

E. Startup service reports.

F. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For each water chiller to include in emergency, operation, and maintenance manuals.

B. Spare Parts List: Recommended spare parts list with quantity for each.

C. Touchup Paint Description: Detailed description of paint used in application of finish coat to allow for procurement of a matching paint.

D. Instructional Videos: Including those that are prerecorded and those that are recorded during training.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Tool kit to include the following:

1. A tool kit specially designed by chiller manufacturer for use in servicing chiller(s) furnished.
2. Special tools required to service chiller components not readily available to Owner service personnel in performing routine maintenance.
3. Lockable case with hinged cover, marked with large and permanent text to indicate the special purpose of tool kit, such as "Chiller Tool Kit." Text size shall be at least 1 inch (25 mm) high.
4. A list of each tool furnished. Permanently attach the list to underside of case cover. Text size shall be at least 1/2 inch (13 mm) high.

B. Touchup Paint: 32 oz. (1 L) container of paint used for finish coat. Label outside of container with detailed description of paint to allow for procurement of a matching paint in the future.

1.8 QUALITY ASSURANCE

A. AHRI Certification: Certify chiller according to AHRI 590 certification program.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Ship water chillers from the factory fully charged with refrigerant and filled with oil.

B. Package water chiller for export shipping.

1.10 WARRANTY

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

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

a. Complete chiller including refrigerant and oil charge.
b. Complete compressor and drive assembly including refrigerant and oil charge.
c. Refrigerant and oil charge.

1) Loss of refrigerant charge for any reason due to manufacturer's product defect and product installation.

d. Parts and labor.

2. Warranty Period: Five years from date of Substantial Completion.

B. Refrigerant loss due to workmanship of piping installation and connection to remote evaporator would be responsibility of installing Contractor.

1. Warranty Period: One year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Site Altitude: Chiller shall be suitable for altitude at which installed without affecting performance indicated. Make adjustments to affected chiller components to account for site altitude.

B. (NOT USED)

C. AHRI Rating: Rate water chiller performance according to requirements in AHRI 550/590.

D. ASHRAE Compliance: ASHRAE 15 for safety code for mechanical refrigeration.

E. ASHRAE/IES 90.1 Compliance: Applicable requirements in ASHRAE/IES 90.1, Section 6 - "Heating, Ventilating, and Air-Conditioning."

F. ASME Compliance: Fabricate and stamp water chiller heat exchangers to comply with ASME Boiler and Pressure Vessel Code.

G. Comply with NFPA 70.

H. Comply with requirements of UL 1995, "Heating and Cooling Equipment," and include label by a qualified testing agency showing compliance.

I. Operation Following Loss of Normal Power:

1. Equipment, associated factory- and field-installed controls, and associated electrical equipment and power supply connected to backup power system shall automatically return equipment and associated controls to the operating state occurring immediately before loss of normal power without need for manual intervention by an operator when power is restored either through a backup power source, or through normal power if restored before backup power is brought on-line.
2. See drawings for equipment served by backup power systems.
3. Provide means and methods required to satisfy requirement even if not explicitly indicated.

J. Outdoor Installations:

1. Chiller shall be suitable for outdoor installation indicated. Provide adequate weather protection to ensure reliable service life over a 25-year period with minimal degradation due to exposure to outdoor ambient conditions.
2. Chillers equipped to provide safe and stable operation while achieving performance indicated when operating at extreme outdoor temperatures encountered by the installation. Review historical weather database and provide equipment that can operate at extreme outdoor temperatures recorded over past 30-year period.

2.2 MANUFACTURERS

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

1. Carrier Corporation.
2. Daikin Applied.
3. Quantech.
4. Trane.
5. YORK; a Johnson Controls company.

2.3 MANUFACTURED UNITS

A. Description: Factory-assembled and run-tested water chiller complete with compressor(s), compressor motors and motor controllers, evaporator, condenser with fans, electrical power, controls, and indicated accessories.

B. Sound-reduction package shall have the following:

1. Acoustic enclosure around compressors.
2. Reduced-speed fans with acoustic treatment.
3. Designed to reduce sound level without affecting performance.

C. Security Package: Security grilles with fasteners for additional protection of compressors, evaporator, and condenser coils. Grilles shall be coated for corrosion resistance and shall be removable for service access.

2.4 CABINET

A. Base: Galvanized-steel base extending the perimeter of water chiller. Secure frame, compressors, and evaporator to base to provide a single-piece unit.

B. Frame: Rigid galvanized-steel frame secured to base and designed to support cabinet, condenser, control panel, and other chiller components not directly supported from base.

C. Casing: Galvanized steel.

D. Finish: Coat base, frame, and casing with a corrosion-resistant coating capable of withstanding a 500-hour salt-spray test according to ASTM B 117.

2.5 COMPRESSOR-DRIVE ASSEMBLIES

A. Compressors:

1. Description: Positive-displacement direct drive with hermetically sealed casing.
2. Each compressor provided with suction and discharge service valves, crankcase oil heater, and suction strainer.

    a. For multiple compressor assemblies, it is acceptable to isolate each compressor assembly in lieu of each compressor.

3. Operating Speed: Nominal 3600 rpm for 60-Hz applications.
4. Capacity Control: On-off compressor cycling.

    a. Digital compressor unloading is an acceptable alternative to achieve capacity control.

5. Oil Lubrication System: Automatic pump with strainer, sight glass, filling connection, filter with magnetic plug or removable magnet in sump, and initial oil charge.

    a. Manufacturer's other standard methods of providing positive lubrication are acceptable in lieu of an automatic pump.

6. Vibration Isolation: Mount individual compressors on vibration isolators.

    a. For multiple compressor assemblies, it is acceptable to isolate each compressor assembly in lieu of each compressor.

B. Compressor Motors:

1. Hermetically sealed and cooled by refrigerant suction gas.

2. High-torque, two-pole induction type with inherent thermal-overload protection on each phase.

C. Compressor Motor Controllers:

1. Across the Line: NEMA ICS 2, Class A, full voltage, nonreversing.

2.6 REFRIGERATION

A. Refrigerant: R-410A. Classified as Safety Group A1 according to ASHRAE 34.

B. Refrigerant Compatibility: Parts exposed to refrigerants shall be fully compatible with refrigerants, and pressure components shall be rated for refrigerant pressures.

C. Refrigerant Circuit: Each circuit shall include an electronic-expansion valve, refrigerant charging connections, a hot-gas muffler, compressor suction and discharge shutoff valves, a liquid-line shutoff valve, a replaceable-core filter-dryer, a sight glass with moisture indicator, a liquid-line solenoid valve, and an insulated suction line.

D. Refrigerant Isolation: Factory install positive shutoff isolation valves in the compressor discharge line and the refrigerant liquid-line to allow the isolation and storage of the refrigerant charge in the chiller condenser.

1. For multiple compressor assemblies, it is acceptable to isolate each compressor assembly in each circuit in lieu of each compressor.

E. Pressure Relief Device:

1. Comply with requirements in ASHRAE 15, ASHRAE 147, and applicable portions of ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.
2. Select and configure pressure relief devices to protect against corrosion and inadvertent release of refrigerant.
3. ASME-rated, spring-loaded, pressure relief valve; single- or multiple-reseating type. Pressure relief valve(s) shall be provided for each heat exchanger.

2.7 EVAPORATOR

A. Brazed-plate design, as indicated.

B. Brazed Plate:

1. Direct-expansion, single-pass, brazed-plate design.
2. Type 304 or 316 stainless-steel construction.
3. Code Compliance: Tested according to ASME Boiler and Pressure Vessel Code.
4. Fluid Nozzles: Terminate with mechanical-coupling end connections for connection to field piping. Furnish flange adapters to mate to flanged piping.

5. Inlet Strainer: Factory-furnished, 20-mesh strainer for field installation in supply piping to evaporator. Manufacturer has option to factory install strainer.

C. Flow Switch: Factory-furnished and -installed, thermal-type flow switch wired to chiller operating controls.

D. Heater: Factory-installed and -wired electric heater with integral controls designed to protect the evaporator to minus 20 deg F (minus 29 deg C).

E. Remote-Mounting Kit: Designed for remote field mounting where indicated. Provide kit for field installation.

2.8 AIR-COOLED CONDENSER

A. Coil(s) with integral subcooling on each circuit.

B. Aluminum Microchannel Coils:

1. Series of flat tubes containing a series of multiple, parallel-flow microchannels layered between refrigerant header manifolds.
2. Single- or multiple-pass arrangement.
3. Construct fins, tubes, and header manifolds of aluminum alloy treated with a corrosion-resistant coating.

C. Hail Protection: Provide condenser coils with louvers, baffles, or hoods to protect against hail damage.

D. Fans: Direct-drive propeller type with statically and dynamically balanced fan blades, arranged for vertical air discharge.

E. Fan Motors: TENV or TEAO enclosure, with sealed and permanently lubricated bearings, and having built-in overcurrent- and thermal-overload protection.

1. Overcurrent- and thermal-overload protection not integral to motor is acceptable if provided with chiller electrical power package.

F. Fan Guards: Removable steel safety guards with corrosion-resistant coating.

2.9 INSULATION

A. Closed-cell, flexible, elastomeric thermal insulation complying with ASTM C 534/C 534M, Type I for tubular materials and Type II for sheet materials.

1. Thickness: 3/4 inch (19 mm).

B. Adhesive: As recommended by insulation manufacturer.

C. Factory-applied insulation over all cold surfaces of chiller capable of forming condensation. Components shall include, but not be limited to, evaporator, evaporator water boxes including nozzles, refrigerant suction pipe from evaporator to compressor, cold surfaces of compressor, refrigerant-cooled motor, and auxiliary piping.

1. Apply adhesive to 100 percent of insulation contact surface.
2. Before insulating steel surfaces, prepare surfaces for paint, and prime and paint as indicated for other painted components. Do not insulate unpainted steel surfaces.
3. Seal seams and joints to provide a vapor barrier.
4. After adhesive has fully cured, paint exposed surfaces of insulation to match other painted parts.
5. Manufacturer has option to factory or field insulate chiller components to reduce potential for damage during installation.
6. Field-Applied Insulation:

a. Components that are not factory insulated shall be field insulated to comply with requirements indicated.
b. Manufacturer shall be responsible for chiller insulation whether factory or field installed to ensure that manufacturer is the single point of responsibility for chillers.
c. Manufacturer's factory-authorized service representative shall instruct and supervise installation of field-applied insulation.
d. After field-applied insulation is complete, paint insulation to match factory-applied finish.
e. Exclusion:
1) Contractor to be responsible for installation of insulation on refrigerant piping per manufacturer's recommendation and Division 23 specification section "HVAC Piping Insulation."

2.10 ELECTRICAL

A. Factory installed and wired, and functionally tested at factory before shipment.

B. Factory-installed and -wired switches, motor controllers, transformers, and other electrical devices necessary shall provide a single-point field power connection to water chiller.

C. House in a unit-mounted, NEMA 250, Type 3R enclosure with hinged access door with lock and key or padlock and key.

D. Wiring shall be numbered and color-coded to match wiring diagram.

E. Factory wiring shall be located outside of an enclosure in a metal raceway. Terminal connections shall be made with not more than a 24-inch (610-mm) length of liquid tight or flexible metallic conduit.

F. Field power interface shall be to NEMA KS 1, heavy-duty, nonfused disconnect switch. Minimum SCCR according to UL 508 shall be as required by electrical power distribution system, but not less than 42,000 A.

G. Each motor shall have overcurrent protection.

H. Overload relay sized according to UL 1995, or an integral component of water chiller control microprocessor.

I. Phase-Failure and Undervoltage: Solid-state sensing with adjustable settings.

J. Power Factor Correction: Capacitors to correct power factor to 0.95 at full load.

K. Controls Transformer: Unit-mounted transformer with primary and secondary fuses and sized with enough capacity to operate electrical load plus spare capacity.

L. Control Relays: Auxiliary and adjustable time-delay relays, or an integral to water chiller microprocessor.

M. Indicate the following for water chiller electrical power supply:

1. Current, phase to phase, for all three phases.
2. Voltage, phase to phase and phase to neutral for all three phases.
3. Three-phase real power (kilowatts).
4. Three-phase reactive power (kilovolt amperes reactive).
5. Running log of total power versus time (kilowatt hours).
6. Fault log, with time and date of each.

2.11 CONTROLS

A. Factory installed and wired, and functionally tested at factory before shipment.

B. Standalone, microprocessor based, with all memory stored in nonvolatile memory so that reprogramming is not required on loss of electrical power.

C. Enclosure: Share enclosure with electrical power devices or provide a separate enclosure of matching construction.

D. Operator Interface: Keypad or pressure-sensitive touch screen. Multiple-character, digital display. Display the following:

1. Date and time.
2. Operating or alarm status.
3. Operating hours.
4. Outside-air temperature if required for chilled-water reset.
5. Temperature and pressure of operating set points.
6. Chilled-water entering and leaving temperatures.
7. Refrigerant pressures in evaporator and condenser.
8. Saturation temperature in evaporator and condenser.
9. No cooling load condition.
10. Elapsed time meter (compressor run status).
11. Pump status.

12. Antirecycling timer status.
13. Percent of maximum motor amperage.
14. Current-limit set point.
15. Number of compressor starts.
16. Alarm history with retention of operational data before unit shutdown.
17. Superheat.

E. Control Functions:

1. Manual or automatic startup and shutdown time schedule.
2. Capacity control based on evaporator leaving-fluid temperature.
3. Capacity control compensated by rate of change of evaporator entering-fluid temperature.
4. Chilled-water entering and leaving temperatures, control set points, and motor load limit. Chilled-water leaving temperature shall be reset based on outside-air temperature.
5. Current limit and demand limit.
6. Condenser-water temperature.
7. External water chiller emergency stop.
8. Antirecycling timer.
9. Automatic lead-lag switching.

F. Manual-Reset Safety Controls: The following conditions shall shut down water chiller and require manual reset:

1. Low evaporator pressure or high condenser pressure.
2. Low chilled-water temperature.
3. Refrigerant high pressure.
4. High or low oil pressure.
5. High oil temperature.
6. Loss of chilled-water flow.
7. Loss of condenser-water flow.
8. Control device failure.

G. DDC System Interface: Factory-install hardware and software to enable system to monitor, control, and display chiller status and alarms.

1. Hardwired I/O Points:

a. Monitoring: On/off status, common trouble alarm, electrical power demand (kilowatts), electrical power consumption (kilowatt hours).
b. Control: On/off operation, chilled-water discharge temperature set-point adjustment.

2. Communication Interface: ASHRAE 135 (BACnet) communication interface shall enable control system operator to remotely control and monitor the water chiller from an operator workstation. Control features and monitoring points displayed locally at water chiller control panel shall be available through DDC system for HVAC.

H. Factory-installed wiring outside of enclosures shall be in NFPA 70-complaint raceway. Make terminal connections with liquid tight or flexible metallic conduit.

2.12 ACCESSORIES

A. Factory-furnished neoprene isolators for field installation.

2.13 CAPACITIES AND CHARACTERISTICS

A. Capacity: See schedule on drawings.

B. Low Ambient Operation: Chiller designed for operation to minus 10 deg F.
   1. Piping to be provided as required by manufacturer for Low Ambient Operation.
   2. Include Hot Gas Bypass piping on one circuit for each chiller per manufacturer recommendation.

C. High Ambient Operation: Chiller designed for operation to 115 deg F (46 deg C).

D. Noise Rating: 72 dBA at 30 feet when measured according to AHRI 370.

2.14 SOURCE QUALITY CONTROL

A. Perform functional test of water chillers before shipping.

B. Factory test and inspect evaporator according to ASME Boiler and Pressure Vessel Code: Section VIII, Division 1. Stamp with ASME label.

C. For water chillers located outdoors, rate sound power level according to AHRI 370 procedure.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Before water chiller installation, examine roughing-in for equipment support, anchor-bolt sizes and locations, piping, controls, and electrical connections to verify actual locations, sizes, and other conditions affecting water chiller performance, maintenance, and operations.

   1. Water chiller locations indicated on Drawings are approximate. Determine exact locations before roughing-in for piping, controls, and electrical connections.

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

3.2 WATER CHILLER INSTALLATION

A. Coordinate sizes and locations of bases with actual equipment provided. Cast anchor-bolt inserts into concrete bases.

B. Install water chillers on support structure indicated.

C. Equipment Mounting:

1. Install water chillers on cast-in-place concrete equipment bases. Comply with requirements for equipment bases and foundations specified in Section 033000 "Cast-in-Place Concrete."
2. Comply with requirements for vibration isolation devices specified in Section 230548.13 "Vibration Controls for HVAC."

D. Maintain manufacturer's recommended clearances for service and maintenance.

E. Maintain clearances required by governing code.

F. Chiller manufacturer's factory-trained service personnel shall charge water chiller with refrigerant if not factory charged and fill with oil if not factory installed.

G. Install separate devices furnished by manufacturer and not factory installed.

1. Chillers shipped in multiple major assemblies shall be field assembled by chiller manufacturer's factory-trained service personnel.

3.3 PIPING CONNECTIONS

A. Comply with requirements in Section 232113 "Hydronic Piping" and Section 232116 "Hydronic Piping Specialties." Drawings indicate general arrangement of piping, fittings, and specialties.

B. Comply with requirements in Section 232300 "Refrigerant Piping." Drawings indicate general arrangement of piping, fittings, and specialties.

C. Where installing piping adjacent to chillers, allow space for service and maintenance.

D. Evaporator Fluid Connections:

1. Connect to evaporator inlet with shutoff valve, strainer, flexible connector, thermometer, and plugged tee with pressure gage.
2. Connect to evaporator outlet with shutoff valve, balancing valve, flexible connector, flow switch, thermometer, plugged tee with pressure gage, flow meter, and drain connection with valve.
3. Make connections to water chiller with a union, flange, or mechanical coupling.

E. Connect each drain connection with a drain valve, full size of drain connection. Connect drain pipe to drain valve with union and extend drain pipe to terminate over floor drain.

F. Connect each chiller vent connection with an automatic vent, full size of vent connection.

3.4 ELECTRICAL POWER CONNECTIONS

A. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

B. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."

C. Provide nameplate for each electrical connection indicating electrical equipment designation and circuit number feeding connection. Nameplate shall be laminated phenolic layers of black with engraved white letters at least 1/2 inch (13 mm) high. Locate nameplate where easily visible.

3.5 CONTROLS CONNECTIONS

A. Install control and electrical power wiring to field-mounted control devices.

B. Connect control wiring between chillers and other equipment to interlock operation as required to provide a complete and functioning system.

C. Connect control wiring between chiller control interface and DDC system for remote monitoring and control of chillers. Comply with requirements in Section 230923 "Direct Digital Control (DDC) System for HVAC."

D. Provide nameplate on face of chiller control panel indicating control equipment designation serving chiller and the I/O point designation for each control connection. Nameplate shall be laminated phenolic layers of black with engraved white letters at least 1/2 inch (13 mm) high.

3.6 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.
5. Check bearing lubrication and oil levels.

6. Verify that refrigerant pressure relief device for chillers installed indoors 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-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. Visually inspect chiller for damage before starting. Repair or replace damaged components, including insulation. Do not start chiller until damage that is detrimental to operation has been corrected.

E. Prepare a written startup report that records results of tests and inspections.

3.7 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain water chillers. Video record the training sessions and provide electronic copy to Owner.

1. Instructor shall be factory trained and certified.
2. Provide not less than eight hours of training.
3. Train personnel in operation and maintenance and to obtain maximum efficiency in plant operation.
4. Provide instructional videos showing general operation and maintenance that are coordinated with operation and maintenance manuals.
5. Obtain Owner sign-off that training is complete.
6. Owner training shall be held at Project site.

END OF SECTION 236423.13

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SECTION 237313.13 - INDOOR, BASIC AIR-HANDLING 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 factory-assembled, indoor air-handling units with limited features, including the following components and accessories:

1. Casings.
2. Fans, drives, and motors.
3. Coils.
4. Air filtration.
5. Dampers.

B. Configuration to match units indicated on drawings.

1.3 ACTION SUBMITTALS

A. Product Data: For each air-handling unit.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
3. Include unit dimensions and weight.
4. Include cabinet material, metal thickness, finishes, insulation, and accessories.
5. Fans:

    a. Include certified fan-performance curves with system operating conditions indicated.
    b. Include certified fan-sound power ratings.
    c. Include fan construction and accessories.
    d. Include motor ratings, electrical characteristics, and motor accessories.

6. Include certified coil-performance ratings with system operating conditions indicated.
7. Include filters with performance characteristics.
8. Include dampers, including housings, linkages, and operators.

B. Shop Drawings: For each type and configuration of indoor, basic, air-handling unit.

1. Include plans, elevations, sections, and mounting details.
2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Detail fabrication and assembly of indoor, basic air-handling units, as well as procedures and diagrams.
4. Include diagrams for power, signal, and control wiring.

C. Delegated-Design Submittal: For vibration isolation 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. Include design calculations for selecting vibration isolators and for designing vibration isolation bases.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Floor plans and other details, or BIM model, drawn to scale, showing the items described in this Section, and coordinated with all building trades.

B. Source quality-control reports.

C. Startup service reports.

D. Field quality-control reports.

E. Sample Warranty: For manufacturer's warranty.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For air-handling units to include in emergency, operation, and maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Filters: One set(s) for each air-handling unit.
2. Gaskets: One set(s) for each access door.

1.7 WARRANTY

A. Warranty: Manufacturer agrees to repair or replace components of indoor, basic, air-handling units that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Manufacturer's standard, but not less than one year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

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

B. NFPA Compliance: Comply with NFPA 90A for design, fabrication, and installation of air-handling units and components.

C. ASHRAE 62.1 Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and Startup."

D. ASHRAE/IES 90.1 Compliance: Applicable requirements in ASHRAE/IES 90.1, Section 6 - "Heating, Ventilating, and Air-Conditioning."

E. Delegated Design: Engage a qualified professional engineer to design vibration isolation, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

F. Structural Performance: Unit casing (wall/floor/roof panels and doors) shall be able to withstand up to 1.5 times design static pressure, or 8-inch w.g., whichever is less, and shall not exceed 0.0042 per inch of panel span (L/240).

2.2 CAPACITIES AND CHARACTERISTICS

A. Refer to Mechanical Equipment Schedules for additional information.

2.3 MANUFACTURERS

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

1. Aaon.
2. Addison.
3. Carrier Corporation; a unit of United Technologies Corp.
4. Daikin Applied.
5. Kreuger.

6. Haakon.
7. Engineered Air.
8. Trane.
9. YORK; a Johnson Controls company.

2.4 UNIT CASINGS

A. General Fabrication Requirements for Casings;

1. Forming: Form walls, roofs, and floors with at least two breaks at each joint.
2. Joints: Sheet metal screws or pop rivets.
3. Sealing: Seal all joints with water-resistant sealant. Hermetically seal at each corner and around entire perimeter.
4. Base Rail:

a. Material: Galvanized steel.
b. Height: 4 inches (150 mm).

B. Double-Wall Construction:

1. Outside Casing Wall: Galvanized steel, minimum 18 gauge (1.3 mm) thick, with manufacturer's standard finish.
2. Inside Casing Wall: G90 (Z275) galvanized steel, solid, minimum 18 gauge (1.3 mm) thick.
3. Floor Plate: G90 (Z275) galvanized steel, treadplate, minimum 18 gauge (1.3 mm) thick.
4. Casing Insulation:

a. Materials: Glass-fiber blanket or board insulation, Type I or Type II ASTM C1071 or injected polyurethane foam insulation.
b. Casing Panel R-Value: Minimum 13 Hr*°F/BTU.
c. Insulation Thickness: 2 inch.
d. Thermal Break: Provide continuity of insulation with no through-casing metal in casing walls, floors, or roofs of air-handling unit.

C. Airstream Surfaces: Surfaces in contact with airstream shall comply with requirements in ASHRAE 62.1.

D. Panels and Doors:

1. Panels:

a. Fabrication: Formed and reinforced with same materials and insulation thickness as casing.
b. Fasteners: Two or more camlock type for panel lift-out operation. Arrangement shall allow panels to be opened against airflow.
c. Gasket: Neoprene, applied around entire perimeters of panel frames.

d. Size: Large enough to allow unobstructed access for inspection and maintenance of air-handling unit's internal components. At least 18 inches (450 mm) wide by full height of unit casing up to a maximum height of 60 inches (1500 mm).

2. Doors:

a. Fabrication: Formed and reinforced with same materials and insulation thickness as casing.
b. Hinges: A minimum of two ball-bearing hinges or stainless-steel piano hinge and two wedge-lever-type latches, operable from inside and outside. Arrange doors to be opened against airflow. Provide safety latch retainers on doors so that doors do not open uncontrollably.
c. Gasket: Neoprene, applied around entire perimeters of frame.
d. Size: Large enough to allow for unobstructed access for inspection and maintenance of air-handling unit's internal components. At least 18 inches (450 mm) wide by full height of unit casing up to a maximum height of 60 inches (1500 mm).

3. Locations and Applications:

a. Fan Section: Doors.
b. Coil Section: Panels.
c. Access Section: Doors.
d. Access Sections Immediately Upstream and Downstream of Coil Sections: Doors.
e. Damper Section: Doors.
f. Filter Section: Doors large enough to allow periodic removal and installation of filters.
g. Mixing Section: Doors.

E. Condensate Drain Pans:

1. Location: Each type of cooling coil.
2. Construction:

a. Single-wall, stainless-steel sheet.

3. Drain Connection:

a. Located at lowest point of pan and sized to prevent overflow. Terminate with threaded nipple on both ends of pan.
b. Minimum Connection Size: NPS 2 (DN 50).

4. Slope: Minimum 0.125 in./ft. (10 mm/mm) slope, to comply with ASHRAE 62.1, in at least two planes to collect condensate from cooling coils (including coil piping connections, coil headers, and return bends) and from humidifiers, and to direct water toward drain connection.
5. Length: Extend drain pan downstream from leaving face for distance to comply with ASHRAE 62.1.
6. Width: Entire width of water producing device.

7. Depth: A minimum of 2 inches (50 mm) deep.

2.5 FAN, DRIVE, AND MOTOR SECTION

A. Provide a fan array system with the quantity of fans indicated on the equipment schedule. Fans selected for N-1 operation.

B. Fan and Drive Assemblies: Statically and dynamically balanced and designed for continuous operation at maximum-rated fan speed and motor horsepower.

C. Fans: Centrifugal, galvanized steel; mounted on solid-steel shaft.

1. Shafts: With field-adjustable alignment.

a. Turned, ground, and polished hot-rolled steel with keyway.

2. Shaft Bearings:

a. Prelubricated and Sealed, Ball Bearings: Self-aligning, pillow-block type with an L-50 rated life of 200,000 hours according to ABMA 9.

3. Housings: Formed- and reinforced-steel panels to form curved scroll housings with shaped cutoff and spun-metal inlet bell.

a. Bracing: Steel angle or channel supports for mounting and supporting fan scroll, wheel, motor, and accessories.

4. Housings, Plenum Fans: Steel frame and panel; fabricated without fan scroll and volute housing. Provide inlet screens for Type SWSI fans.
5. Plenum Fan Arrays: Contained as defined in AHRI 430. Steel or aluminum frame with inlet cone and structural framing around each fan built into an array of multiple fans. Provide backdraft dampers at each fan to prevent short circuiting of flow if one fan is not operating.
6. Mounting: For internal vibration isolation. Factory-mount fans with manufacturer's standard vibration isolation mounting devices having a minimum static deflection of 1 inch (25 mm).
7. Shaft Lubrication Lines: Extended to a location outside the casing.
8. Flexible Connector: Factory fabricated with a fabric strip minimum 3-1/2 inches (89 mm) wide, attached to two strips of minimum 2-3/4-inch- (70-mm-) wide by 0.028-inch- (0.7-mm-) thick, galvanized-steel sheet.

a. Flexible Connector Fabric: Glass fabric, double coated with neoprene. Fabrics, coatings, and adhesives shall comply with UL 181, Class 1.

1) Fabric Minimum Weight: 26 oz./sq. yd. (880 g/sq. m).
2) Fabric Minimum Tensile Strength: 480 lbf/inch (84 N/mm) in the warp and 360 lbf/inch (63 N/mm) in the filling.

3) Fabric Minimum Service Temperature Range: Minus 40 to plus 200 deg F (Minus 40 to plus 93 deg C).

D. Drive, Direct: Factory-mounted, direct drive.

E. Motors:

1. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Section 230513 "Common Motor Requirements for HVAC Equipment."
2. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
3. Enclosure Type: Totally enclosed, fan cooled.
4. Efficiency: Premium efficient as defined in NEMA MG 1.
5. Controllers, Electrical Devices, and Wiring: Comply with requirements for electrical devices and connections specified in electrical Sections.
6. Mount unit-mounted disconnect switches on interior of unit.

F. Comply with Section 262923 "Variable-Frequency Motor Controllers."

G. Variable-Frequency Motor Controller: Serving all fans combined in fan array. Provide two (2) VFDs for redundancy.

1. Manufactured Units: Pulse-width modulated; constant torque and variable torque for inverter-duty motors.
2. Output Rating: Three phase; 10 to 60 Hz, with voltage proportional to frequency throughout voltage range; maximum voltage equals input voltage.
3. Unit Operating Requirements:

a. Internal Adjustability:

1) Minimum Speed: 5 to 25 percent of maximum rpm.
2) Maximum Speed: 80 to 100 percent of maximum rpm.
3) Acceleration: 0.1 to 999.9 seconds.
4) Deceleration: 0.1 to 999.9 seconds.
5) Current Limit: 30 to minimum of 150 percent of maximum rating.

b. Self-Protection and Reliability Features:

1) Surge suppression.
2) Loss of input signal protection.
3) Under- and overvoltage trips.
4) Variable-frequency motor controller and motor-overload/overtemperature protection.
5) Critical frequency rejection.
6) Loss-of-phase protection.
7) Reverse-phase protection.
8) Motor-overtemperature fault.

c. Bidirectional autospeed search.
d. Torque boost.
e. Motor temperature compensation at slow speeds.

1) Panel-mounted operator station.
2) Historical logging information and displays.
3) Digital indicating devices.

f. Control Signal Interface: Electric.
g. Proportional Integral Directive (PID) control interface.
h. DDC system for HVAC Protocols for Network Communications: ASHRAE 135.

4. Line Conditioning:

a. Input line conditioning.
b. Output filtering.
c. EMI/RFI filtering.

5. Redundant VFD: Provide an additional VFD for redundancy that will allow the motors to operate and deliver the required airflow if the other VFD is not functional.

2.6 COIL SECTION

A. General Requirements for Coil Section:

1. Comply with AHRI 410.
2. Fabricate coil section to allow removal and replacement of coil for maintenance and to allow in-place access for service and maintenance of coil(s).
3. Coils shall not act as structural component of unit.

B. Preheat Coils:

1. Hot-Water Coils: Continuous circuit.

a. Piping Connections: Threaded or flanged, same end of coil.
b. Tube Material: Copper.
c. Fin Type: Plate.
d. Fin Material: Aluminum.
e. Fin and Tube Joint: Mechanical bond.
f. Headers:

1) Cast iron with cleaning plugs and drain and air vent tappings extended to exterior of unit.
2) Provide insulated cover to conceal exposed outside casings of headers.

g. Frames: Channel frame, minimum 0.052-inch- (1.3-mm-) thick galvanized steel.
h. Coil Working-Pressure Ratings: 200 psig (1380 kPa), 325 deg F (163 deg C).
i. Coating: None.

C. Cooling Coils:

1. Chilled-Water Coil: Continuous circuit.

a. Piping Connections: Threaded or flanged, same end of coil.
b. Tube Material: Copper.
c. Tube Thickness: 5/8 inches (mm).
d. Fin Type: Plate.
e. Fin Material: Aluminum.
f. Fin and Tube Joint: Mechanical bond.
g. Headers:

1) Cast iron with cleaning plugs and drain and air vent tappings extended to exterior of unit.

h. Frames: Channel frame, minimum 0.052-inch- (1.3-mm-) thick stainless steel.
i. Coatings: None.
j. Working-Pressure Ratings: 200 psig (1380 kPa), 325 deg F (163 deg C).

2.7 AIR FILTRATION SECTION

A. Panel Filters (Pre-Filters):

1. Description: Factory-fabricated, self-supported disposable air filters with holding frames.
2. Filter Unit Class: UL 900.
3. Media: Interlaced glass, synthetic, or cotton fibers coated with nonflammable adhesive and antimicrobial coating.
4. Filter-Media Frame: High wet-strength beverage board with perforated metal retainer, or metal grid, on outlet side.
5. MERV 8.

B. Cartridge Filters (Primary Filters):
1. Description: 12-inch cartridge filters constructed of continuous sheet of fine-fiber media made into closely spaced pleats.
2. Filters shall be sealed into a metal frame assembled in a rigid manner.
3. Gasket material shall be installed on the metal header of the filter to prevent filter bypass where the metal headers meet on the side-access racks.
4. MERV 15.

C. Adhesive, Sustainability Projects: As recommended by air-filter manufacturer and with a VOC content of 80 g/L or less.

D. Side-Access Filter Mounting Frames:

1. Particulate Air Filter Frames: Match inner casing and outer casing material, and insulation thickness. Galvanized steel track.

a. Sealing: Incorporate positive-sealing device to ensure seal between gasketed material on channels to seal top and bottom of filter cartridge frames to prevent bypass of unfiltered air.

2.8 DAMPERS

A. Outdoor- and Return-Air Dampers: Low-leakage, double-skin, airfoil-blade, galvanized-steel dampers with compressible jamb seals and extruded-vinyl blade edge seals in opposed-blade arrangement with zinc-plated steel operating rods rotating in sintered bronze or nylon bearings mounted in a single galvanized-steel frame, and with operating rods connected with a common linkage. Leakage rate shall not exceed 4 cfm/sq. ft. (20 L/s per sq. m) at 1-inch wg (250 Pa) and 8 cfm/sq. ft. (40 L/s per sq. m) at 4-inch wg (1.0 MPa) rated in accordance with AMCA 500D).

B. Electronic Damper Operators: To be provided as part of specification section 230923 "Direct Digital Control (DDC) System for HVAC."

C. Mixing Section: Multiple-blade, air-mixer assembly located immediately downstream of mixing section.

D. Combination Filter and Mixing Section:

1. Cabinet support members shall hold 2-inch- (50-mm-) thick, pleated, flat, permanent or throwaway filters.

2.9 TOTAL ENERGY RECOVERY WHEEL SECTION

A. Total energy recovery wheels shall be provided as indicated on the schedule and drawings. Wheels shall be integral parts of the AHUs and shall be sized per the ventilation requirement of the units. Additional outside air units, or other field assembled and ducted energy recovery devices, are not acceptable. Mixed air units with economizing shall be constructed with internal bypass dampers such that the pressure drop across the wheel does not increase during economizing. External bypass and multiple duct connections are not acceptable.

B. The air handling unit shall be certified by AHRI to contain a rotary energy recovery wheel certified to ANSI/AHRI Standard 1060 and bears the AHRI 1060 label. Performance characteristics of the energy wheel shall be provided as defined by AHRI 1060 definitions. The energy wheel shall be a total energy wheel, with the sensible and latent effectiveness reported and within 5% of each other. The calculated total net effectiveness of the recovery wheel shall not be less than 70% when the specified ventilation flow rate equals the exhaust flow rate. The energy wheels EATR shall be less than the value indicated in the schedule and drawings. Wheel face velocity and pressure drop shall not exceed performance as defined on schedule. The energy recovery cassette shall be an Underwriters Laboratories (UL) Recognized Component certified for mechanical, electrical, and fire safety in accordance with UL Standard 1812.

C. The energy recovery component shall incorporate a rotary wheel in an insulated cassette frame complete with seals, drive motor and drive belts. The total energy recovery wheel shall

incorporate a desiccant without the use of binders or adhesives, which may plug the desiccant aperture. The adsorbent shall not be applied as a glued-on surface coating and not susceptible to erosion, abrasion, or delamination. Coated segments shall be washable using standard detergent or alkaline-based coil cleaners. The adsorbent shall be selected for its high affinity for water vapor and shall not dissolve or deliquesce in the presence of water or high humidity. The rim shall be continuous rolled stainless steel to form an even concentric circle to prevent leakage around the rim and to minimize wear of components. All diameter and perimeter seals shall be provided as part of the cassette assembly. Perimeter seals shall be self-adjusting; diameter seals shall be adjustable.

D. Wheel drive motor shall be provided mounted in the cassette frame. Wheel drive motor shall be thermally protected and UL Component Recognized. Drive belts shall not require belt tensioner. On units that require drive belt tensioner for the wheel belt/motor assembly, the unit manufacturer shall provide at no additional charge to the customer a visual inspection every four months, and adjustment if necessary, of the recommended belt tension during the unit warranty period. Wheel motors shall be of the voltage, phase, frequency, and Hp indicated on the schedule and drawings.

E. Wheel bearings shall be permanently sealed and lubricated and have a minimum L-10 life of 400,000 hours.

F. Access doors shall be provided for the removal of wheel segments. Doors shall be located to allow access to the entire upstream and downstream face of each wheel. Adequate space and access shall be provided for energy wheel motor, bearing and belt removal.

G. Energy recovery wheels shall be designed with variable effectiveness control, to vary the wheel's recovery capacity. Variable effective control shall be done by an internal bypass damper provided by the AHU Manufacturer. The wheel's variable effectiveness control shall have the ability to modulate the total energy recovery ability down to at least 40% of the initial recovery capacity. Variable frequency speed control is not an acceptable method for controlling variable effectiveness.

H. Control of energy wheels shall be incorporated and an integral part of the AHU control systems and shall be as described under the AHU control specifications. Secondary independent wheel controllers are not acceptable.

I. Access doors shall be provided on all air entering and air leaving sides of wheel to allow for wheel maintenance, belt, or motor removal.

2.10 MARINE LIGHT

A. Marine lights shall be provided throughout AHUs as indicated on the schedule and plans. Lights shall be instant-on, light-emitting diode (LED) type to minimize amperage draw and shall produce lumens equivalent to a minimum 75W incandescent bulb (1200 lumens). LED lighting shall provide instant-on, white light and have a minimum 50,000 hr. life.

B. Light fixture shall be weather-resistant, enclosed and gasketed to prevent water and dust intrusion.

C. Fixtures shall be designed for flexible positioning during maintenance and service activities for best possible location providing full light on work surface of interest and not being blocked by technician.

D. All lights on a unit shall be wired in the factory to a single on-off switch.

E. Installing contractor shall be responsible for providing 115V supply to the factory-mounted marine light circuit (unless single-point power is specified to be provided by AHU manufacturer).

2.11 CONVENIENCE OUTLETS

A. A 15-amp, 115V GFCI convenience outlet shall be provided by the AHU manufacturer. The outlet shall be separate from the load side of the equipment per NEC requirements. Installing contractor shall be responsible for providing 115V supply to the factory-mounted GFCI outlet circuit per NEC (even when single-point power is specified to be provided by AHU manufacturer).

2.12 MATERIALS

A. Steel:

1. ASTM A36/A36M for carbon structural steel.
2. ASTM A568/A568M for steel sheet.

B. Galvanized Steel: ASTM A653/A653M.

2.13 SOURCE QUALITY CONTROL

A. AHRI 430 Certification: Air-handling units and their components shall be factory tested according to AHRI 430 and shall be listed and labeled by AHRI.

B. AMCA 300 and AMCA 301, or AHRI 260 Certification: Air-handling unit fan sound ratings shall comply with AMCA 300, "Methods for Calculating Fan Sound Ratings from Laboratory Test Data" and AMCA 301, "Methods for Calculating Fan Sound Ratings from Laboratory Test Data," or with AHRI 260, "Sound Rating of Ducted Air Moving and Conditioning Equipment."

C. Water Coils: Factory tested to 300 psig (2070 kPa) according to AHRI 410 and ASHRAE 33.

PART 3 - EXECUTION

3.1 EXAMINATION

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

B. Examine casing insulation materials and filter media before air-handling unit installation. Replace with new insulation materials and filter media that are wet, moisture damaged, or mold damaged.

C. Examine roughing-in for hydronic, and condensate drainage piping systems and electrical services to verify actual locations of connections before installation.

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

3.2 INSTALLATION

A. Equipment Mounting:

1. Install air-handling units on cast-in-place concrete equipment bases. Coordinate sizes and locations of concrete bases with actual equipment provided. Comply with requirements for equipment bases and foundations specified in Section 033000 "Cast-in-Place Concrete."
2. Comply with requirements for vibration isolation devices specified in Section 230548.13 "Vibration Controls for HVAC."

B. Arrange installation of units to provide access space around air-handling units for service and maintenance.

C. Do not operate fan system until filters (temporary or permanent) are in place. Replace temporary filters used during construction and testing with new, clean filters.

D. Connect duct to air-handling units with flexible connections. Comply with requirements in Section 233300 "Air Duct Accessories."

3.3 PIPING CONNECTIONS

A. Piping installation requirements are specified in other Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Where installing piping adjacent to air-handling unit, allow for service and maintenance.

C. Connect piping to air-handling units mounted on vibration isolators with flexible connectors.

D. Connect condensate drain pans using NPS 1-1/4 (DN 32), ASTM B88, Type M (ASTM B88M, Type C) copper tubing. Extend to nearest equipment or floor drain. Construct deep trap at connection to drain pan and install cleanouts at changes in direction.

E. Hot- and Chilled-Water Piping: Comply with applicable requirements in Section 232113 "Hydronic Piping" and Section 232116 "Hydronic Piping Specialties." Install shutoff valve and union or flange at each coil supply connection. Install balancing valve and union or flange at each coil return connection.

3.4 ELECTRICAL CONNECTIONS

A. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

B. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."

C. Install electrical devices furnished by manufacturer, but not factory mounted, according to NFPA 70 and NECA 1.

D. Install nameplate for each electrical connection, indicating electrical equipment designation and circuit number feeding connection.

1. Nameplate shall be laminated acrylic or melamine plastic signs, as specified in Section 260553 "Identification for Electrical Systems."
2. Nameplate shall be laminated acrylic or melamine plastic signs with a black background and engraved white letters at least 1/2 inch (13 mm) high.

3.5 CONTROL CONNECTIONS

A. Install control and electrical power wiring to field-mounted control devices.

B. Connect control wiring according to Section 260523 "Control-Voltage Electrical Power Cables."

3.6 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.

1. Complete installation and startup checks according to manufacturer's written instructions.
2. Verify that shipping, blocking, and bracing are removed.
3. Verify that unit is secure on mountings and supporting devices and that connections to piping, ducts, and electrical systems are complete. Verify that proper thermal-overload protection is installed in motors, controllers, and switches.
4. Verify proper motor rotation direction, free fan wheel rotation, and smooth bearing operations. Reconnect fan drive system, align belts, and install belt guards.
5. Verify that bearings, pulleys, belts, and other moving parts are lubricated with factory-recommended lubricants.
6. Verify that outdoor- and return-air mixing dampers open and close, and maintain minimum outdoor-air setting.
7. Comb coil fins for parallel orientation.
8. Verify that proper thermal-overload protection is installed for electric coils.
9. Install new, clean filters.
10. Verify that manual and automatic volume control and fire and smoke dampers in connected duct systems are in fully open position.

B. Starting procedures for air-handling units include the following:

1. Energize motor; verify proper operation of motor, drive system, and fan wheel. Adjust fan to indicated rpm.
2. Measure and record motor electrical values for voltage and amperage.
3. Manually operate dampers from fully closed to fully open position and record fan performance.

3.7 ADJUSTING

A. Adjust damper linkages for proper damper operation.

B. Comply with requirements in Section 230593 "Testing, Adjusting, and Balancing for HVAC" for air-handling system testing, adjusting, and balancing.

C. Occupancy Adjustments: When requested within 12 months from date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

3.8 CLEANING

A. After completing system installation and testing, adjusting, and balancing of air-handling unit and air-distribution systems, and after completing startup service, clean air-handling units internally to remove foreign material and construction dirt and dust. Clean fan wheels, cabinets, dampers, coils, and filter housings, and install new, clean filters.

3.9 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

C. Perform the following tests and inspections with the assistance of a factory-authorized service representative:

1. Leak Test: After installation, fill water and steam coils with water, and test coils and connections for leaks.
2. Charge refrigerant coils with refrigerant and test for leaks.
3. Fan Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.

D. Air-handling unit and components will be considered defective if unit or components do not pass tests and inspections.

E. Prepare test and inspection reports.

3.10 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain air-handling units.

END OF SECTION 237313.13

SECTION 262550 – GENERATOR CAMLOCK ROTARY MANUAL TRANSFER SWITCH

PART 1 - GENERAL

1.1 QUALITY ASSURANCE

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

B. Comply with NFPA 70.

C. UL 1008 or ETL Listed to UL 1008 Standards.

D. Comply with NEC 700.3(F)

1.2 GUARANTEE/WARRANTY

A. The equipment installed under this contract shall be left in proper working order. Replace, without additional charge, new work or material which develops defects from ordinary use within one year.

B. New materials and equipment shall be guaranteed against defects in composition, design or workmanship. Guarantee certificates shall be furnished.

PART 2 - PRODUCTS

2.1 Generator Camlock Quick Connect Rotary Service Entrance

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

1. ASCO
2. Power Temp

Any alternate shall be submitted for approval to the consulting engineer at least 10 days prior to bid. Any alternates to this bid shall only be considered if a complete written description of the proposed system along with any variances with the specification, are received ten (10) days prior to bid due date. Any variances not specifically enumerated prior to bidding shall be considered non-responsive. Costs incurred to modify the building and/or interfacing equipment which are affected as a result of an alternate, shall be the responsibility of the contractor.

2.2 INTEGRATED CIRCUIT BREAKER(S) & ROTARY SWITCH

A. Circuits breakers shall be Square D, Siemens, or ABB, LI, UL 489 Circuit Breakers, Comply with UL 489 with interrupt capabilities to meet the available fault currents. Include mechanical lugs on tin plated copper busbar for line and load connections. Integrated rotary manual transfer switch required in addition to service breaker.

2.3 GENERAL REQUIREMENTS

A. A set of Camloks shall be provided for each of the following:

1. Portable Generator

B. Protective Caps

1. All Camloks shall be protected with spring loaded weather proof flip covers that are clear in color to allow for easy viewing of phase color and gender.

C. Enclosures:
1. Pad mount, Bottom/Side/Top Cable Entry, NEMA 3R rain-tight, aluminum (non-corrosive) or stainless steel enclosure with rake system for cable entry at the bottom.
2. Cable entry area at the bottom of the enclosure shall be covered by a hinged trap door.
   a. It shall be possible to close and lock the front door to the enclosure with the trap door open, and power cables connected through the bottom of the enclosure. The enclosure shall maintain NEMA 3R integrity with power cables connected.
3. Front Cover:
   a. Hinged.
   b. Gasketed.
   c. Pad-lockable latch.
4. Finishes:
   a. Paint after fabrication. Powder coated Hammer Gray or Black.

D. Phase, Neutral, and Ground Buses:

1. Material: Silver-plated, Tin-plated or Hard-drawn copper, specified upon order.
2. Equipment Ground Bus: bonded to box.
3. Isolated Ground Bus: insulated from box.
4. Ground Bus: 25%, 50% or 100% of phase size.
5. Neutral Bus: Neutral bus rated 100 percent of phase bus.
6. Round edges on bus.

E. All hardware shall be stainless steel including all bolts, nuts, and hinges.

F. Portable Generator Hardwire Connections will be "Repetitive Use" Smart Lugs for the use of fine strand portable power cable, oblong cable hole, have ¾" hex head bolt type head and ½" threaded hole for ring terminal connection. Standard Cone Type mechanical lugs for THHN will not be allowed.

G. Copper bus shall be silver plated.

H. Lockable rake system with reinforced support struts to reduce cable theft.

I. Permanent generator connectors shall be broad range set-screw type, located behind an aluminum barrier.

J. Voltage & Phase shall be as shown on project one line drawing. Camloks shall be color coded as appropriate for the specified voltage.

K. Phase rotation meter shall be included and shall have LED's to annunciate improper phase rotation as well as a dry contact output for building management monitoring.

L. Amperage rating shall be as shown on project one-line drawing.

M. Extra depth shall be provided on all quick connects with pad mount leg kits to accommodate bottom cable entry.

N. Auto Start Circuit to meet NEC 700.3.F(2), Reference NEC 700.12 (10 second start).

O. Aux contacts on switches, circuit breakers, or switching mechanism to meet NEC 700.3.F(5)

P. Portable Generator block heater receptacle 120V (30A)

Q. Portable Generator Battery Charger receptacle 120V (20A)

R. Portable Generator Convenience outlet 120V (20A)

S. Internal Heater 120V (20A)

T. Kirk key for mounting on permanent generator (or another circuit breaker) as required to avoid inadvertent back-feed per NEC 700.3.F(4), or a manual transfer switch is acceptable.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine elements and surfaces to receive Generator Quick Connect for compliance with installation tolerances and other conditions affecting performance of the Work.

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

3.2 INSTALLATION

A. Surface, Flush or Base Mounted: Specified with order.

1. Install anchor bolts to elevations required for proper attachment to Generator Quick Connect.

B. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.

3.3 FIELD QUALITY CONTROL

A. Generator Quick Connect vendor shall be required to send a technical representative to the job site to inspect and review installation to ensure it meets the requirements of the consulting engineer.

B. Prepare inspection report that identifies Generator Quick Connect with notations of any remedial action taken to correct any issues.

END OF SECTION 262550

SECTION 264313 - SURGE PROTECTION FOR LOW-VOLTAGE ELECTRICAL POWER CIRCUITS

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 field-mounted SPDs for low-voltage (120 to 600 V) power distribution and control equipment.

1.	SPD-MDP	(Main Distribution Panel/Switchboard 'MDP')	480/277V, 3-phase, 4-wire.
2.	SPD-EDP	(Emergency Dist. Panel/Switchboard 'EDP')	480/277V, 3-phase, 4-wire.
3.	SPD-E1HA	(Emergency Power Panelboard 'E1HA')	480/277V, 3-phase, 4-wire.
4.	SPD-E1HB	(Emergency Power Panelboard 'E1HB')	480/277V, 3-phase, 4-wire.
5.	SPD-E1HC	(Emergency Power Panelboard 'E1HC')	480/277V, 3-phase, 4-wire.
6.	SPD-E1HD	(Emergency Power Panelboard 'E1HD')	480/277V, 3-phase, 4-wire.
7.	SPD-E2HA	(Emergency Power Panelboard 'E2HA')	480/277V, 3-phase, 4-wire.
8.	SPD-L1HA	(Legal Power Panelboard 'L1HA')	480/277V, 3-phase, 4-wire.
9.	SPD-E1PA	(Emergency Lighting Panelboard 'E1PA')	208/120V, 3-phase, 4-wire.
10.	SPD-E1PB	(Emergency Lighting Panelboard 'E1PB')	208/120V, 3-phase, 4-wire.
11.	SPD-E1PE	(Emergency Lighting Panelboard 'E1PE')	208/120V, 3-phase, 4-wire.
12.	SPD-E1PF	(Emergency Lighting Panelboard 'E1PF')	208/120V, 3-phase, 4-wire.
13.	SPD-E2PA	(Emergency Lighting Panelboard 'E2PA')	208/120V, 3-phase, 4-wire.
14.	SPD-L1PA	(Legal Lighting Panelboard 'L1PA')	208/120V, 3-phase, 4-wire.
15.	SPD-LDH	(Emergency Power Panelboard 'LDH')	480/277V, 3-phase, 4-wire.
16.	SPD-LDPA	(Emergency Lighting Panelboard 'LDPA')	208/120V, 3-phase, 4-wire.
17.	SPD-LDPB	(Emergency Lighting Panelboard 'LDPB')	208/120V, 3-phase, 4-wire.
18.	SPD-LTH	(Emergency Power Panelboard 'LTH')	480/277V, 3-phase, 4-wire.
19.	SPD-LTP	(Emergency Lighting Panelboard 'LTP')	208/120V, 3-phase, 4-wire.

1.3 REFERENCED STANDARDS

A. IEEE C62.41: IEEE Guide for Surge Voltages in Low Voltage AC Power Circuits (ANSI).

B. IEEE C62.45: IEEE Guide for Surge Suppressor Testing (ANSI).

C. NETA ATS: Acceptance Testing Specifications; Section 7.19, "Low-Voltage Surge Protection Devices".

D. NEMA 250: Enclosures for Electrical Equipment (1000 Volts Maximum).

E. NEMA WD 6: Wiring Device--Dimensional Requirements.

F. NFPA 70: National Electrical Code.

G. UL 486A: Wire Connectors and Soldering Lugs for Use with Copper Conductors.

H. UL 1283: Electromagnetic Interference Filters.

I. UL 1449 (3rd Edition Effective 9/29/2009): UL1149 4th Edition Effective 3/26/2016 Surge Protection Devices.

1.4 DEFINITIONS

A. Inominal: Nominal discharge current.

B. MCOV: Maximum continuous operating voltage.

C. Mode(s), also Modes of Protection: The pair of electrical connections where the VPR applies.

D. SCCR: Short-circuit current rating.

E. SPD: Surge protective device.

F. VPR: Voltage protection rating.

1.5 SUBMITTALS

A. Product Data: For each type of product.

1. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
2. Copy of UL Category Code VZCA certification, as a minimum, listing the tested values for VPRs, Inominal ratings, MCOVs, type designations, OCPD requirements, model numbers, system voltages, and modes of protection.
3. Shipping, installed, and operating weights; furnished specialties; and accessories.

B. Product Certificates: Signed by manufacturers of surge protection devices, certifying that products furnished comply with the following testing and labeling requirements:

1. UL 1283 certification by an OSHA approved NRTL.
2. UL 1449 (3rd Edition Effective 9/29/2009) 4th Edition Effective 3/26/2016 listing and classification by an OSHA approved NRTL.
3. NEMA LS-1 Single Pulse

C. Field Test Reports: Written reports of tests specified in Part 3 of this Section. Include the following:

1. Test procedures used.
2. Test results that comply with requirements.
3. Failed test results and corrective action taken to achieve requirements.

D. Maintenance Data: For surge protection devices to include in maintenance manuals specified in Division 1.

E. Warranties: Special warranties specified in this Section.

1.6 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

B. Sample Warranty: For manufacturer's special warranty.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For SPDs to include in maintenance manuals.

1.8 WARRANTY

A. General Warranty: Special warranties specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Special Warranty: Written warranty, executed by manufacturer agreeing to repair or replace components of surge suppressors that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Fifteen (15) years from date of Substantial Completion.

1.9 SERVICE CONDITIONS

A. Rate surge protective devices for continuous operation under the following conditions, unless otherwise indicated:

1. Maximum Continuous Operating Voltage: Not less than 115 percent of nominal system operating voltage.
2. Operating Temperature: minus 20 degrees F to plus 120 degrees F.
3. Humidity: 0 to 85 percent, non-condensing.
4. Altitude: Less than 20,000 feet above sea level.

PART 2 - PRODUCTS

2.1 GENERAL SPD REQUIREMENTS

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

1. Current Technology Inc.

2. Substitution requests shall be submitted for Engineer review a minimum of ten (10) working days prior to bid date; provide product data sheets, technical specifications and testing, warranty, and other pertinent information demonstrating equipment is a performance equal; include a list of all deviations or exceptions where taken.

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

C. Comply with NFPA 70.

D. Comply with UL 1449. 4th Edition Effective 3/26/2016.

E. MCOV of the SPD shall be the nominal system voltage.

2.2 PANEL SUPPRESSORS

A. Comply with UL 1449 (4th Edition) Type 1, tested at Inominal Rating: 20 kA.

B. Per ANSI/IEEE C62.41.1-2002, C62.41.2-2002 and C62.45-2002, the SPD system shall be repetitive surge current capacity tested in every mode using a 1.2 x 50 µsec, 20KV open circuit voltage, 8 x 20 µsec, 200KA short circuit current ANSI/IEEE C62.41 Category C3 waveform at one minute interval. Minimum repetitive strikes with less than 10% degradation of clamping voltage shall be 3500 repetitive C3 strikes per mode.

C. Single Pulse Surge Testing: The maximum single-pulse surge current capacity per mode shall be verified through testing at an independent third-party testing facility. Testing shall be conducted in each mode of the device and all tested modes shall be from the same test sample. This test shall include all components of the SPD system, including disconnects (if applicable) and fusing as a completed assembly. Individual component testing, module testing only, or subsystem testing of the SPD for compliance with this section will not be acceptable. Ratings based on the arithmetic sum of the ratings of the individual MOVs in a given mode are not acceptable. Testing that causes damage to the device, fuse operation, or voltage clamping performance degradation by more than 10% is not acceptable. The Single Pulse Surge Current Capacity shall be as indicated below:

1. 480/277V, 3-phase, 4-wire Current Technology TG3 Series

a.	SPD-MDP	200KA	TG3-200-480-3Y-MNB-M3-F-2
b.	SPD-EDP	150KA	TG3-150-480-3Y-MNB-M3-F-2
c.	SPD-LDH	150KA	TG3-150-480-3Y-MNB-M3-F-2
d.	SPD-LTH	150KA	TG3-150-480-3Y-MNB-M3-F-2

2. 480/277V, 3-phase, 4-wire Current Technology CGP3 Series

a.	SPD-L1HA	100KA	CGP3-100-480-3Y-PL-U-F
b.	SPD-E1HA	100KA	CGP3-100-480-3Y-PL-U-F
c.	SPD-E1HB	80KA	CGP3-080-480-3Y-PL-U-F
d.	SPD-E1HC	100KA	CGP3-100-480-3Y-PL-U-F
e.	SPD-E1HD	100KA	CGP3-100-480-3Y-PL-U-F
f.	SPD-E2HA	100KA	CGP3-100-480-3Y-PL-U-F

3. 208/120V, 3-phase, 4-wire. Current Technology CGP3 Series

a.	SPD-E1PA	80KA	CGP3-080-208-3Y-PL-U-F
b.	SPD-E1PB	60KA	CGP3-060-208-3Y-PL-U-F
c.	SPD-E1PE	80KA	CGP3-080-208-3Y-PL-U-F
d.	SPD-E1PF	80KA	CGP3-080-208-3Y-PL-U-F
e.	SPD-E2PA	80KA	CGP3-080-208-3Y-PL-U-F
f.	SPD-L1PA	60KA	CGP3-060-208-3Y-PL-U-F
g.	SPD-LDPA	80KA	CGP3-080-208-3Y-PL-U-F
h.	SPD-LDPB	80KA	CGP3-080-208-3Y-PL-U-F
i.	SPD-LTP	80KA	CGP3-080-208-3Y-PL-U-F

D. Filtering: The SPD shall provide a noise filtering system capable of attenuating noise levels produced by electromagnetic interference and radio frequency interference (EMI/RFI). The system's filtering characteristics shall be expressed in decibels (dB) of attenuation at no less than 8 points over a frequency spectrum between 50kHz and 100MHz. The noise filtering system shall also be listed to UL 1283 by an approved NRTC, as an electromagnetic interference filter.

E. Fusing: Each MOV shall be individually fused and designed to operate only in the event of an MOV failure within the SPD. In the event of an MOV failure, the fuse will operate to remove the failed MOV from the circuit. The remaining MOV's and fuses will stay intact to handle subsequent surges. The fusing included with the SPD system shall be required to meet the above requirement and shall be included with the above testing guidelines. Overcurrent fusing that limits the rated single pulse surge current of the SPD is not acceptable. Replaceable cartridge type per phase or per mode overcurrent fusing is not acceptable where there is more than one MOV per mode.

F. Fault Current Capability: The unit shall be capable of interrupting up to a 200kA symmetrical fault current with 600VAC applied without the need of an upstream overcurrent protection device (fuse or circuit breaker).

G. UL 1449 Voltage Protection Rating: The unit shall be UL 1449 3rd Edition 4th Edition Effective 3/26/2016Listed by a Nationally Recognized Testing Laboratory and shall be as follows for L-N, L-G, N-G, and L-L, modes:

1. TG3-200-480-3Y-MNB-M3-F-2; TG3-150-480-3Y-MNB-M3-F-2

    a. Line to Neutral: 1200 V.
    b. Line to Ground: 1200 V.
    c. Neutral to Ground: 1000 V.
    d. Line to Line: 2000 V.

2. CGP3-100-480-3Y-PL-U-F

    a. Line to Neutral: 1200 V.
    b. Line to Ground: 1200 V.
    c. Neutral to Ground: 1200 V.
    d. Line to Line: 1800 V.

3. CGP3-080-480-3Y-PL-U-F

    a. Line to Neutral: 1000 V.
    b. Line to Ground: 1000 V.
    c. Neutral to Ground: 1000 V.
    d. Line to Line: 1800 V.

4. CGP3-080-208-3Y-PL-U-F & CGP3-060-208-3Y-PL-U-F

    a. Line to Neutral: 600 V.
    b. Line to Ground: 600 V.
    c. Neutral to Ground: 600 V.
    d. Line to Line: 1000 V.

H. SPD units shall provide protection status indication via a tri-colored LED per phase. The tri-colored LED shall report when the SPD has reached 75% of remaining useful life, and 40% of remaining useful life.

I. Monitoring Contacts: The unit shall come standard with Form C dry relay contacts (N.O. and N.C.) for remote monitoring capability, and internal audible alarm with silence button.

J. Event Counter: The unit shall come standard with a transient event counter with LCD panel display and reset button on the front cover.

K. Enclosure: The unit shall be supplied in a NEMA type 1 enclosure rated for indoor applications.

2.3 HIGH-PERFORMANCE INTERCONNECT CABLES

A. Contractor shall install cabling from panel bus to surge protective device. Where cabling length is great than 6'-0", a high-performance connection cable shall be used. Cable shall be a pre-manufactured, dual shielded, triple insulated, multi-core power conductor specially constructed to minimize interconnection impedance for SPD installations. Cable shall be UL approved for use with Current Technology SPD products.

1. Manufacturer/Model: Current Technology HPI

PART 3 - EXECUTION

3.1 COORDINATION

A. Coordinate location of field-mounted surge suppressors to allow adequate clearances for maintenance.

3.2 INSTALLATION

A. Placing into Service: Do not energize or connect service entrance equipment, or power or lighting panelboards to their sources until the surge protective devices are installed and connected. Verify system voltage prior to energizing surge protective device. When the cable connection length, between the SPD and the switchboard or panelboard, exceeds more than 6 lineal feet, the Contractor shall furnish and install a low impedance connection system from Current Technology, Model HPI, to maximize the performance of the SPD in mitigating the effects of transient voltage surges to the client's protected systems

B. Comply with NECA 1.

C. Install an OCPD or disconnect as required to comply with the UL listing of the SPD.

D. Install SPDs with conductors between suppressor and points of attachment as short and straight as possible; adjust circuit-breaker positions to achieve shortest and straightest leads. Do not splice and extend SPD leads unless specifically permitted by manufacturer and Engineer. Do not exceed manufacturer's recommended lead length. Do not bond neutral and ground.

E. Use crimped connectors and splices only. Wire nuts are unacceptable.

F. Wiring:

1. Power Wiring: Comply with wiring methods in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

3.3 CONNECTIONS

A. 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.

3.4 FIELD QUALITY CONTROL AND START-UP

A. Perform the following the following field quality-control tests and inspections with the assistance of a factory-authorized service representative.

1. Compare equipment nameplate data for compliance with Drawings and Specifications.
2. Inspect anchorage, alignment, grounding, and clearances.
3. Verify that electrical wiring installation complies with manufacturer's written installation requirements.
4. After installing surge protective devices, but before electrical circuitry has been energized, test for compliance with requirements, using a diagnostic portable test kit.
5. Complete startup checks according to manufacturer's written instructions.
6. Do not perform insulation-resistance tests of the distribution wiring equipment with SPDs installed. Disconnect SPDs before conducting insulation-resistance tests and reconnect them immediately after the testing is over.
7. Energize SPDs after power system has been energized, stabilized, and tested.

B. Manufacturer's Field Service: Upon completion of installation and prior to energization, a factory-authorized local service representative shall provide product start-up testing services. The tests shall include:

1. On-Line Testing: Verification that all suppression and filtering paths are operating with 100% protection as well as verification of proper facility neutral-to-ground bond by measuring neutral-to-ground current and voltage.
2. Off-line testing: Impulse injection to verify the system tolerances as well as verification of proper facility neutral-to-ground bond. To be compared to factory benchmark test parameters supplied with each individual unit.

C. The SPD manufacturer's technician shall perform a system checkout and start-up in the field to assure proper installation, operation and to initiate the warranty of the system. The technician will be required to do the following:

1. Verify voltage clamping levels utilizing a diagnostic test kit, comparing factory readings to installed readings.
2. Verify N-G connection.
3. Record information to a product signature card; keep a signature card with each SPD as reference for ongoing operation, maintenance, testing, or servicing.

D. Documentation and Reporting:

1. Prepare test and inspection reports.

a. A copy of the start-up test results and the factory benchmark testing results shall be provided to the Engineer and the Owner for confirmation of proper system function.
b. This letter shall also confirm that all neutral-to-ground bonds were verified through testing and visual inspection, and that all grounding bonds were observed to be in place.
c. Include Operation and Maintenance Manual.

E. An SPD will be considered defective if it does not pass tests and inspections. Repair or replace malfunctioning units. Retest after repairs or replacements are made.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to operate and maintain surge protective devices.

1. Train Owner's maintenance personnel on procedures and schedules for maintaining suppressors.
2. Review data to be included in operation and maintenance manuals. Refer to Division 017823 "Operation and Maintenance Data."
3. Schedule training with Owner, through Construction Manager, with a seven (7) day advanced notice.

END OF SECTION 264313

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SECTION 280500 – COMMON WORK RESULTS FOR ELECTRONIC SAFETY AND SECURITY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This section includes general requirements for Division 28 work and is supplemental and in addition to the requirements of Division 1.

B. It is the intention of this Division of the Specifications to describe and provide for the furnishing, installing, testing and placing in satisfactory and fully operational condition all equipment, materials and devices necessary to provide a complete Division 28 system.

C. The Division 28 Security Systems shall be bid to the Detention Equipment Contractor as a complete package. Delineation of responsibilities between the Division 11, 26 and 28 contractors are specified herein.

D. The Steel Detention Cell shall include a factory installed self-contained modular control system (MCS) that controls and monitors the cell door and intercom. The system shall utilize Ethernet to distribute control and monitoring commands between the Security System Integrator's (SSI's) security network and touch screen application and the factory installed MCS. Omron shall be an acceptable PLC manufacturer for this solution. The Steel Detention Cell manufacturer shall also provide a Modular Control Interface (MCI) server to be located in the primary security equipment room. The MCI will receive and transmit commands from the System Integrator's SCADA software, PLC system and audio system. In addition, the MCI server will distribute 24VDC power, audio commands, audio paths and control commands to the MCS as required to provide a fully functional system.

E. The Division 28 Security Systems Integrator (SSI) shall be responsible for the coordination, furnishing and installation of all Division 28 systems, which shall include the following:

1. 280500 - COMMON WORK RESULTS FOR ELECTRONIC SAFETY & SECURITY
2. 280510 – CABINETS AND ENCLOSURES
3. 281300 – ACCESS CONTROL SYSTEM
4. 282300 – IP VIDEO COMMUNICATION SYSTEM
5. 284619 – SECURITY AUTOMATION SYSTEM
6. 284620 – VIDEO GRAPHIC USER INTERFACE
7. 285123 – IP AUDIO COMMUNICATION SYSTEM

F. The Division 26 contractor shall design, furnish, install and place in satisfactory condition all conduits/raceways, boxes (back boxes and junction boxes), conductors and connections and all other materials required for the Division 28 systems specified in the contract documents to be complete and fully operational upon completion of the project.

G. All cabling provided by the Division 26 contractor shall be in conduit where determined, and continuous between the field device and the head-end equipment location. The Division 26 contractor shall maintain uniform phasing and color-coding throughout system, adhering to the approved Division 28 shop drawings.

H. The SSI shall coordinate with the Division 26 contractor all requirements of the security electronics cable system including PLC/GUI, video surveillance, access control, audio communications, and other miscellaneous systems per NEC, as shown in the project documents.

I. The Division 26 contractor shall set in place all SSI-supplied security equipment cabinets, racks and enclosures. The SSI shall provide documentation detailing the required installation.

J. The Division 26 contractor shall be responsible for the provision and installation/terminations of all required 120VAC power, including UPS circuits, for the security electronics head-end equipment and control station location equipment. The Division 26 contractor shall be responsible for the installation of all Div. 28-supplied UPS equipment.

K. The Division 26 contractor shall be responsible for all cabling/conduit coordination in regard to electric locks, position switches, door hardware and door frames supplied by Division 8 and/or Division 11 contractor(s).

L. The Division 26 contractor shall be responsible for all Division 28 field device and head-end equipment installation and terminations. The SSI shall be responsible for the installation and terminations of all control station equipment, including GUI PCs, monitors, network client PCs and monitors.

M. The General Contractor shall provide coordination to ensure that control rooms and rooms housing security electronics head end equipment are completed, clean and have conditioned air as early as possible to facilitate completion of control wiring and terminations. Space shall be free of air-borne particles prior to installation of any Security Electronics Equipment. The Architect shall inspect and approve the condition of these rooms prior to the installation of any active equipment.

N. The Division 11 contractor shall furnish and install all security hardware, adjust all door position and lock position switches as necessary to properly indicate to the security electronics system, provide all hardware and frame schedules as necessary to pertinent contractors, and provide all wiring diagrams to the SSI and Division 26 contractors for electric locking devices being interfaced to by the security electronics system.

O. The Owner shall be responsible for providing a high-speed internet connection to the Security Management System for remote diagnostics by the SSI. The Owner shall provide a network connection between their LAN and the video management system. Configuration of the Owner's

network switches shall be by the Owner. Inmate Telephone system terminations at the SSI-supplied telephone relay interface panel shall be by the Owner's telephone system contractor.

1.3 DEFINITIONS

A. UL: Underwriters Laboratories

B. NEMA: National Electrical Manufacturer's Association

C. NEC: National Electrical Code

D. NFPA: National Fire Protection Association

E. SSI: Security System Integrator

1.4 SUBMITTALS

A. General: Submit the following information to be included in the submittal package.

B. Product Data:
1. Include rated capacities, operating characteristics, furnished specialties, and accessories.
2. Indicate specification section and paragraph for each item.
3. Indicate listing by UL or other approved testing agency.
4. Data sheets showing multiple products or models shall clearly identify the specific product or model being proposed.
5. Submit in a three-ring binder with hardboard covers.

C. Shop Drawings: Submitted shop drawings shall be generated utilizing AutoCAD and shall be drawn to the drawing/detail scale. The Electronic Safety and Security shop drawings shall include, but not be limited to the following:

1. Dimensions, weights, loads, required clearances, method of field assembly, location and size of each field connection.
2. Detailed equipment enclosure drawings showing arrangement of all proposed equipment with required wire-way and receptacles shown.
3. System risers showing all required interconnections for the following subsystems along with any special terminations that may be required for that subsystem:

a. Overall Electronic Safety and Security System
b. PLC I/O Network
c. Ethernet Network
d. Video Surveillance System
e. Digital Intercom System
f. Utility & Misc. Systems

4. Submit power system drawings indicating all fuse ID numbers as well as voltage and size.

5. Submit power loading spreadsheets detailing all AC power circuits and DC power supply circuits. The spreadsheet shall indicate each device's steady state and in rush current requirements.
6. Submit device schedules that reference the shop drawings detailing exact termination locations for each security device in the system. The device schedules shall indicate the name, location, termination point, voltage, and fuse ID for each. The schedules shall be categorized by device type (i.e. doors, intercoms, cameras, proximity readers, etc.).

D. Operation and Maintenance Data: Provide O&M manuals as required below:

E. The O&M manuals shall include the information required to operate and maintain all Division 28 electronic security system equipment. The information provided shall include the following:

1. Operations manual for GUI and Security Management System.
2. As-built shop drawings, including up-to-date device schedules.
3. Wiring diagrams.
4. CD with manufacturer's installation and operations manuals.
5. Complete list of spare parts being provided.
6. The current contact (including service) information for the SSI.
7. Provide two (2) copies of each operating and maintenance manual. Manuals shall be bound in "D-ring" binders with a detailed table of contents.
8. Provide one electronic copy of the O&M manual for inclusion with the O&M manual deliverables on a USB flash drive.

F. Software Deliverables: Provide a software binder that shall incorporate the following files and information;

1. Provide a text file containing all operator and administrator-level passwords for the GUI system, Security Management system, digital intercom system, PLC system and DVMS.
2. PC recovery files, GUI runtime licenses, digital intercom system software, VMS software, PLC software, and monitor drivers.

1.5 QUALITY ASSURANCE

A. Security Systems Integrators

1. Only PRE-QUALIFIED Security System Integrators (SSIs) shall be permitted to bid on the Division 28 Electronic Security Systems.
2. The pre-qualified SSIs shall only be allowed to furnish materials from the manufacturers as specified in the Division 28 specifications.
3. The SSI shall assume sole-source responsibility for the entire electronic security system and shall not subcontract out any programming work associated with the GUI or PLC systems. The SSI shall ensure that all integrated systems are compatible with each other for a complete, fully operational and fully tested system upon completion of the project.
4. The SSI shall furnish and install only new material, unused without any defects.
5. The following pre-qualified Security System Integrators (SSI's) shall be allowed to submit pricing:

a. Security Automation Systems, Inc. (Indianapolis, IN) (Basis of Design)

b. Accurate Controls (Ripon, WI)

1.6 COORDINATION

A. Coordinate the work of this section to meet the substantial completion date.

B. Coordinate the delivery and location of items with the Construction Manager.

C. Special attention is called to the following items. Coordinate all conflicts prior to installation:

1. Location of millwork, control consoles, counters, desks, doors and frames so that Division 28 material is in proper relation to these items.
2. Scheduling of new equipment for installation.

D. The SSI shall coordinate their security equipment rack space requirements with the Owner in shared spaces.

1.7 DELIVERY, STORAGE, AND HANDLING

A. SSI shall mark or tag each relevant item of equipment (cameras, housings, monitors, etc.) for the project. The SSI shall deliver equipment at the proper time and location for installation. Equipment received, but not installed shall be placed in secured storage. Handling shall be controlled to prevent losses and delays. Upon delivery, the SSI shall inspect equipment for damage. All damaged items shall be removed from the site and replaced.

B. For equipment stored off-site, the SSI shall protect equipment from theft or damage. All items stored for the project shall be clearly labeled as such and shall be available for inspection. Shipping receipts for stored items shall be made available upon request. The SSI shall provide appropriate insurance coverage for stored equipment that shall cover all items against theft or damage.

1.8 WARRANTY

A. The SSI shall warrant all material and workmanship for Division 28 systems for a period of twenty-four (24) months after substantial completion (see ADJUSTING, section 3.5). The warranty shall cover all material and software provided. The SSI shall provide qualified and/or manufacturer-certified technicians capable of diagnosing and repairing the installed system.

B. The SSI shall repair or replace (at no cost to the Owner) any defective materials or work when given written notice during the warranty period. Warranty service shall be provided to the Owner during normal working hours. When requested by the Owner, after-hours service (including on-site service) shall be provided and the SSI's applicable labor and travel rates shall apply.

C. The SSI shall provide emergency service during the 24-month warranty period. The SSI shall provide the owner a 4-hour phone response time and a one business-day response time for major system failures. Major system failures shall be considered those failures which result in limited or no functionality of major electronic security system components, such as a PLC failure or a GUI failure.

D. The warranty shall exclude acts of vandalism, abuse, neglect, Owner misuse, failure of the Owner to provide continuous environmental conditions for which the installed equipment is rated for, and all other acts beyond the control of the SSI (i.e. – weather damage, floods, fire, lightning, and similar acts).

1.9 EXTRA MATERIALS

A. The SSI shall reference each specific section in Division 28 for extra materials required. Extra materials shall match products installed and shall be packaged with protective covering for storage and identified with labels describing contents.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Inspect the conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.

B. Verify the accuracy of all dimensions, allowances, and clearances on site prior to commencing with any work that may be affected by those dimensions, allowances, and clearances.

C. Comply with manufacturer's installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in the Contract Documents.

D. Precautions shall be taken to guard against electrostatic and electromagnetic susceptibility and interference.

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

3.2 INSTALLATION

A. Provide complete electronic security system as specified herein.

B. All system equipment to be contained within equipment racks or cabinets. If more or larger equipment racks or cabinets are required than exist or are indicated on the drawings, allow for such additional equipment racks and cabinets in contract price.

C. All system equipment and field devices to be held securely in place. Fastenings and supports shall be selected to provide a safety factor of three.

D. All system equipment equipped with plug in power connectors to be connected to a dedicated receptacle. Do not use tap connectors for plugging in multiple plugs into a single receptacle.

E. All cable within equipment racks, cabinets, or on backboards, to be neatly bundled and secured.

F. Wires shall not be nicked, have strands removed, or have frayed strands when removing insulation or terminating.

G. Factory manufactured interface cables to be provided for each field interface board. Terminal blocks to be provided in cabinet or on backboard for factory cable interface to field wiring.

H. Provide adequate ventilation for all heat radiating equipment. SSI shall provide fan kits as required to maintain rated operating temperature of installed equipment.

I. Seal-tite flexible conduits, NEMA-rated weatherproof junction boxes connectors shall be utilized for exterior camera locations.

3.3 CONNECTIONS

A. For equipment furnished under this Division of the specifications, provide all Division 28 connections necessary so that the equipment is fully operational upon completion of the project.

B. Ground equipment according to manufacturer's recommendations.

3.4 FIELD QUALITY CONTROL

A. Verify that the electronic security system work is installed according to the Contract Documents. Prepare inspection reports and indicate compliance with and deviations from the Contract Documents. Perform additional inspections to determine compliance of replaced or additional work.

B. Manufacturer's Field Service: The SSI shall provide a qualified technician and/or factory-authorized service representative to inspect, test, and adjust security electronic security system components and equipment installation, including connections, and to assist in field testing.

C. Perform the following field tests and inspections and prepare test reports:

1. Operational Test: After the security electronic system has been energized, perform an operational test of the system to verify compliance with the Contract Documents.
2. When test results indicate that electronic security work does not comply with the Contract Documents, the SSI shall diagnose and correct the deficiencies.
3. Retesting: At the SSI's expense, test and adjust electronic security system head-end equipment and field devices. Replace damaged and malfunctioning equipment.

D. Remove and replace malfunctioning equipment and retest as specified above.

3.5 ADJUSTING/SCHEDULED MAINTENANCE

A. SSI shall provide initial electronic security system configuration and adjustments. All field devices and head-end equipment shall be adjusted for optimum performance.

B. Occupancy Adjustments: The SSI shall provide two (2) scheduled, on-site preventative maintenance/adjustment visits during the warranty period. During these visits, the SSI shall make any necessary adjustments to the electronic security system and replace/repair any defective equipment and/or workmanship found. The duration of each visit shall be a minimum of 4 hours. Each visit shall be documented in a maintenance log and shall be presented to the Owner.

3.6 SYSTEM TESTING

A. Prior to the shipment of the PLC and GUI control systems to the project site, the SSI shall provide a full system test of all security electronic control system equipment. All control system hardware head-end equipment, including all PLC input and output points, shall be tested with the GUI software and Security Management system. The SSI shall make all necessary software modifications/corrections based on the results of the testing. The control systems shall be re-tested after the software modifications/corrections have been made.

B. At a minimum of 30 days prior to the shipment of the control system equipment to the project site, the SSI shall notify the Owner that the control system equipment is tested and ready to be demonstrated. This demonstration shall be conducted at the site of the SSI. During the demonstration, the SSI shall coordinate with the Owner to make any programming/configuration changes to the system. These changes may include minor changes to the layout and text on the GUI screens, based on the operational requirements of the Owner.

3.7 DEMONSTRATION

A. Provide qualified and/or manufacturer-certified personnel to train Owner's maintenance personnel to adjust, operate, and maintain the electronic security system. Refer to Division 01 Section "Demonstration and Training".

B. Provide demonstration and instruction sessions to familiarize Owner's operation and maintenance personnel with systems and their operation and maintenance.

C. Establish agendas for demonstration and instruction sessions in conjunction with the Architect and Owner. Coordinate scheduling of sessions with the Architect and Owner.

D. Provide two 8-hour seminars to demonstrate operation of the systems.

E. Provide two 8-hour technical seminars to demonstrate configuration, troubleshooting, repair and maintenance of the system.

F. Training shall be video recorded.

END OF SECTION 280500

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SECTION 280510 – CABINETS AND ENCLOSURES FOR ELECTRONIC SAFETY AND SECURITY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 and Division 28 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the requirements for Cabinets and Enclosures for the Electronic Safety and Security system. The cabinets and enclosures shall contain all Electronic Security System head-end equipment.

B. The Cabinets and Enclosures for the Electronic Safety and Security system shall include the following main components:

1. Security Equipment Enclosures:

   a. Free-Standing Security Equipment Enclosures.

   b. Wall-mounted NEMA 12 enclosures for utility control.

   c. Site-located gate control equipment system enclosure.

2. Control Console:

   a. Custom Control Consoles located in Control Room C2004.

1.3 DEFINITIONS

A. AWG: American Wire Gauge

B. NEMA: National Electrical Manufacturers Association

C. SSI: Security Systems Integrator

1.4 SUBMITTALS

A. Product Data: Include rated capacities, operating characteristics, and accessories.

B. Shop Drawings: Detail equipment enclosure assemblies and indicate dimensions, loads, required clearances, and required components.

1. Wiring Diagrams: Power, signal, and control wiring.
2. SSI shall provide complete enclosure design showing the layout of all devices housed within the enclosures.

C. Operation and Maintenance Data: For Cabinets and Enclosures for Electronic Safety and Security system to include in operation, and maintenance manuals.

1.5 QUALITY ASSURANCE

A. All work shall conform to applicable National Electrical Codes (NEC). SSI shall adhere to applicable state and local ordinances and the requirements of the authority having jurisdiction.

1.6 COORDINATION

A. Coordinate layout and installation of the Cabinets and Enclosure for the Electronic Safety and Security system equipment with existing conditions that penetrates or is supported by ceilings, including light fixtures, HVAC equipment, fire-suppression-system components, and partition assemblies.

1.7 WARRANTY

1. Warranty Period: 24 months from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SECURITY EQUIPMENT ENCLOSURES

A. Manufacturers:

1. Middle Atlantic
2. Hoffman
3. Hammond

B. Description: This specification describes the Security Equipment Enclosures used for housing Electronic Security System devices. The free-standing enclosures shall house at a minimum, PLC processor equipment, video surveillance head-end, digital intercom head-end, relays, power supplies, network switches and access control equipment. The wall mount racks shall house network switch and video surveillance system equipment. The wall-mounted NEMA 12 enclosures shall house PLC output modules and lighting/receptacle/telephone control relays. The site-located gate control equipment enclosure shall house power supplies, network switches and fiber optic transceivers. SSI shall refer to bid prints for Security Equipment Enclosure locations.

C. Free-Standing Security Equipment Enclosure

1. Provide freestanding equipment cabinets to house 19" rack mountable equipment in the equipment rooms. Each cabinet shall have a rectangular frame with removable side panels and doors. Tops shall accept additional cooling fans if required. Installed cabinets shall include thermal, power, and cable management accessories that control airflow through the cabinet and keep signal and power cables separate and organized.
2. Enclosure shall be vented and provide fan units, as necessary, per the manufacturers recommendations and actual heat loads of the installed equipment.
3. Enclosure shall be rated for a minimum 2500lb UL listed load capacity.
4. Shall be constructed using 14 or 16-gauge steel tops & bottoms and minimum 16-gauge steel frame construction.
5. Provide fully perforated front and rear doors with keyed locks and provide side panels on each end of consecutive modular enclosures.
6. The depth of each enclosure shall accommodate all equipment mounted within. Enclosure shall include a minimum 30-5/8" usable depth. Equipment hindering the closing and locking of any enclosure door will not be acceptable.
7. Enclosure shall include 24-1/4" OD width for cables, 2 extra-wide pair of 10-32 threaded rack rail. Enclosure shall include laser-cut 1/8" thick internal braces for strength.
8. Enclosure shall be finished in a durable black textured power coat.
9. Provide multi-outlet plug strips along the inside of the enclosure as required.
10. Wiring within the enclosure shall be routed within covered wire ways.
11. Enclosure shall have grounding stud installed in base.
12. Approved manufacturers: Middle Atlantic (WRK series) and Hoffman

D. Wall-mounted NEMA 12 enclosure

1. Shall be constructed of 14AWG rolled steel and be NEMA 12 rated.
2. The enclosure shall have a removable 12AWG inner panel for equipment mounting.
3. Door bar on hinge side for wire management and bonding.
4. Mounting holes in back of body for direct mounting or for optional external wall-mounting brackets.
5. Seamless foam-in-place gasket shall provide oil-tight and dust-tight seal against contaminants.
6. Provision for thermoplastic data pocket.
7. Approved manufacturers: Hoffman, Hammond

E. Site-located Gate Control Equipment System Enclosure

1. Shall be constructed of 14AWG Type 304 stainless steel and be NEMA 4X rated.
2. The enclosure shall have a removable 12AWG inner panel for equipment mounting.
3. The enclosure door shall include a padlock adapter for use with a padlock. Door hardware supplier shall provide a padlock for the enclosure door.
4. Approved manufacturers: Hoffman and Hammond

2.2 CONTROL CONSOLES

A. Manufacturers:

1. Xybix (www.xybix.com)

2. Evans

B. Description: This specification describes the new Control Console that shall be located in Control Room C2004. The SSI shall provide and install a quantity of one 78" x 78" Dual Surface Control Console with true sit to stand adjustable range of 22" – 48" AFF, with L5 Table Base. This control console shall be used to house GUI PCs and other associated equipment. It shall be used as working platforms for GUI control, CCTV monitors, audio communication devices and other Owner-provided equipment. The basis of design is Xybix.

C. Control Console

1. The Control Console at Control Room C2004 shall consist of the following features;
   a. Xybix 78" x 78" Dual Surface Console with true sit to stand adjustment range of 22" – 48" AFF, with L5 Table Base.
   b. Under fixed work surface, drawer pedestal 18"W with 6", 6" and 12" drawers.
   c. "Rollervision" Monitor Mounting System with 10" of focal depth adjustment. System shall accommodate (2) 27" and (1) 32" flat panel monitors on a single level. Addition mounts shall be added to stack a second tier of (2) 27" flat panel monitors.
   d. Single shelf with grommet, under monitor surface, 19"W x 5 ¼"H x 9"D with Power-Only USB ports
   e. Data Dock – Keyboard surface cable organizer with (8) USB Ports and (1) CAT6 port.
   f. (2) Dimmable Lux task lights with a flexible mounting arm, mounted to keyboard surface.
   g. Swivel Cup Holder.
   h. Cable Management Bridge for cable organization from desk to CPU cabinet
   i. (5) CPU Enclosure, 39.25" wide, under flip top work surface with front locking access doors, fixed shelf and (2) silent 45 CFM fans for active ventilation.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Inspect both the substrate and conditions under which work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.

B. SSI shall coordinate with the Owner to confirm that no obstructions exist that would hinder the installation of the required Cabinets and Enclosures.

C. Verify the accuracy of all dimensions, allowances, and clearances on site prior to commencing with any work that may be affected by those dimensions, allowances, and clearances. SSI shall

coordinate with the Owner to confirm that no obstructions exist that would obstruct the installation.

D. Comply with manufacturer's installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in the Contract Documents.

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

3.2 INSTALLATION

A. Provide Cabinets and Enclosures for the Safety and Security system as specified herein.

B. All material furnished shall be new and conform to the applicable requirements of the Underwriters Laboratories and the National Standards Institute.

C. All system equipment to be contained within equipment racks, cabinets, or closets. If more or larger equipment racks or cabinets are required than exist or are indicated in the specifications, allow for such additional equipment racks and cabinets in contract price.

D. Provide adequate ventilation for all heat radiating equipment.

E. All cable within equipment racks, and cabinets, or on backboards, to be neatly bundled and secured.

3.3 CONNECTIONS

A. Ground equipment according to manufacturer's recommendations.

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, and verify the Cabinets and Enclosures for the Electronic Safety and Security system components and equipment installation, including connections, and to assist in field testing.

3.5 ADJUSTING

A. SSI shall ensure that all cabinet and enclosure doors and locks are operating properly and that no obstructions exist. Make proper adjustments as necessary.

3.6 DEMONSTRATION

A. Provide qualified personnel to train Owner's maintenance personnel to adjust, operate, and maintain the Cabinets and Enclosures for the Electronic Safety and Security system. Refer to Division 01 Section "Demonstration and Training."

B. Training shall be video recorded.

END OF SECTION 280510

SECTION 281300 – ACCESS CONTROL SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 and Division 28 Specification Sections, apply to this Section.

1.2 SUMMARY

A. The SSI shall provide and install an access control system as specified herein. The system shall include all equipment, installation, installation materials, set up, and testing to form a complete operating system. Independent system functions shall be fully verified as part of system testing and commissioning.

B. For those doors that are connected to the PLC door control and GUI control station system, the access control system shall provide a dry contact interface between the node(s) and the PLC system. The access control system shall make requests (outputs) to the PLC system (PLC inputs) to open the doors upon a successful read by a reader of a valid credential.

C. The access control system network controller shall be connected to the facility LAN. The SSI shall coordinate the configuration of the network controller and network nodes as required with the Owner's IT facility administrator. The Division 26 contractor shall provide and install all necessary data cabling to connect the network controller to the facility LAN.

D. The SSI shall provide initial configuration of the access control system, confirming all network nodes are operational and properly configured with the controller. The SSI shall confirm all inputs, outputs and readers are properly configured for each node and portal, and that the interface with the PLC system has been configured and verified for each portal.

E. The SSI shall demonstrate and provide training to the Owner on the methods and procedures for enrolling people into the access system database. This shall include instruction on entering personal information for each individual, credential information and configuring access levels, permissions, etc. The Owner shall be responsible for enrolling their staff and additional people into the system.

F. The Owner shall be responsible for configuring access levels, access level groups, custom schedules, etc. for people in the system. If, during the warranty period, the Owner requires technical assistance from the SSI for system configuration changes, this work would be considered outside the scope of the SSI's responsibilities and the SSI shall offer a cost proposal for the requested changes.

G. The access control system shall be implemented through network appliance architecture with a three-tiered modular hardware hierarchy and embedded three-tier software architecture.

1. The network appliance shall be capable of running on a TCP/IP network and shall be accessible, configurable, and manageable from any network-connected PC with a browser.
2. Browser access for configuration and administration of the system shall be possible from a PC on the same subnet, through routers and gateways from other subnets, and from the Internet. Control and management of the system shall therefore be geographically independent.
3. Security of the data communicated over the network to and from the browser, network controller, and nodes is protected by encryption (SSL 128-bit) and authentication (SHA-1).
4. The top hardware tier is the network controller. Embedded on the Network Controller are an operating system, a web server, security application software, and the database of personnel and system activity.
5. The middle hardware tier is the network node. The network node shall make and manage access control decisions with data provided by the network controller, and it shall manage the communication between the network controller and Application blades connected to the system's inputs, outputs, and readers. This modular design makes it possible, even during network downtime, for the system to continue to manage access control and store system activity logs. When network connectivity is re-established, the system activity logs are automatically re-integrated.
6. The bottom hardware tier is the Application Blades. Four unique Application blades shall be available:

    a. Access Control Blade: shall support two readers, four supervised inputs, and four relay outputs.
    b. Alarm Input Blade: shall support eight supervised inputs.
    c. Relay Output Blade: shall support eight relay outputs.
    d. Temperature Blade: shall support eight analog temperature sensor inputs.

H. The access control system shall integrate, within a browser interface, access control, alarm monitoring, video monitoring, and temperature monitoring applications. These applications shall be embedded in a three-tier software architecture.

1. The database tier shall use PostgreSQL. PostgreSQL is a full featured, high performance database management system that supports ODBC. This shall provide a small footprint, low administration, and high reliability relational database that is embedded without requiring the use of a separate PC server.
2. The web server tier shall be based on an Apache™ embedded web server. This shall provide a graphically rich security management application through a standard web browser.
3. The security application software tier contains the business logic. This application shall also be embedded on the network device and requires no additional memory or processing power.
4. This three-tiered embedded software design runs within an embedded Linux Ubuntu operating system and shall require no client-side software other than a web browser.

I. Client-server based access control systems that require the access control software to be installed on a PC or server-type machine shall NOT be approved.

J. Systems that utilize serial-based proximity readers with Ethernet-serial converters shall NOT be approved.

K. All equipment and materials used shall be standard components, regularly manufactured, and regularly utilized in the manufacturer's system.

L. All access control systems and components shall have been thoroughly tested and proven in actual use.

M. All access control systems and components shall be provided with an explicit manufacturer warranty of one year for software and two years for hardware.

N. The access control system shall include the following main components:

1. Network Controllers
2. Network Nodes
3. Access Control Blades
4. Access Management Software
5. SIGNO Readers
6. iCLASS + Proximity Cards
7. iCLASS Keyfobs
8. Request-to-exit motion detector
9. Optical Weigand Data Extender
10. Badging Station

O. Related Sections:

1. Division 08 Section – "Door Hardware".

P. Codes and References: Comply with the current version year adopted by the Authority Having Jurisdiction.

1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
2. ICC/IBC - International Building Code.
3. NFPA 70 - National Electrical Code.
4. NFPA 80 - Fire Doors and Windows.
5. NFPA 101 - Life Safety Code.
6. NFPA 105 - Installation of Smoke Door Assemblies.
7. State Building Codes, Local Amendments.

1.3 DEFINITIONS

A. AJAX: Asynchronous Javascript™ and XML technology

B. NAS: Network attached storage

C. FTP: File transfer protocol

D. SSI: Security Systems Integrator

1.4 SUBMITTALS

A. Product Data: Include rated capacities, operating characteristics, and accessories.

B. System Operational Descriptions: Complete system operational narratives for the integrated access controlled openings defining the owner's prescribed requirements for the opening functionality. Narratives include, but are not limited to, the following situations: normal secured/unsecured state of door; authorized access; authorized egress; unauthorized access; unauthorized egress; fire alarm and loss of power conditions, and interfaces with other building control systems.

C. Shop Drawings: Detail equipment enclosure assemblies and indicate dimensions, loads, required clearances, components, and location of each field connection.

1. Wiring Diagrams: Power, signal, and control wiring.

a. Elevation diagram of each unique access controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.

D. Coordination Drawings: Details, drawn to scale, on which the following items are shown and coordinated with each other:

1. Readers
2. Network Switches
3. Network Controllers
4. Network Nodes

E. Proof of Certification: Provide copy of manufacturer(s) official certification or accreditation document indicating proof of status as a qualified and authorized provider of the primary access control components.

F. Operation and Maintenance Data: For access control system to include in operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:

1. Schedules detailing locations, titles, and termination locations of all readers, network controllers and network nodes.

1.5 QUALITY ASSURANCE

A. All work shall conform to applicable National Electrical Codes (NEC). SSI shall adhere to applicable state and local ordinances and the requirements of the authority having jurisdiction.

B. The SSI shall be an authorized integrator of the access control system.

C. The installed access control system shall conform to all local jurisdiction requirements.

1.6 COORDINATION

A. Coordinate quantity and arrangement of assemblies with ceiling space configuration and with components occupying ceiling space, including structural members, pipes, air-distribution components, raceways, cable trays, recessed lighting fixtures, and other items.

1.7 WARRANTY

A. Warranty Period: 24 months from date of Substantial Completion. The manufacturer shall repair or replace software and hardware that fails in materials or workmanship within specified warranty period. The SSI shall provide the Owner with an active software subscription agreement that allows the Owner access to software updates during the full 24 month warranty period.

1.8 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Proximity Readers: Furnish 1 spare proximity reader for each type provided.

PART 2 - PRODUCTS

2.1 NETWORK CONTROLLERS

A. Manufacturers: LenelS2, Avigilon

B. Description: At the top tier is the Network Controller, which shall contain the database engine, web server, application software, and configuration data. It is at this level that System Users, through a browser interface, shall interact with the access control system, set configurations, monitor activities, run reports, and manage alarms.

C. Network Controller:

1. The network controller shall include the following features:

a. Network Nodes Supported: 64
b. Processor: Intel® Atom™ N2800
c. Portals: Configured for 64
d. RAM: 4 GB total
e. Storage Capacity: 20 GB
f. Ethernet Ports: 1 (10/100)

g. Operating Temperature: 32° to 95° F (0° to 35° C)
h. Relative Humidity: 85% at 35°C non-condensing
i. Power Supply: 86 to 264 VAC, 47/440Hz, 1.5A
j. MTBF: 213,447 hrs
k. Weight: 9.7 lbs. (4.4 kg)

2.2 NETWORK NODES

A. Manufacturers: LenelS2, Avigilon

B. Description: The Network Node, an intelligent device with native TCP/IP support, shall make and manage access control decisions with data provided by the network controller, and it shall manage the communication between the Network Controller and Application blades connected to the system's inputs, outputs, and readers. The Node shall be supplied with 12V DC at a minimum of 3 amps. The Node blade shall supply all Application blades in the node with power. The Network Node shall be available in three configurations: a combined network controller/network node blade; a standalone Network Node blade, and a MicroNode with included Access Control blade. Each Network Node shall support up to seven Application blades except for the MicroNodes. Communications between the node and network controller shall be encrypted and authenticated (SHA-1). SSI shall provide and install the required number of network nodes to support all proximity readers.

C. Network Nodes:

1. Each network node shall include the following capabilities:

a. Application blades: 7
b. Access control readers: 14
c. Access Levels: 512
d. Portals: 14
e. Portal Groups: 64
f. Readers: 14
g. Reader Groups: 128
h. Supervised Inputs: 56
i. Input Groups: 64
j. Relay Outputs: 56
k. Output Groups: 64
l. Temperature Monitor Inputs: 56
m. Elevators: 14
n. Floors: 52
o. Floor Groups: 64
p. Credential storage: 20,000
q. Activity Log records: 27,000

2.3 ACCESS CONTROL BLADES

A. Manufacturers: LenelS2, Avigilon

B. Description: The Application blades shall interface with the network controller through the Network Node. The Application blades shall be blade-style circuit cards. This project shall utilize one type of application blade, the "access control blade". The access control blade shall support 2 readers (input devices such as keypads, RFID devices or Biometric readers), 4 supervised inputs and 4 relay outputs. SSI shall provide and install the required number of access control blades to support all readers.

C. Access Control Blade:

1. The access control blade shall receive power via the ribbon cable bus directly from the Node Blade. The access blade shall supply up to 400 milliamps of power to one reader or 200 milliamps of power to each of two readers.
2. The access control blade shall include the following features:

a. 7-pin reader connectors: 2
b. Maximum reader wire length: 500 feet (152 m) (18 AWG twisted, shielded)
c. Power available to readers: 400 milliamps
d. 2-pin supervised input connectors: 4
e. Maximum input wire length: 2000 feet (610 m) (22 AWG twisted, shielded)
f. 3-pin relay output connectors: 4
g. Maximum output wire length: Determined by the peripheral device

2.4 ACCESS MANAGEMENT SOFTWARE

A. Manufacturers: LenelS2, Avigilon

B. Description: The access control system shall integrate, within a web browser interface, access control and alarm monitoring applications. These applications shall be embedded in a three-tier software architecture.

C. Operating System and Application Software:

1. The embedded operating system for the solid-state Network Controller shall be the Linux Ubuntu operating system. The operating system kernel shall be open-source and no operating system training or certification shall be necessary.
2. The application software shall be embedded in the system. The database shall be an embedded PostgreSQL relational database requiring a small footprint and provides high reliability. The web server shall be based on an embedded Apache™ web server enabling users to access and operate the system using a standard web browser.

D. Software Licensing:
1. Software licensing shall be based upon the number of readers, cameras, and select features for one Network Controller. Software license upgrades shall be available if system reader and camera capacity must be raised. The user license shall be valid in

perpetuity and shall include one year of software updates from the date of shipment from the factory.

2. Licensing shall be controlled by a Product Key and an Activation Key. The Product Key contains the licensed system features and limits. To upgrade your system license to enable more cameras or more doors you will need a new Product Key. The Activation Key contains the warranty expiration date. The keys are locked to the system license number. The system license number shall be viewable on-screen on the Support: About page

E. Software Upgrades: Software upgrades shall be possible from a browser on any network-connected PC, by uploading a software update to the Controller. Controllers shall automatically upgrade all connected nodes. No client software installation shall be necessary.

F. Personnel Data: The access control system shall maintain person data relating to access control, system user privileges, photo identification, system activity, and contact information.

1. All person data in the system shall be integrated onto one tabbed page for viewing, editing, and deletion by system users.
2. A system user holding at least an 'Administer' user role shall be able to create, delete, and modify person records, including access levels.
3. A system user holding at least a "Setup" user role shall be able to configure the display of person records. For example, the user shall be able to hide various tabs, and configure the User-defined tab by changing the tab label and customizing any of the 20 data fields that appear on the tab. The user shall also be able to define UDF value lists, which can be displayed as pre-entered drop-down lists for user-defined data fields.

G. Data Import and Export: A Data Management Tool shall be provided that supports, via an API, the import and export of personnel data. This tool shall make possible the pre-populating, and ongoing populating, of cardholders into the access control system database.

H. Data Security:

1. Communication between the network controller and the browser shall be secured using SSL. In addition, administrative access to the security management application and the personnel data shall be password protected and controlled by roles-based authorizations.
2. Communication between the network controller and the network nodes shall be encrypted and authentication/tamper detection shall be done using the SHA-1 algorithm.
3. Communication between the network controller and other systems (when using the API) shall be secured using SSL and authentication/tamper detection shall be done using the SHA-1 algorithm.

I. Data Backups: It shall be possible to configure regular automatic database backups.

1. It shall be possible to back up a solid-state Network Controller to a built-in solid state hard drive.
2. It shall also be possible to save backups from any controller to separate network attached storage (NAS) and file transfer protocol (FTP) servers.

3. It shall also be possible to setup regular automatic creation of database archive files.

J. On-board Data Management: Each night the system shall truncate a sufficient number of the oldest records held on-board to reduce the database to its set limit, if required. This shall create the needed storage space for additional system activity records. Truncation will be performed on a First-in, First-out (FIFO) basis.

K. User Roles and Permissions: There shall be 4 pre-programmed levels of User Roles, and a total of 16 possible Custom User Roles that can be configured in the system, with different permissions for each user:

1. Master Partition Monitor: These users may use the functions in the Monitor menu only within the Master (default) partition. Monitor functions shall include viewing the activity log, cameras, and floor plans.
2. Master Partition Administer: These users may use the functions of both the Administration and Monitor menus only within the Master (default) partition. Administrative functions shall include adding and editing person information in the enrollment database, issuing and revoking cards, generating reports, and performing database backups.
3. Master Partition Setup: These users may use the functions of the Setup, Administration, and Monitor menus only within the Master (default) partition. Setup functions shall include defining access control, alarm event behavior, camera settings, floor plan images and configurations, holiday and time specifications. Setup functions shall also include: designation of network resources such as time and DNS servers, email and network storage settings; performance of system maintenance such as database backup and restore, software updates and file cleanups; designation of time zone, daily backup schedule and enrollment readers.
4. Full System Setup: These users may use the functions of all menus in all partitions.
5. Custom User Roles: In addition to the roles above the system shall also support the creation of detailed user permissions regarding which cameras, floor plans, elevators, events, access levels, portals, reports, and personal data fields the system user may see, edit, delete, or control.

L. Alarm Events: The system shall be capable of managing alarm events.

1. It shall be possible to delay an input's change to the Alarm state by a specified number of seconds. The range of delay options shall be .5 seconds or 1-120 seconds.
2. It shall be possible to associate specific actions with each alarm event. These actions may include, but are not limited to:
    a. Lock and Unlock portals.
    b. Activate and Deactivate relay outputs.
    c. Arm and Disarm input groups.
    d. Pulse outputs or output groups.
    e. Arm and Disarm alarm panels.
    f. Send emails and SMS messages.
    g. Move cameras to preset positions.

h. Switch to a video monitor.
i. Record video.
j. Momentarily unlock portals.
k. Display ID photos.
l. Change the threat level for a location, and (optionally) for its sub-locations.
m. Make entries in the activity log.
n. Play a digital sound file; it shall be possible to specify that it play in a loop until cleared or acknowledged.
o. Display alarms in different colors.
p. Set a priority for an alarm (one of 20 levels, with 1 being the highest).
q. Require a duty log entry.
r. Clear alarm automatically or require an acknowledgement.

3. A system user holding at least a "Setup" user role shall be able to create, delete, and modify alarm system inputs, input groups, outputs, output groups, alarm panels, and events.
4. It shall be possible to trigger events based on system activity such as:
   a. Failed login attempts.
   b. Video motion detection.
   c. Camera failure and camera restore events.
   d. Valid or Invalid card reads.
   e. Portals held or forced open.
   f. Valid card reads with a specified access level.
   g. Inputs entering an alarm state.
   h. High and low temperature events.
   i. Alarm panel arming failures.
   j. Alarm panel zone faults.
   k. Tailgating and pass-back violations.
   l. Occupancy limit violations.
   m. Zone empty violations.
   n. Node power failure, communication failure, timeout, and tamper events.
5. It shall be possible to clone an event which creates an event with all attributes of the original, needing to change only the event's name and any attributes it will not have in common.

M. Network-based Camera and Video Surveillance: The system shall provide live IP video surveillance capability. The number of supported cameras shall be limited only by license. The system's video capabilities shall include video monitor switching based on access activity. The system shall provide monitoring, configuration, and administration of IP video. Cameras can be separately monitored or monitored in groups.

1. Presets: The system shall support the creation, deletion, and editing of camera preset positions in the system. It shall also be possible to save changes in preset positions directly to a camera website.
2. Views: The system shall support the creation, deletion, and editing of multiple camera views, specifically Quad views (four cameras). The application shall provide a drop-down pick list for selecting current views or naming of new views.

N. Activity Monitoring:
1. The system shall support a Monitoring Desktop that integrates video, system activity logs, floorplans, ID photos, and alarm notifications.
2. Activity Log viewing includes one-click navigation to person records.
3. The system shall support a Widget Desktop that allows the creation of custom monitoring layouts. Within a custom layout, widgets display live video, system activity logs, alarm notifications, ID photos, floorplans, duty log entries, portal status displays, and DMP intrusion panels.
4. Many widgets support multiple partition viewing and filtering. For example, the Activity Log widget can display data from multiple partitions and data filtered by event type or reader group, and/or based on the text content of the event.
5. It shall also be possible to view cameras, activity logs, and floorplans on separate monitoring pages within the application.
6. The system shall support tracing a person's activity in the current partition if the "Trace this person" check box is selected on the person record. The traced activity is displayed in bold in the color selected for "Trace person log color" on the Network Controller page. In addition, if an event is selected for "Trace person event" on the Network Controller page, it is triggered each time a traced person makes an access attempt. These event activations can be reported using a Trace people filter in a custom history report.

O. Access Control:

1. The access control system shall be able to make access control decisions, define a variety of access levels and time specifications, write system activity into a log file, maintain a personnel enrollment database, receive signals from input devices such as door switch monitors, card readers and motion detectors, energize devices such as door locks and alarms via outputs.

P. Threat Levels:
1. It shall be possible to configure up to eight threat levels. It shall be possible to alter security system behavior through the use of threat levels. Groups of threat levels may be created and assigned to portal groups, access levels, input groups, output groups, floor groups, and event actions. The behavior of groups, access levels, and event actions with assigned threat level groups shall change based upon the current system threat level.
2. The system shall support 32 threat level groups.
3. It shall also be possible to change the system threat level in response to an alarm event.
4. The current system threat level shall display in the title bar of the security application interface and on floorplans.

Q. Location-based threat levels: The system administrator shall have the ability to define locations. This allows for threat levels to be assigned to individual locations.
   1. Within each parent location, sub-locations can be created, and additional sub-locations can be created within each of these, and so on. This creates a location hierarchy.
   2. Portals can be assigned, and threat levels applied, to any location within the hierarchy.

R. Appropriate Use banner: The system administrator shall have the ability to enter text (such as an appropriate use statement) to be displayed on the login page.

S. Reports:

   1. The access control system shall be capable of producing a variety of predefined reports regarding software and security hardware configuration, event history, and the administration of people within the system. In addition, an easy to use query language shall be included to create ad hoc reports. The query language shall be documented in the online help system. Alternatively, it shall be possible to specify a query by use of point-and-click.

2.5 SIGNO READERS

A. Manufacturer: HID

B. Description: SSI shall provide and install SIGNO readers as specified herein. The basis for the specification is HID.

C. SIGNO Readers:
   1. HID Signo model 40 for proximity only. HID Signo model 40K for proximity/keypad.
   2. The readers shall include the following features:

      a. Dimensions: 80mm x 121.5 mm x 19.5 mm (3.15" x 4.78" x 0.77") for model 40 and 80mm x 121.5 mm x 21.5 mm (3.16" x 4.79" x 0.85") for model 40K
      b. Material: Polycarbonate UL 94 V0
      c. Power Supply: 12VDC
      d. Current requirements (maximum average): 75mA (12VDC) for model 40 and 80mA for model 40K
      e. Operating temperature: -35° C to +66° C (-31° F to 150° F)
      f. Transmission frequency: 125 kHz, 13.56 MHz and 2.4 GHz
      g. Color: black bezel with silver trip faceplate
      h. Environmental: UL294 Outdoor and Indoor rated, IP65
      i. Use: Indoor/outdoor
      j. Communications & Panel Connection: Wiegand and RS-485 Half Duplex (OSDP) via Pigtail (18 in / 0.5 m) or Terminal Strip
      k. Device Management: HID Reader Manager / OSDP configuration

2.6 iCLASS + Proximity CARDS

A. Manufacturer: HID

B. Description: SSI shall provide two hundred (200) iCLASS + Proximity printable cards to the Owner upon substantial completion. The Owner shall be responsible for enrolling the proximity cards into the Access Control System. The basis for the specification is HID.

C. Smart Cards:

1. HID model 212x series printable, P/N 2120BGGAVA.
2. The iCLASS + proximity cards shall include the following features:

a. Dimensions: 5.4 cm x 8.57 cm x 0.084 cm (2.127" x 3.375" x 0.033")
b. Operating frequency: 13.56 MHz for iCLASS, 125KHz for HID Prox
c. Weight: 0.24 oz
d. Construction: Thin PVC laminate
e. Operating Temperature: -40° C to + 50° C (-40 ° F to 122 ° F)
f. Memory Type: EEPROM, read/write
g. Write Endurance: Min 100,000 cycles
h. Data Retention: Min 10 years non-volatile data retention
i. Slot Punch: Vertical Slot Punch

2.7 iCLASS Key Fobs

A. Manufacturer: HID

B. Description: SSI shall provide two hundred (200) iCLASS Key Fobs to the Owner upon substantial completion. The Owner shall be responsible for enrolling the key fobs into the Access Control System. The basis for the specification is HID.

C. Key Fobs:

1. HID model 2050PNNAN.
2. The iCLASS key fobs shall include the following features:

a. Dimensions: 3.95 cm x 3.18 cm x 0.60 cm (1.555" x 1.25" x 0.235")
b. Operating frequency: 13.56 MHz
c. Typical Maximum Read Range: Up to 70mm (depending on the reader in use)
d. Weight: 0.14 oz
e. Construction: Ultrasonically welded ABS Shell with TPE Insert
f. Operating Temperature: -45° C to + 70° C (-50 ° F to 160 ° F)
g. Memory Type: EEPROM, read/write
h. Slot Punch: Key Ring Hole

2.8 REQUEST-TO-EXIT MOTION DETECTOR

A. Manufacturers:

1. Kantech
2. Securitron
3. Bosch

B. Description: SSI shall provide request-to-exit motion detectors as shown on the plans. The PLC system shall provide the required number of inputs to integrate with all request-to-exit detectors. The basis for the specification is Kantech.

C. Request-to-Exit Motion Detector:

1. Kantech model T.REX-LT.
2. The request-to-exit detectors shall include the following features:

a. Detector Type: Passive Infrared
b. Filter Technology: Digital Signal Processing (DSP)
c. Detector Lens: Curtain-type Fresnel lens
d. Detection Range: Narrow Targeting Area; 3m. Whole Body; 6m.
e. Main Relay Contacts: SPDT, 1A max @ 30VDC max
f. Tamper Switch: N.C., 100mA max @ 30VDC max
g. Indicator Light: Red/Green LED
h. Physical Dimensions: 4.5 x 19 x 4.75cm (H x W x D)
i. Power Consumption: 12-28 VDC, 50mA
j. Accessories: Provide T.REX-PLATE for mounting to single-gang box

2.9 OPTICAL WIEGAND DATA EXTENDER

A. Manufacturer: COMNET

B. Description: SSI shall provide and install Optical Wiegand Data Extenders for control and monitoring of the site-located proximity readers and gate control. The remote extenders shall be located in Nema 4X enclosures as specified in section 281105 and the central units shall be located at the security electronics head-end equipment racks. The basis for the specification is Comnet.

C. Optical Wiegand Data Extender:
1. Comnet model FDW1000M/C and FDW1000M/R.
2. The extender shall include the following features:

a. Interface: Wiegand, Strobed (Clock and Data), and F-2F
b. Relays: Maximum switching voltage and current; 220VDC 30W, 1A, resistive load only, 250VAC, 37.5VA, 1A
c. Fibers: Multimode; Loss Budget 13dB, 850nm, 2 fibers
d. Connectors: Optical – ST; Data/Power/Relay – removable screw terminal blocks
e. Power: Input; 8 to 16VDC @ 200 mA Max

f. Operating Temperature: -40° C to +75° C
g. Storage Temperature: -40° C to + 85° C
h. Relative Humidity: 0% to 95% (non-condensing)

2.10 BADGING STATION

A. Manufacturers:
1. Fargo
2. Logitech
3. DELL

B. Description: SSI shall provide one (1) badging station to be installed in Administration Support Room A1010.

C. Badging Station:

1. The badging station shall include the following features:

a. Printer: Fargo DTC1250e (dual-sided) with quantity of two Fargo 45000 Color Ribbons.
b. Workstation PC: DELL Precision PC (minimum - i7, 16GB RAM, 256 GB SSD, Win 10 Pro, 24" 1080p monitor)
c. ID Camera: Logitech C922 Pro web camera with tripod
d. System Identity Management Solution: Netbox Photo ID 2 for systems with 64 portals, P/N S2-IDC-64
e. Provide enrollment reader as shown on the plans.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.

B. Examine scheduled openings, 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 installed access control system.

C. Examine roughing-in for electrical source power to verify actual locations of wiring connections before electrified and integrated access control door hardware installation.

D. Examine roughing-in for LAN and control cable conduit systems to controllers, card readers, and other cable-connected devices to verify actual locations of conduit and back boxes before device installation.

E. Verify the accuracy of all dimensions, allowances, and clearances on site prior to commencing with any work that may be affected by those dimensions, allowances, and clearances.

F. Comply with manufacturer's installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in the Contract Documents.

G. Precautions shall be taken to guard against electrostatic and electromagnetic susceptibility and interference.

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

3.2 PREPARATION

A. Doors and frames at scheduled access controlled openings to be properly prepared to receive specified electrified and access control hardware and connections without additional in-field modifications.

3.3 INSTALLATION

A. Provide complete access control system as specified herein.

B. All material furnished shall be new and conform to the applicable requirements of the Underwriters Laboratories and the National Standards Institute.

C. All system head-end equipment to be contained within equipment cabinets or enclosures.

D. All system equipment and field devices to be held securely in place. Fastenings and supports shall be selected to provide a safety factor of three.

E. All system equipment equipped with plug in power connectors to be connected to a dedicated receptacle. Do not use tap connectors for plugging in multiple plugs into a single receptacle.

F. All cable within equipment racks, and cabinets, or on backboards, to be neatly bundled and secured.

G. Wires shall not be nicked, have strands removed, or have frayed strands when removing insulation or terminating.

3.4 CONNECTIONS

A. Ground equipment according to manufacturer's recommendations.

3.5 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust the access control system components and equipment installation, including connections, and to assist in field testing. Report results in writing.

B. Perform the following field tests and inspections and prepare pass/fail reports:

1. Proximity reader inspection: SSI shall perform an inspection of each proximity reader to ensure that each device works correctly.

2. Request to exit detector inspection: SSI shall perform an inspection of each request-to-exit motion detector to ensure that each device works correctly.

C. Remove and replace malfunctioning units and retest as specified above.

3.6 CLEANING AND PROTECTION

A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all integrated access control door hardware at the latest possible time frame.

B. Clean adjacent surfaces soiled by access control system installation.

C. Clean operating items as necessary to restore proper finish and provide final protection and maintain conditions that ensure access control door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

A. A trained service representative will perform system maintenance training at the owner's facility once the final inspection is complete. Refer to Division 01 Section "Demonstration and Training."

B. Training shall be video recorded.

END OF SECTION 281300

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SECTION 282300 – IP VIDEO COMMUNICATION SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 01 and Division 28 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the requirements for an IP video communication system. The IP video communication system shall be integrated with the overall Electronic Security System.

B. The video management system shall be integrated with the PLC system and GUI software to allow automatic (connecting intercom stations or alarm activities) or manual call-up of any camera connected to the system. Reference section 284620 for software functionality.

C. System shall include a complete IEEE 802.3 100/1000 BASE-T Local Area Network that interfaces the GUI control stations to the IP camera servers. This security network shall be a closed network. The IP camera servers shall include multiple NICs. One NIC in each IP camera server shall be connected to the Owner's LAN.

D. The SSI shall provide the following quantities of video client workstations and monitors:

1. One (1) video client workstation, with two (2) 27" monitors located in Control Room C2004.
2. Two (2) video client workstations, one with one (1) 50" monitor and one with two (2) 50" monitors located in Control Room C2004.
3. One (1) video client workstation with two (2) 27" monitors located in Booking B1021.
4. One (1) video client workstation with one (1) 27" monitor located in Dispatch B1006.
5. One (1) video client workstation with one (1) 43" monitor located in the following locations; (a) Jail Commander A1047, (b) Assistant Jail Commander A1050.

E. PCs (provided by the Owner) shall be capable of accessing the IP video communication system using the video management system software. Software shall be configured to only allow those users with valid credentials (i.e. logins and passwords) to access the IP video communication system. The SSI shall train the Owner on the installation and configuration of the video management system software. Installation of the software on Owner-provided PCs shall be the responsibility of the Owner. The Owner shall provide PCs that meet the recommended software and hardware requirements of the video management system.

F. The video management system shall include the ability to mask areas of the video images. SSI shall mask toilet and shower areas of video images from cameras located in the detention

areas of the facility. SSI shall coordinate with the Owner's requirements during final configuration of the system.

G. The SSI shall provide initial configuration of the camera views for the video client software for each GUI control station location, with input from the Owner.

H. All cameras (including body worn cameras) in the video management system shall be licensed as required for proper viewing and recording. SSI shall provide licenses for all cameras and encoders in the system.

I. The video management system shall include the required quantity of IP camera servers and storage devices required to accommodate all cameras as shown on the plans, with cameras configured at their maximum allowable resolution and adhering to the following recording parameters:

1. 10 IPS per camera (or if not possible with specified camera, the maximum allowable rate for that camera).
2. Inmate Property "transaction" camera shall be configured to record at 22 IPS.
3. Intake area cameras (including holding cells) shall be configured to record 24/7. All other cameras shall be configured to record on motion. SSI shall assume a 50% overall motion activity level.
4. All cameras shall be configured for minimum stored image retention of 200 days.
5. SSI shall provide a minimum of 864TB of usable storage after RAID6. SSI shall configure servers and storage units with enough drives in RAID 5 or RAID 6 configuration to support the required storage. Architect shall verify installed storage prior to issuing substantial completion certificate.

J. For stand-alone microphone locations, provide Louroe model Verifact A and D-V line level microphones. Microphones shall terminate to Axis cameras and Axis Audio & I/O interface units as indicated on the security plans.

K. The IP video communication system shall include the following main components:

1. Cameras
2. Video Management System
3. Audio & I/O Interface
4. Encoders
5. Microphones
6. Media Converter Cabinet
7. Surveillance Cabinet
8. CAT6 Patch Panels
9. Network switches
10. Video Client Workstations

1.3 DEFINITIONS

A. VMS: Video Management System

B. PoE: Power-Over-Ethernet

C. NIC: Network Interface Card

1.4 SUBMITTALS

A. Product Data: Include rated capacities, operating characteristics, and accessories.

B. Shop Drawings: Detail equipment enclosure assemblies and indicate dimensions, loads, required clearances, components, and location of each field connections.

1. Wiring Diagrams: Power, signal, and control wiring.

C. Operation and Maintenance Data: For IP video communication system to include in operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:

1. Schedules detailing model numbers, locations, titles, and termination locations of all cameras, switches and video management system equipment in the system.

1.5 QUALITY ASSURANCE

A. All work shall conform to applicable National Electrical Codes (NEC). SSI shall adhere to applicable state and local ordinances and the requirements of the authority having jurisdiction.

1.6 COORDINATION

A. The SSI shall coordinate the exact location of cameras with the Architect and Owner to obtain the best possible view.

1.7 WARRANTY

A. Warranty Period: 24 months from date of Substantial Completion. The manufacturer shall repair or replace software and hardware that fails in materials or workmanship within specified warranty period.

B. Special warranty: The IP camera servers shall include a 3-year warranty from the manufacturer from the date of purchase. The Video Management System manufacturer shall warranty the software licensing and update subscriptions (SSAs) for a period of 3 years from date of purchase. During this 3-year period, all software updates shall be free of charge.

1.8 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Cameras: Furnish 1 spare "Type 4" and "Type 10" camera.

PART 2 - PRODUCTS

2.1 CAMERAS

A. Manufacturers:

1. Axis
2. Hanwha

B. Description: This specification is based on cameras manufactured by Axis and Hanwha. Multiple camera types have been defined below. Each camera TYPE includes a description of what hardware shall be included. SSI shall reference the camera schedule included in this specification section for a complete list of cameras and TYPES for the project.

C. Camera TYPE 1 (360° Multi-directional with IR, 15MP, remote focus and zoom, WDR, IP66, IP67, IK09, Nema 4X)

1. Axis model P3719-PLE

D. Camera TYPE 2 (360° Multi-directional with IR, 8MP, remote focus and zoom, WDR, IP66, IP67, IK09, Nema 4X)

1. Axis model P3727-PLE

E. Camera TYPE 3 (360° Indoor/Outdoor Dome with IR, 12MP, WDR, IP66, IK10, Nema 4X)

1. Axis model M3058-PLVE

F. Camera TYPE 4 (Outdoor dome with IR, 2MP, remote focus and zoom, WDR, IP66, IK10)

1. Hanwha model QNV-6082R

G. Camera TYPE 5 (180° Panoramic, 15MP, WDR, IP66, IK10)

1. Hanwha model PNM-9031RV

H. Camera TYPE 6 (209°/180° Panoramic, 8.3PM/7.3MP, IP66, IK10, Nema 4X)

1. Hanwha model PNM-9022V

I. Camera TYPE 7 (Fixed dome, 1080p, remote focus and zoom, WDR, built-in microphone, IK10)

1. Axis model P3375-V

J. Camera TYPE 8 (360° Indoor/Outdoor Dome with IR, 6MP, WDR, built-in microphone, IP66, IK10, Nema 4X)

1. Axis model M3077-PLVE

K. Camera TYPE 9 (Corner-mount, 4MP, IR, IP66/69, IK10+, built-in microphone)

1. Axis model Q9216-SLV

L. Camera TYPE 10 (Fixed mini dome, 1080p, WDR, IP66, IK10, Nema 4X)

1. Hanwha model XNV-6011

M. Camera TYPE 11 (Analog HD IR Dome Camera, 1080p, Vari-focal lens, WDR)

1. Hanwha model SCD-6085R

N. Camera TYPE 12 (Outdoor dome with IR, 5MP, remote focus and zoom, WDR, IP66, IK10)

1. Hanwha model QNV-8080R

O. Camera TYPE 13 (180° Panoramic, 8.3MP, IP66/IP67, IK10, Nema 4X)

1. Axis model P3807-PVE

CAMERA SCHEDULE

CAMERA #	CAMERA TYPE	MODEL	ACCESSORY	MOUNT	TERMINATION LOCATION	NOTES
1	TYPE 4	QNV-6082R	-	PEDESTAL	SQE#1	
2	TYPE 4	QNV-6082R	-	WALL	SQE#1	ALT. BID
3	TYPE 4	QNV-6082R	-	WALL	SQE#1	
4	TYPE 13	P3807-PVE	-	WALL	SQE#1	
5	TYPE 1	P3719-PLE	T94N01D/T91D61/T91A64	CORNER	SQE#1	
6	TYPE 1	P3719-PLE	T94N01D/T91D61/T91A64	CORNER	SQE#1	
7	TYPE 13	P3807-PVE	-	WALL	SQE#1	
8	TYPE 1	P3719-PLE	T94N01D/T91D61/T91A64	CORNER	SQE#1	
9	TYPE 1	P3719-PLE	T94N01D/T91D61/T91A64	CORNER	SQE#1	
10	TYPE 1	P3719-PLE	T94N01D/T91D61/T91A64	CORNER	SQE#1	
11	TYPE 1	P3719-PLE	T94N01D/T91D61/T91A64	CORNER	SQE#1	
12	TYPE 13	P3807-PVE	-	WALL	SQE#1	
13	TYPE 13	P3807-PVE	-	WALL	SQE#1	
14	TYPE 1	P3719-PLE	T94N01D/T91D61/T91A64	CORNER	SQE#1	
15	TYPE 13	P3807-PVE	-	WALL	SQE#1	
16	TYPE 1	P3719-PLE	T94N01D/T91D61/T91A64	CORNER	SQE#1	
17	TYPE 13	P3807-PVE	-	WALL	SQE#1	
18	TYPE 8	M3077-PLVE	-	CEILING	SQE#1	5
19	TYPE 8	M3077-PLVE	-	CEILING	SQE#1	5
20	TYPE 8	M3077-PLVE	-	CEILING	SQE#1	5

21	TYPE 8	M3077-PLVE	-	CEILING	SQE#1	5
22	TYPE 7	P3375-V	-	WALL	SQE#1	
23	TYPE 7	P3375-V	-	WALL	SQE#1	
24	TYPE 7	P3375-V	-	WALL	SQE#1	
25	TYPE 7	P3375-V	-	WALL	SQE#1	
26	TYPE 3	M3058-PLVE	T94K01D/T91B50/T94S01P	CEILING	SQE#1	1
27	TYPE 10	XNV-6011	-	CEILING	SQE#1	
28	TYPE 4	QNV-6082R	-	CEILING	SQE#1	
29	TYPE 10	XNV-6011	-	CEILING	SQE#1	
30	TYPE 10	XNV-6011	-	CEILING	SQE#1	
31	TYPE 10	XNV-6011	-	CEILING	SQE#1	
32	TYPE 10	XNV-6011	-	CEILING	SQE#1	
33	TYPE 7	P3375-V	-	CEILING	SQE#1	2
34	TYPE 7	P3375-V	-	CEILING	SQE#1	
35	TYPE 7	P3375-V	-	CEILING	SQE#1	
36	TYPE 7	P3375-V	-	CEILING	SQE#1	
37	TYPE 8	M3077-PLVE	-	CEILING	SQE#1	
38	TYPE 9	Q9216-SLV	-	CORNER	SQE#1	
39	TYPE 8	M3077-PLVE	-	CEILING	SQE#1	
40	TYPE 8	M3077-PLVE	-	CEILING	SQE#1	
41	TYPE 8	M3077-PLVE	-	CEILING	SQE#1	
42	TYPE 8	M3077-PLVE	-	CEILING	SQE#1	
43	TYPE 8	M3077-PLVE	-	CEILING	SQE#1	
44	TYPE 8	M3077-PLVE	-	CEILING	SQE#1	
45	TYPE 9	Q9216-SLV	-	CORNER	SQE#1	
46	TYPE 9	Q9216-SLV	-	CORNER	SQE#1	
47	TYPE 9	Q9216-SLV	-	CORNER	SQE#1	
48	TYPE 9	Q9216-SLV	-	CORNER	SQE#1	
49	TYPE 8	M3077-PLVE	-	CEILING	SQE#1	
50	TYPE 8	M3077-PLVE	-	CEILING	SQE#1	
51	TYPE 3	M3058-PLVE	T94S01P	CEILING	SQE#1	1
52	TYPE 3	M3058-PLVE	T94S01P	CEILING	SQE#1	1
53	TYPE 4	QNV-6082R	-	CEILING	SQE#1	
54	TYPE 7	P3375-V	-	CEILING	SQE#1	
55	TYPE 10	XNV-6011	-	CEILING	SQE#1	
56	TYPE 7	P3375-V	-	CEILING	SQE#1	
57	TYPE 10	XNV-6011	-	CEILING	SQE#1	
58	TYPE 10	XNV-6011	-	CEILING	SQE#1	
59	TYPE 7	P3375-V	-	CEILING	SQE#1	
60	TYPE 4	QNV-6082R	-	CEILING	SQE#1	
61	TYPE 4	QNV-6082R	-	CEILING	SQE#1	
62	TYPE 10	XNV-6011	-	CEILING	SQE#1	
63	TYPE 10	XNV-6011	-	CEILING	SQE#1	

64	TYPE 10	XNV-6011	-	CEILING	SQE#1	
65	TYPE 10	XNV-6011	-	CEILING	SQE#1	
66	TYPE 10	XNV-6011	-	CEILING	SQE#1	
67	TYPE 10	XNV-6011	-	CEILING	SQE#1	
68	TYPE 10	XNV-6011	-	CEILING	SQE#1	
69	TYPE 8	M3077-PLVE	-	CEILING	SQE#1	
70	TYPE 10	XNV-6011	-	WALL	SQE#1	
71	TYPE 7	P3375-V	-	CEILING	SQE#1	2
72	TYPE 10	XNV-6011	-	CEILING	SQE#1	
73	TYPE 10	XNV-6011	-	CEILING	SQE#1	
74	TYPE 10	XNV-6011	-	CEILING	SQE#1	
75	TYPE 10	XNV-6011	-	CEILING	SQE#1	
76	TYPE 10	XNV-6011	-	CEILING	SQE#1	
77	TYPE 10	XNV-6011	-	CEILING	SQE#1	
78	TYPE 10	XNV-6011	-	CEILING	SQE#1	
79	TYPE 8	M3077-PLVE	-	CEILING	SQE#1	
80	TYPE 10	XNV-6011	-	WALL	SQE#1	
81	TYPE 10	XNV-6011	-	CEILING	SQE#1	
82	TYPE 10	XNV-6011	-	CEILING	SQE#1	
83	TYPE 10	XNV-6011	-	CEILING	SQE#1	
84	TYPE 10	XNV-6011	-	CEILING	SQE#1	
85	TYPE 10	XNV-6011	-	CEILING	SQE#1	
86	TYPE 10	XNV-6011	-	CEILING	SQE#1	
87	TYPE 10	XNV-6011	-	CEILING	SQE#1	
88	TYPE 10	XNV-6011	-	CEILING	SQE#1	
89	TYPE 10	XNV-6011	-	CEILING	SQE#1	
90	TYPE 11	SCD-6085R	-	CEILING	SQE#1	3
91	TYPE 10	XNV-6011	-	CEILING	SQE#1	
92	TYPE 10	XNV-6011	-	CEILING	SQE#1	
93	TYPE 10	XNV-6011	-	CEILING	SQE#1	
94	TYPE 8	M3077-PLVE	-	CEILING	SQE#1	
95	TYPE 8	M3077-PLVE	-	CEILING	SQE#1	
96	TYPE 10	XNV-6011	-	CEILING	SQE#1	
97	TYPE 10	XNV-6011	-	CEILING	SQE#1	
98	TYPE 8	M3077-PLVE	-	CEILING	SQE#1	
99	TYPE 4	QNV-6082R	-	CEILING	SQE#1	
100	TYPE 10	XNV-6011	-	CEILING	SQE#1	
101	TYPE 10	XNV-6011	-	CEILING	SQE#1	
102	TYPE 10	XNV-6011	-	CEILING	SQE#1	
103	TYPE 10	XNV-6011	-	CEILING	SQE#1	
104	TYPE 8	M3077-PLVE	-	CEILING	SQE#1	
105	TYPE 10	XNV-6011	-	CEILING	SQE#1	
106	TYPE 10	XNV-6011	-	CEILING	SQE#1	

107	TYPE 10	XNV-6011	-	CEILING	SQE#1	
108	TYPE 10	XNV-6011	-	CEILING	SQE#1	
109	TYPE 4	QNV-6082R	-	WALL	SQE#1	
110	TYPE 4	QNV-6082R	-	WALL	SQE#1	
111	TYPE 4	QNV-6082R	-	WALL	SQE#1	
112	TYPE 4	QNV-6082R	-	WALL	SQE#1	
113	TYPE 4	QNV-6082R	-	WALL	SQE#1	
114	TYPE 4	QNV-6082R	-	WALL	SQE#1	
115	TYPE 4	QNV-6082R	-	WALL	SQE#1	
116	TYPE 4	QNV-6082R	-	WALL	SQE#1	
117	TYPE 4	QNV-6082R	-	WALL	SQE#1	
118	TYPE 4	QNV-6082R	-	WALL	SQE#1	
119	TYPE 4	QNV-6082R	-	WALL	SQE#1	
120	TYPE 4	QNV-6082R	-	WALL	SQE#1	
121	TYPE 4	QNV-6082R	-	WALL	SQE#1	
122	TYPE 4	QNV-6082R	-	WALL	SQE#1	
123	TYPE 4	QNV-6082R	-	WALL	SQE#1	
124	TYPE 10	XNV-6011	-	CEILING	SQE#1	
125	TYPE 10	XNV-6011	-	CEILING	SQE#1	
126	TYPE 10	XNV-6011	-	CEILING	SQE#1	
127	TYPE 2	P3727-PLE	-	CEILING	SQE#1	
128	TYPE 8	M3077-PLVE	-	CEILING	SQE#1	
129	TYPE 4	QNV-6082R	-	WALL	SQE#1	
130	TYPE 4	QNV-6082R	-	WALL	SQE#1	
131	TYPE 4	QNV-6082R	-	WALL	SQE#1	
132	TYPE 4	QNV-6082R	-	WALL	SQE#1	
133	TYPE 4	QNV-6082R	-	WALL	SQE#1	
134	TYPE 4	QNV-6082R	-	WALL	SQE#1	
135	TYPE 4	QNV-6082R	-	WALL	SQE#1	ALT. BID
136	TYPE 4	QNV-6082R	-	WALL	SQE#1	
137	TYPE 8	M3077-PLVE	-	WALL	SQE#1	5
138	TYPE 8	M3077-PLVE	-	CEILING	SQE#1	
139	TYPE 8	M3077-PLVE	-	CEILING	SQE#1	
140	TYPE 8	M3077-PLVE	-	CEILING	SQE#1	
141	TYPE 4	QNV-6082R	-	WALL	SQE#1	
142	TYPE 10	XNV-6011	-	CEILING	SQE#1	
143	TYPE 10	XNV-6011	-	CEILING	SQE#1	
144	TYPE 4	QNV-6082R	-	WALL	SQE#1	
145	TYPE 10	XNV-6011	-	CEILING	SQE#1	
146	TYPE 8	M3077-PLVE	-	CEILING	SQE#1	
147	TYPE 12	QNV-8080R	-	CEILING	SQE#1	
148	TYPE 12	QNV-8080R	-	CEILING	SQE#1	
149	TYPE 4	QNV-6082R	-	CEILING	SQE#1	

150	TYPE 13	P3807-PVE	-	WALL	SQE#1	
151	TYPE 4	QNV-6082R	-	CEILING	SQE#1	
152	TYPE 13	P3807-PVE	-	WALL	SQE#1	
153	TYPE 13	P3807-PVE	-	WALL	SQE#1	
154	TYPE 4	QNV-6082R	-	CEILING	SQE#1	
155	TYPE 8	M3077-PLVE	-	CEILING	SQE#1	5
156	TYPE 13	P3807-PVE	-	WALL	SQE#1	
157	TYPE 8	M3077-PLVE	-	CEILING	SQE#1	5
158	TYPE 4	QNV-6082R	-	CEILING	SQE#1	
159	TYPE 13	P3807-PVE	-	WALL	SQE#1	
160	TYPE 13	P3807-PVE	-	WALL	SQE#1	
161	TYPE 4	QNV-6082R	-	CEILING	SQE#1	5
162	TYPE 4	QNV-6082R	-	CEILING	SQE#1	
163	TYPE 8	M3077-PLVE	-	CEILING	SQE#1	
164	TYPE 13	P3807-PVE	-	WALL	SQE#1	
165	TYPE 13	P3807-PVE	-	WALL	SQE#1	
166	TYPE 4	QNV-6082R	-	CEILING	SQE#1	
167	TYPE 8	M3077-PLVE	-	CEILING	SQE#1	
168	TYPE 13	P3807-PVE	-	WALL	SQE#1	
169	TYPE 8	M3077-PLVE	-	CEILING	SQE#1	
170	TYPE 4	QNV-6082R	-	CEILING	SQE#1	
171	TYPE 13	P3807-PVE	-	WALL	SQE#1	
172	TYPE 4	QNV-6082R	-	CEILING	SQE#1	
173	TYPE 4	QNV-6082R	-	CEILING	SQE#1	
174	TYPE 4	QNV-6082R	-	PEDESTAL	SQE#1	4
175	TYPE 4	QNV-6082R	-	PEDESTAL	SQE#1	4
176	TYPE 8	M3077-PLVE	-	CEILING	SQE#1	
177	TYPE 8	M3077-PLVE	-	CEILING	SQE#1	
178	TYPE 5	PNM-9031RV	SBP-276HMW/SBP-300WM1/T95A67/T98A18-VE Media Converter Cabinet A/T8133/CABINET LOCK A/T8612 SFP MODULE	POLE	SQE#1	4
179	TYPE 5	PNM-9031RV	SBP-276HMW/SBP-300WM1/T95A67/T98A18-VE Media Converter Cabinet A/T8133/CABINET LOCK A/T8612 SFP MODULE	POLE	SQE#1	4
180	TYPE 8	M3077-PLVE	-	CEILING	SQE#1	
181	TYPE 8	M3077-PLVE	-	CEILING	SQE#1	
182	TYPE 8	M3077-PLVE	-	CEILING	SQE#1	
183	TYPE 8	M3077-PLVE	-	CEILING	SQE#1	
184	TYPE 8	M3077-PLVE	-	CEILING	SQE#1	
185	TYPE 4	QNV-6082R	-	CEILING	SQE#1	ALT. BID
186	TYPE 4	QNV-6082R	-	CEILING	SQE#1	ALT. BID
187	TYPE 4	QNV-6082R	-	CEILING	SQE#1	ALT. BID

188	TYPE 8	M3077-PLVE	-	CEILING	SQE#1	5
189	TYPE 8	M3077-PLVE	-	CEILING	SQE#1	5
190	TYPE 8	M3077-PLVE	-	CEILING	SQE#1	5
191	TYPE 4	QNV-6082R	-	CEILING	SQE#1	5
192	TYPE 10	XNV-6011	-	CEILING	SQE#1	
193	TYPE 10	XNV-6011	-	CEILING	SQE#1	
194	TYPE 10	XNV-6011	-	CEILING	SQE#1	

Notes:

1. Provide local network connection to Axis T6101. Axis T6101 shall terminate to PoE switch. Provide Louroe VERIFACT A line level microphone to connect to T6101.
2. Provide Louroe VERIFACT A line level microphone and connect directly to camera.
3. Provide video balun at camera and head-end location. Provide Axis M7011 single-channel encoder at head-end for camera. Wire local ON/OFF switch to camera power.
4. Reference Electrical Site Plan for camera location.
5. Delete camera if Alternate Bid is accepted.
6. Camera to be relocated if Alternate Bid is accepted.

2.2 VIDEO MANAGEMENT SYSTEM

A. Video Management System Software Manufacturers:

1. Exacq Technologies

B. IP Camera Server System Manufacturers:

1. Exacq Technologies
2. BCDVideo
3. Seneca

C. Description: SSI shall provide the required quantity of IP camera servers and storage to support all cameras as shown on the plans and specifications. SSI shall provide a minimum of four servers.

D. IP Camera Servers:

1. Maximum IP Cameras: Expandable to 128 cameras per server (data rate dependent)
2. Alarm Inputs: 8
3. Alarm Outputs: 3 TTL & 1 Relay
4. Pre-Loaded VMS Software: exacqVision Professional
5. Typical Video Storage Rate (Mbps): 800 Mbps (Windows), 1200 Mbps (Linux)
6. Local Client Display Rate (FPS): 700 @ HD resolution (Windows), 900 @ HD resolution (Linux)
7. Server Operating System: Windows 10 64 bit, Windows 2019 (Optional) or Linux Ubuntu 18.04
8. Operating System Drive: 128GB SSD
9. Maximum Hard Drives per server: 20

10. Configured Storage: Provide required number of servers/drives in RAID-6 configuration for specified requirements. Reference 1.2, Letter I, for total minimum required storage.
11. CPU: Gen 4 Intel Xeon E3-1275 v6
12. RAM: 16 GB
13. NIC: 4 x 1 Gbps
14. USB Ports: 6 USB
15. Monitor Output: 1 DVI-I, 1 HDMI, 1 VGA, maximum 2 simultaneous monitors
16. Audio Outputs: 4
17. Keyboard & Mouse: Included
18. Warranty: 3 years, parts & labor plus 3 years SSA included
19. Dimensions (LxWxH): 4U / 27 x 16.875 x 7 in.
20. Weight: 49 – 90 lbs.
21. Regulatory: CE (Class A), FCC (Class A), UL-Listed
22. Input Voltage: 120/240 VAC auto-sensing
23. Power Supplies: Dual Hot Swappable
24. Power & Heat: 390 Watts/1320 BTU/h (Max), 210 Watts/700 BTU/h (Typical)
25. Operating Temperature: 40-95° F
26. Provide Rackmount sliding rail kit for exacqVision Z series chassis
27. Approved Manufacturers: BCDVideo Enterprise Series, Exacq Technologies 4U "Z-Series" with optional P/Ns 5000-40393, 5000-40349, 5000-40141, and 5000-20070.
28. Provide Raritan model RKP117 (or approved equal) 1U 17" LCD Keyboard Drawer w/touchpad, 18.12" deep.
29. Provide KVM USB VGA Switch with required quantity of USB/PS2 Combo Cable Kits to administer the system.

2.3 AUDIO & I/O INTERFACE

A. Manufacturer:

1. Axis

B. Description: SSI shall provide the required number of Audio & I/O interface units to support microphones to be incorporated into the overall video surveillance system. The basis for the specification is Axis.

C. Audio & I/O Interface:

1. The audio & I/O interface unit shall include the following features:

a. Audio Steaming: Two-Way
b. Audio Compression: Based on the audio compression capabilities of the connected camera
c. Audio input/output: External microphone input or line input, line output
d. I/O Interface: Two configurable supervised inputs/digital outputs, 12VDC output, max load 50mA
e. Security: Password protection, IP address filtering, HTTPS encryption, IEEE 802.1X network access control, Digest authentication, User access log, centralized certificate management

f. Casing: Polycarbonate casing, metal base, encapsulated electronics
g. Display and indicators: Status LED
h. Power: Power over Ethernet (PoE) IEEE 802.3af/802.3at Type 1 Class 2 or 3 (selectable), Axis T6101 feeds power to the camera
i. Connectors: PoE in: RJ45 10BASE-T/100BASE-TX, PoE out: RJ45 10BASE-T/100BASE-TX, I/O: 4-pin 2.5 mm terminal block, Audio: 3.5mm mic/line in, 3.5mm line out
j. Mounting: Connected anywhere between switch and camera. Maximum total distance using a CAT5 cable: 100m (330 ft).
k. Operating conditions: -40°C to 55°C (-40°F to 149°F), Humidity 10-85% non-condensing)
l. Dimensions: 3.5" x 2.5" x 1"
m. Weight: 0.22 lb
n. Approved manufacturer: Axis model T6101.

2.4 ENCODERS

A. Manufacturer:

1. Axis

B. Description: SSI shall provide the required number of encoders to support all analog cameras to be incorporated into the overall video surveillance system. The basis for the specification is Axis.

C. Encoder:

1. The encoder shall include the following features:

a. Video Compression: H.264, Motion JPEG
b. Resolutions: 176x120 to 720x480
c. Frame rate: 30fps in all resolutions
d. Video streaming: Multiple, individually configurable streams in H.264 and Motion JPEG, Axis Zipstream technology in H.264, controllable frame rate and bandwidth
e. Image settings: Compression, color, brightness. Rotation; 90°, 180°, 270°. Aspect ratio correction, mirroring of images, text and image overlay, privacy mask, enhanced de-interlace filter, video termination, anti-aliasing, temporal noise filtering, sharpness, noise reduction, local enhancement
f. Security: Password protection, IP address filtering, HTTPS encryption, IEEE 802.1X network access control, Digest authentication, User access log, centralized certificate management
g. Analytics: Video motion detection, Active tampering alarm
h. Event triggers: Analytics, Edge Storage Events, Video loss
i. Casing: PC+ABS CX7240
j. Memory: 256MB RAM, 256MB Flash
k. Power: Power over Ethernet (PoE) IEEE 802.3af/802.3at Type 1 Class 1
l. Connectors: Analog composite video BNC input, 10BaseT/100BaseTX PoE, RS485/RS422

m. Storage: Support for microSD/microSDHC/microSDXC card
n. Operating conditions: 0°C to 50°C (32°F to 122°F), Humidity 10-85% non-condensing)
o. Approved manufacturer: Axis model M7011.

2.5 MICROPHONES

A. Manufacturer:

1. Louroe

B. Description: SSI shall provide microphones as shown on the plans. The microphones shall be omni-directional, low impedance, electret condenser microphones with built-in preamps for producing line level audio. The basis for the specification is Louroe.

C. Microphones:

1. The microphones shall include the following features:

a. Sensitivity: -45 dBV/Pa
b. Frequency response: 50 Hz to 15 kHz
c. Output: Line Level (0 dBV, 600Ω @1kHz)
d. Current drain: 10 mA
e. Supply Voltage: 12 VDC
f. Microphone housing: High-impact anti-static ABS (VERIFACT-A)
g. Dimensions: 4" dia x 1 ½"H
h. Approved manufacturer: Louroe model VERIFACT-A for ceiling applications and VERIFACT D-V for wall-mount locations.

2.6 MEDIA CONVERTER CABINET

A. Manufacturer:

1. Axis

B. Description: SSI shall provide media converter cabinets to support cameras covering parking lot areas and located on camera poles. The basis for the specification is Axis.

C. Media Converter Cabinet:

1. The media converter cabinet shall include the following features:

a. Casing: Polycarbonate cabinet and stainless-steel mounting plate
b. Environment: Indoor/Outdoor
c. Power: Input (120VAC), 90-175 VAC, Max. 4A; Input (230VAC): 90-264 VAC, Max. 4A

d. Connectors: 2 x RJ45 connectors (10/100 Mbps), 2 x SFP connectors (100/1000Mbps) for SFP fiber optic modules or SFP to copper modules
e. Operating Conditions: -40°C to 65°C (-40°F to 149°F), humidity 10-100% RH (condensing)
f. Weight: 4.4kg (9.7 lb)
g. Included accessories: Unit shall include power supply, electrical safety kit, media converter, DIN Clip for midspan, Cabinet Lock A
h. Approved manufacturer: Axis model T98A18-VE Media Converter Cabinet A
i. Provide Axis pole-mount adapter model T95A67 and Axis 30W midspan model T8133 per cabinet location. Provide SFP module compatible with media converter and installed fiber optic cable.

2.7 SURVEILLANCE CABINET

A. Manufacturer:

1. Axis

B. Description: SSI shall provide surveillance cabinets to support cameras covering parking lot areas and located on camera poles. The basis for the specification is Axis.

C. Surveillance Cabinet:

1. The surveillance cabinet shall include the following features:

a. Casing: Polycarbonate cabinet and stainless-steel mounting plate
b. Environment: Indoor/Outdoor
c. Power: Input (120VAC), 90-175 VAC, Max. 4A; Input (230VAC): 90-264 VAC, Max. 4A
d. Operating Conditions: -40°C to 65°C (-40°F to 149°F), humidity 10-100% RH (condensing)
e. Weight: 3.5kg (7.7 lb)
f. Included accessories: Unit shall include electrical safety kit, DIN Clip for midspan, Cabinet Lock A
g. Approved manufacturer: Axis model T98A18-VE Surveillance Cabinet
h. Provide Axis pole-mount adapter model T95A67 and Axis 30W midspan model T8133 per cabinet location.

2.8 CAT6 PATCH PANELS

A. Manufacturers:

1. Leviton
2. ICC
3. Commscope

B. Description: SSI shall provide 24-port and 48-port CAT6 patch panels to support all network field cabling terminations at rack-mount security equipment enclosure locations. Cabling for cameras, PCs, and other network devices shall terminate to these CAT6 patch panels. The SSI shall provide CAT6 patch cables between patch panels and network switch equipment. The basis for the specification is ICC.

C. CAT6 Patch Panels:

1. The CAT6 patch panels shall include the following features:

a. 24-port and 48-port Patch Panel: 16GA CRS
b. Jack Housing: High-impact, Flame Retardant Plastic, UL 94V-0
c. Spring Wire: Phosphor Bronze
d. 110 Connector: Phosphor Bronze Alloy with 100 micro-inch Alloy
e. Gold Rating: 50 Micro-inches of Gold over 100 micro inches of Nickel
f. Surface Finish: Black Powder Coat
g. Mating Force: 100 Grams MIN/Contact
h. Temperature Range: -40°C to 70°C
i. Plug Retention in Jack: 50N (11 LBS SQ)
j. IDC Wire Gauge: 22-24 AWG
k. Current Rating: 1.5A DC
l. Contact Resistance: 2.5 MILOHMS MAX

2.9 NETWORK SWITCHES

A. Manufacturers:

1. Netgear
2. HP
3. Alcatel-Lucent
4. Comnet

B. Description: The SSI shall provide the quantity of 24-port to 48-port Layer 2/3 PoE switches to support all video network devices. Stacking cables shall be installed to connect similar switches at the same location(s). SSI shall provide and install the required quantity of 1GbE and 10GbE SFP optical transceivers at switch locations as required. The SSI shall provide self-managed switches for site-located gate control equipment.

C. 24-port Layer 2/3 PoE Switches:

1. The Layer 2/3 PoE switches shall include the following features:

a. Gigabit RJ-45 port count: 24 PoE+
b. 1G SFP+ port count: 2
c. 1G/10G SFP+: 4
d. MACSec capable ports: All 1G RJ45
e. USB port: 1
f. Console port: 1

g. Primary slide-in PSU slot: 1
h. Backup slide-in PSU slot: 1
i. Fans: 2
j. File system flash: 1GB
k. RAM: 1GB
l. Max switching ASIC capacity: 168 Gb/s
m. Switch capacity with all 1G/10G ports (all ports, full duplex): 168 Gb/s
n. Switch frame rate with 6 x 10GE ports @ 64-byte packet: 125 Mpps
o. 2x10GE stacking capacity (aggregated): 40 Gb/s
p. System Power Consumption: 40W
q. System heat dissipation: 143 (BTU/h)
r. Power Consumption w/PoE: 600W
s. Heat dissipation w/PoE: 2047 (BTU/h)
t. Dimensions (WxDxH): 17.33" x 13.78" x 1.73"
u. Weight: 10.75 lbs. (4.88 kg)
v. Operating Temperature: (Min) 32°F – (Max) 113°F [(Min) 0°C – (Max) 45°C]
w. Operating Humidity: 5 – 95% Non-condensing
x. Power Supply: Modular 920W AC PoE
y. PoE with 1 PSU: Up to 815W
z. PoE with 2 PSU: Up to 1645W
aa. Power Supply Input voltage/current: 90V to 136V AC/13A, 180V to 264V AC/6.5A
bb. Power Supply Max output power/current: 920W/16.88A
cc. Power Supply efficiency: 89%

D. 48-port Layer 2/3 PoE Switches:

1. The Layer 2/3 PoE switches shall include the following features:

a. Gigabit RJ-45 port count: 48 PoE+
b. 1G SFP+ port count: 2
c. 1G/10G SFP+: 4
d. MACSec capable ports: All 1G RJ45, 2 x 1G SFP, 2 x 10 SFP+
e. USB port: 1
f. Console port: 1
g. Primary slide-in PSU slot: 1
h. Backup slide-in PSU slot: 1
i. Fans: 2
j. File system flash: 2GB
k. RAM: 1GB
l. Max switching ASIC capacity: 216 Gb/s
m. Switch capacity with all 1G/10G ports (all ports, full duplex): 216 Gb/s
n. Switch frame rate with 6 x 10GE ports @ 64-byte packet: 160.5 Mpps
o. 2x10GE stacking capacity (aggregated): 40 Gb/s
p. System Power Consumption: 104W
q. System heat dissipation: 355 (BTU/h)
r. Power Consumption w/PoE: 920W
s. Heat dissipation w/PoE: 3139 (BTU/h)
t. Dimensions (WxDxH): 17.33" x 13.78" x 1.73"

u. Weight: 10.3 lbs. (4.68 kg)
v. Operating Temperature: (Min) 32°F – (Max) 113°F [(Min) 0°C – (Max) 45°C]
w. Operating Humidity: 5 – 95% Non-condensing
x. Power Supply: Modular 920W AC PoE
y. PoE with 1 PSU: Up to 815W
z. PoE with 2 PSU: Up to 1645W
aa. Power Supply Input voltage/current: 90V to 136V AC/13A, 180V to 264V AC/6.5A
bb. Power Supply Max output power/current: 920W/16.88A
cc. Power Supply efficiency: 89%

E. Self-Managed Switch:

1. SSI shall provide 6-port switches to support site-located PoE equipment at gate control locations. The switches shall include the following features:

a. Data Rate: 10/100/1000 Mbps IEEE 802.3 Compliant, Full Duplex or Half Duplex Electrical Ports/Full Duplex Optical Port
b. Electrical: Ports 1 - 4: 30W Max
c. Optical Connectors: Requires SFP-SX modules
d. Physical characteristics (cm): 15.5 x 13.5 x 2.8
e. Weight:0.9 kg
f. Operating Voltage: 48 to 57 VDC PoE, 12 to 24 VDC non-PoE
g. Current Draw: 5A max, with PoE, 1A w/o PoE
h. Operating temperature: -40°C to 75°C
i. Operating relative humidity: 0% to 95%, noncondensing
j. Mounting: Wall or Flat Surface Screw Attachment
k. Approved manufacturer: Comnet CNGE2FE4SMSPoE
l. Provide Comnet Power Supply model PS48VDC-5ADIN, or approved equal

2.10 VIDEO CLIENT WORKSTATIONS

A. Manufacturers:

1. Dell
2. HP

B. Description: Video client workstations and monitors shall be provided at GUI control station locations to allow the operator(s) to view cameras around the facility. Reference Section 1.2, D for workstation and monitor quantities, locations and sizes. SSI shall coordinate the exact location of the workstations and monitors with the Architect, Owner and other trades as necessary. Each workstation shall be loaded with the VMS software. The basis for the specification is Dell.

C. Video Client Workstations:

1. The Video Client Workstations shall include the following (minimum) features:

a. Processor: Intel® Core™ i7-10700, 8 Core, 16MB Cache

b. Operating System: Windows 10 Professional, 64-bit
c. Memory: 16GB
d. Hard Drive: 512GB SSD
e. Video Card: NVIDIA Quadro P620 (2GB) (for use with single monitor applications)
f. Video Card: NVIDIA Quadro P1000 (4GB) (for use with dual monitor applications)
g. Keyboard: Dell USB Keyboard, English, Black
h. Mouse: Dell USB Optical Mouse with Scroll, Black
i. 27" Monitor (4K); Dell model P2721Q
j. 43" Monitor (4K); Samsung model UN43TU8000 or equivalent
k. 50" Monitor (4K); Samsung model UN50TU7000FXZA

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify the accuracy of all dimensions, allowances, and clearances on site prior to commencing with any work that may be affected by those dimensions, allowances, and clearances. SSI shall confirm that no obstructions exist that would obstruct camera views.

B. Comply with manufacturer's installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in the Contract Documents.

C. Precautions shall be taken to guard against electrostatic and electromagnetic susceptibility and interference.

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

3.2 INSTALLATION

A. Provide complete IP video communication system as specified herein.

B. All material furnished shall be new and conform to the applicable requirements of the Underwriters Laboratories and the National Standards Institute.

C. All VMS head-end equipment to be contained within equipment racks.

D. Provide adequate ventilation for all heat radiating equipment. SSI shall provide fan kits as required to maintain rated operating temperature of installed equipment.

E. All system equipment and field devices to be held securely in place. Fastenings and supports shall be selected to provide a safety factor of three.

F. All system equipment equipped with plug in power connectors to be connected to a dedicated receptacle. Do not use tap connectors for plugging in multiple plugs into a single receptacle.

G. All cable within equipment racks, and cabinets, or on backboards, to be neatly bundled and secured.

H. Wires shall not be nicked, have strands removed, or have frayed strands when removing insulation or terminating.

I. Cameras located in rooms with small footprints (sally ports, holding rooms, etc.) shall be ceiling-mounted and shall be near vertical walls to maximize the field of view.

J. Seal-tite flexible conduits, NEMA-rated weatherproof junction boxes connectors shall be utilized for exterior camera locations.

3.3 CONNECTIONS

A. All IP video communication system equipment connections shall be completed per manufacturer's recommendations and per SSI shop drawings.

B. Ground equipment according to manufacturer's recommendations.

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust IP video communication system components and equipment installation, including connections, and to assist in field testing. Report results in writing.

B. Perform the following field tests and inspections and prepare pass/fail reports:

1. Video image inspection: SSI shall perform a visual inspection of each video image to ensure that each camera is properly focused, aimed, and properly configured for its location.
2. Video client PCs shall be initially configured for camera views applicable to their areas, coordinated with the Owner, and tested for proper operation.

C. Remove and replace malfunctioning units and retest as specified above.

3.5 ADJUSTING

A. All cameras shall be adjusted for optimum performance.

B. 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 four visits to Project for this purpose.

3.6 DEMONSTRATION

A. Provide qualified personnel to train Owner's maintenance personnel to adjust, operate, and maintain the IP video communication system. Refer to Division 01 Section "Demonstration and Training."

B. Training shall be video recorded.

END OF SECTION 282320

SECTION 284619 – SECURITY AUTOMATION SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General provisions of the Contract, including General and Supplementary Conditions, and Division 28 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the hardware requirements for the Security Automation System and associated equipment. This shall include all hardware necessary to provide a complete and functional PLC-based GUI control system.

B. The SSI shall provide and install a Security Automation System as specified herein. The system shall include all equipment, installation materials, set up, and testing to form a complete operating system. Independent system functions and integrated system functions to be fully verified as part of system testing and commissioning.

C. All PLC input and output modules shall be distributed and interconnected utilizing an EtherNet/IP bus.

D. The SSI shall provide an electronic interface between the PLC/GUI control system and the intelligent breaker panel system as specified in Division 26. This interface shall provide ON/OFF control of lighting circuits and receptacles from each GUI station in the system. The intelligent breaker panel system manufacturer shall provide the SSI with all necessary documentation and hardware necessary to facilitate the interface. The SSI shall provide the necessary PLC/GUI hardware and programming required for this interface.

E. The Security Automation System shall include the following main components:

1. PLC Equipment

2. Power Supplies

3. Relays

4. Fuses

5. Door Release Pushbutton Station

6. Call Pushbutton Station

7. Wall-Mount Duress Pushbutton Station

8. Under-Counter Duress Pushbutton Station

9. Under-Counter Door Release Pushbutton Station

10. Motion Sensor

11. Surge Protection Equipment

12. GUI Station Touchscreen Monitors

13. GUI Station PCs

14. Security Management Server & Monitor

15. Network Switches

16. Temperature Sensor

17. 3-Button Control Station

18. Uninterruptible Power Supplies

1.3 DEFINITIONS

A. GUI: Graphical User Interface

B. PLC: Programmable Logic Controller

C. NEC: National Electric Code

D. DVI: Digital Video Interface

E. VGA: Video Graphics Array

1.4 SUBMITTALS

A. Product Data: Include product specifications, operating characteristics, and accessories.

B. Shop Drawings: Detail equipment enclosure assemblies with dimensions, loads, required clearances, components, and locations.

1. Wiring Diagrams: Power, signal, and control wiring.

C. Operation and Maintenance Data: Security Automation System shall be included in operation and maintenance manuals. Include the following:

1. Schedules detailing device names, termination locations, operating voltages, and fuse sizes of all equipment in the system.

1.5 QUALITY ASSURANCE

A. All work shall conform to applicable National Electrical Codes (NEC). SSI shall adhere to applicable state and local ordinances and the requirements of the authority having jurisdiction.

1.6 WARRANTY

A. Warranty Period: 24 months from date of Substantial Completion. The manufacturer shall repair or replace software and hardware that fails in materials or workmanship within specified warranty period.

1.7 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Fuses: Furnish 10 spare fuses of each type provided.

2. Relays: Furnish 5 spare relays of each type provided.

3. PLC input module: Furnish 1 input module of each type provided.

4. PLC output module: Furnish 1 output module of each type provided.

5. PLC processor: Furnish 1 processor of each type provided, including a non-volatile memory card.

6. PLC power supply: Furnish 1 PLC power supply of each type provided.

7. Surge Protector: Furnish 1 spare surge protector of each type provided.

8. GUI Station PC: Furnish 1 spare GUI Station PC. The PC shall be loaded with the GUI software applications for all GUI station locations. Upon startup, the GUI shall prompt the installer as to what location the GUI is being installed.

PART 2 - PRODUCTS

2.1 PLC Equipment

A. Manufacturer:
1. Omron

B. Description: The PLC system provides the logic control for the Security Automation System. The programmable controller shall interface to the GUI control stations. The PLC executes system commands and operations initiated by the GUI stations. The SSI shall be responsible for all PLC programming and security system integration. All security system related inputs and

outputs shall be connected to the PLC I/O network. Hardwired device indication and control relays shall not acceptable.

C. System shall include a complete IEEE 802.3 100/1000 BASE-T Local Area Network that interfaces the GUI control stations, PLCs, Audio Communications Control equipment and the Digital Video Management System. Network shall be a closed network. Reference section 282300 for network switch requirements.

D. Provide a PLC system that is the product of a single company, which has regularly manufactured PLC equipment for a period of 15 years. Provide components that are regularly used in industrial automation applications. PLC racks and modules shall be DIN rail mountable. The control architecture shall use distributed control over Ethernet. Each controller shall share selected memory with all other controllers via broadcast messages over Ethernet.

E. PLC Processor
1. The PLC processor shall be an industrial rated controller capable of executing a basic cycle of instructions in less than 100 milliseconds.
2. The processor shall be capable of supporting 50,000 steps of programming and 160,000 words of data memory.
3. The processor shall utilize input and output modules of the same manufacturer to connect to security devices in distributed security equipment enclosures.
4. The processor shall have an embedded Ethernet port for communication to the GUI control stations.
5. The SSI shall provide a non-volatile memory card for each PLC processor provided.
6. The SSI shall configure the PLC to allow for programming using a connection to the facility's security network.
7. For systems with multiple PLC processors, failure of any PLC or PLCs shall not impact the operation of those remaining operational except to the extent that remote indications from the failed PLC may be lost.

F. PLC Input and Output Modules
1. I/O modules shall be distributed and interconnected utilizing an EtherNet/IP bus.
2. The I/O modules shall have LED indicators that reflect the state of each input or output point.
3. The I/O modules shall be capable of being replaced without the need to unwire field connections. All field wiring shall remain intact on removable connectors.
4. At each location that I/O is installed, provide a minimum of 10% spare input points and 10% spare output points.
5. Upon loss of power, faults, or communication failures with PLC I/O modules, all electric locks shall fail-secure. Sliding and overhead doors shall remain in their present state.

G. Security Interface
1. Owner shall provide a high-speed internet connection for use by SSI.

H. PLC Software
1. SSI shall provide the Owner with a licensed copy of the latest version of the PLC programming software. All necessary software to program and configure the PLC system shall be included with the software package. This software shall be installed on the

Security Management Server. System program files and documentation shall be included with the programming software.

2.2 POWER SUPPLIES

A. Manufacturers:
   1. Mean Well
   2. Omron
   3. PULS

B. Description: Din-rail mountable power supplies for powering the PLC equipment, electric locks and other related security devices. The basis for the specification is Mean Well.

C. 24VDC Power Supply
   1. Rated for 120VAC input and 240W output
   2. Short Circuit/Over-load/Over-voltage/Over-temperature protection with self-correction after fault is removed
   3. Din Rail Mountable
   4. UL508 (industrial control equipment) approved
   5. LED indication for power on

2.3 RELAYS

A. Manufacturers
   1. Omron
   2. Allen-Bradley

B. Description: Relays shall be connected to the discrete outputs from the PLC and connect to field devices for signaling and control.

C. Door Control Relay
   1. Coil rating of 24VDC @ 21mA
   2. Contact rating of 250VAC @ 5A
   3. Power consumption of no more than 0.5W
   4. Slim socket design to allow for quick replacement.
   5. LED for indication

D. Offender Telecommunication Circuit Control Relay
   1. Coil rating of 24VDC @ 21mA
   2. Contact rating of 250VAC @ 5A
   3. Power consumption of no more than 0.5W
   4. Slim socket design to allow for quick replacement.
   5. LED for indication
   6. Double-pole, double-throw

2.4 FUSES

A. Manufacturers
1. Allen Bradley
2. ABB
3. Sprecher + Schuh

B. Description: To ensure system integrity, all primary and secondary circuits shall be fused according NEC guidelines. A fuse shall be provided for each door control relay. Each fuse shall be uniquely labeled with an identifier. Each equipment cabinet containing fuses shall contain a "Fuse Schedule" sheet posted inside the door listing all fuses by the appropriate identifier and specify the operating voltage and fuse size for each

C. 24VDC FUSE HOLDER
1. 5mm Din rail mounted fuse holder with screw clamps
2. Rated for 250V @ 10A
3. Shall be UL recognized
4. LED indication

D. 120VAC FUSE HOLDER
1. 17.5mm Din Rail mounted with screw clamps
2. Rated for 600V @ 30A
3. Shall be UL recognized

2.5 DOOR RELEASE PUSHBUTTON STATION

A. Manufacturers:
1. Quam
2. Harding Instruments

B. Description: The Door Release pushbutton stations shall consist of wall-mounted detention grade stainless steel wall plates containing crushproof pushbuttons where shown on the Security Drawings.

C. Door Release Pushbutton Station
1. Single-gang, vandal-resistant 12GA brushed stainless steel faceplate
2. Momentary, normally open, pushbutton.
3. Mounted using #6-32 security screws
4. Laser engrave the text "DOOR RELEASE" into the faceplate

2.6 CALL PUSHBUTTON STATION

A. Manufacturers:
1. Quam
2. Harding Instruments

B. Description: The Call pushbutton stations shall consist of wall-mounted detention grade stainless steel wall plates containing crushproof pushbuttons where shown on the Security Drawings.

C. Call Pushbutton Station
   1. Single-gang, vandal-resistant 12GA brushed stainless steel faceplate
   2. Momentary, normally open, pushbutton.
   3. Mounted using #6-32 security screws
   4. Laser engrave the text "CALL" into the faceplate

2.7 WALL-MOUNT DURESS PUSHBUTTON STATION

A. Manufacturers:
   1. Allen Bradley
   2. AutomationDirect
   3. GE

B. Description: The wall-mounted Duress Pushbuttons shall consist of a red illuminated mushroom-head pushbutton mounted to a detention grade stainless steel wall plate.

C. Wall-Mount Duress Pushbutton Station
   1. 22mm or 30mm illuminated mushroom-head button with push-pull, or twist-to-release.
   2. Normally-closed, screw clamp, contact blocks
   3. Illumination via LED not incandescent bulbs
   4. Single-gang, vandal-resistant 12GA brushed stainless steel faceplate
   5. Engrave the text "DURESS" into the faceplate.

2.8 UNDER-COUNTER DURESS PUSHBUTTON STATION

A. Manufacturers:
   1. Potter
   2. Ademco
   3. GE

B. Description: Under counter pushbutton shall function as a duress signaling device to the Security Automation System. These devices shall be mounted under millwork out of public view so that they can be activated inconspicuously. The basis for the specification is Potter.

C. Under-Counter Duress Pushbutton Station
   1. Dimensions no greater than 2"W x 2 5/16"L x 1"H
   2. Can use maintained contacts (latching) or momentary contacts.
   3. Equipped with both Normally Open and Normally Closed contacts.
   4. Switch rating of 3A at 28VDC

2.9 UNDER-COUNTER DOOR RELEASE PUSHBUTTON STATION

A. Manufacturers:
   1. Alarm Controls (ASSA ABLOY)
   2. Potter
   3. GE

B. Description: Under counter Door Release pushbuttons shall provide a means of unlocking an electrically controlled door from a desk or countertop. The basis for the specification is Alarm Controls.

C. Under-Counter Door Release Pushbutton Station
   1. Dimensions no greater than 1-1/2"W x 2"L x 1"H
   2. Equipped with both Normally Open and Normally Closed contacts.
   3. Configured for momentary pushbutton operation
   4. Switch rating of 4A at 28VDC

2.10 SURGE PROTECTION EQUIPMENT

A. Manufacturers:
   1. Transtector Systems
   2. Emerson Network Power
   3. Ditek

B. Description: Surge Protectors shall provide high speed transient protection for all security system power circuits as well as signaling and communication circuits for devices located exterior to the building. The basis for the specifications is Transtector Systems and Ditek.

C. 120VAC Surge Protection (Din-Rail Mount)
   1. Ditek model DTK-DR120P1
   2. The 120VAC surge protector shall include the following features:
      a. Surge Current Rating: 75,000 Amps
      b. SCCR: 200,000A RMS
      c. Frequency: 50-60Hz
      d. Connection Method: #14-4AWG Solid/Stranded Cu, Dry Contact: #30-16AWG
      e. Housing: IP20, UL94 V0
      f. Mounting: Din Rail – 35mm
      g. Surge Protection Status: Green – Normal, Red – Replace
      h. Remote Monitoring: Form C Dry Contact 250VAC/1A Max, 125VAC/3A Max
      i. Operating Temperature: -40°F - 185°F (-40°C - 85°C)
      j. Humidity: 5-95% Relative
      k. Dimensions: 4.19"L x 0.69"W x 2.81"H (1 Pole)

D. PoE RJ-45 Surge Protector
   1. Ditek model DTK-MRJPOE
   2. Ditek model DTK-RM12NETS

3. Surge protector shall be used for each PoE camera located on the exterior of the building. Surge protectors shall be located in the security equipment head-end rack location(s).
4. The PoE surge protector shall include the following features:
    a. Service Voltage: <60V
    b. Protection Modes: L-G (All), L-L (All)
    c. Clamping Voltage Common Mode: 75V
    d. Clamping Voltage Differential Mode: 7.22V
    e. Surge Current Rating: 20kA/Pair
    f. Power Handling: 144 Watts
    g. Data Rate: Up to 10GbE
    h. Connection Method: RJ45 In/Out or Shielded RJ45 In/Out, 12 Channels
    i. Housing: ABS or Galvanneal
    j. Operating Temperature: -40°F to 158°F (-40°C to 70°C)
    k. Maximum Humidity: 95% non-condensing

E. Intercom/Card Reader Surge Protection
1. Ditek model DTK-2LVLPLV
2. Surge protector shall be used for each intercom station or card reader mounted on the exterior of the building.
3. The intercom/card reader surge protector shall include the following features:
    a. Protection Modes: Line-Ground (All)
    b. Surge Current Rating: 2,000 Amps per pair (5V –48V), 9,000 Amps per pair (75V – 130V)
    c. Max. Continuous Current: 5 Amps, 0.15 Amps (SCP)
    d. Connection Method: Screw Terminals, #22-#16AWG
    e. Housing: ABS
    f. Operating Temperature: -40°F to 158°F (-40°C to 70°C)
    g. Maximum Humidity: 95% non-condensing

2.11 GUI STATION TOUCHSCREEN MONITORS

A. Manufacturers:
1. ELO
2. Planar

B. Description: Each GUI Station PC shall include one touchscreen monitor. Provide 24" touchscreen monitors for the Booking Counter and Dispatch. Central Control shall be provided with a 32" touchscreen monitor.

C. 24" LED Monitor - The 24" monitors shall have the following features:
1. Touch Technology and Capacity: Projected Capacitive – 10 Touch
2. Diagonal Size: 23.8" diagonal, active matrix TFT LCD (LED)
3. Aspect Ratio: 16:9
4. Active Area: 20.75" x 11.67"
5. Resolution: 1920 x 1080 @ 50, 60Hz
6. Viewing Angle: Horizontal: ±89° or 178° total / Vertical: ±89° or 178° total

7. Number of Colors: 16.7 million
8. Response Time: 15 msec
9. Contrast Ratio: 1000:1
10. Touch Interface: USB
11. Input Video Format: VGA and HDMI
12. Speakers: Two x 2W internal speakers
13. Provide ELO Model 2402L, P/N E351806

D. 32" LED Monitor - The 32" monitors shall have the following features:
1. Touch Technology and Capacity: Projected Capacitive – 12 Touch
2. Diagonal Size: 31.5" diagonal, active matrix TFT LCD (LED)
3. Aspect Ratio: 16:9
4. Active Area: 27.49" x 15.47"
5. Resolution: 1920 x 1080 @ 60Hz
6. Viewing Angle: Horizontal: ±89° or 178° total / Vertical: ±89° or 178° total
7. Number of Colors: 16.7 million
8. Response Time: 8 msec
9. Contrast Ratio: 3000:1
10. Touch Interface: USB
11. Input Video Format: VGA and HDMI
12. Speakers: Four x 5W stereo speakers
13. Provide ELO Model 3203L, P/N E720061
14. Provide desktop stand for countertop mounting

2.12 GUI STATION PC

A. Manufacturers:
1. OnLogic
2. Teguar
3. Industrial PC
4. No other manufacturers shall be considered

B. Description: Industrial Fanless Computer utilizing the HMI software to communicate with the PLC to control and monitor security system functions. The basis for the specification is OnLogic. This computer shall meet the following minimum specifications:
1. Processor: Intel Quad-Core i5-1135G7
2. OS: Windows 10 Professional, 64-bit
3. Memory: 16GB SO-DIMM DDR4
4. Hard Drive: 128GB M.2 SSD
5. Wireless Keyboard & Mouse: Logitech Model MK540
6. Provide OnLogic Model ML100G-53, or approved equal

2.13 SECURITY MANAGEMENT SERVER & MONITOR

A. Manufacturers:
1. Dell
2. HP

B. Description: The Security Management Server shall record all events that take place within the Electronic Security automation system PLC and GUI. The basis for the specification is Dell. Reference section 284620 for software requirements. The Server shall meet the following minimum specifications:
   1. Processor: Intel® Xeon® E-2234 3.60 GHz, 8M Cache, Turbo, 4C/8T
   2. OS: Windows Server 2019 Standard
   3. SQL Server 2019 Standard Edition
   4. Memory: 16GB
   5. Network Adapter: Dual GB NIC
   6. OS Hard Drive: 480GB SSD SATA
   7. Database Hard Drive: 960GB SSD SATA
   8. Removable Media: DVD-RW drive
   9. Integrated display video adaptor
   10. Dell basic keyboard
   11. Dell 2-button optical USB mouse
   12. Dell 22" LCD monitor, model E2216HV
   13. Lexmark Laser printer, model B2236dw

2.14 NETWORK SWITCHES

A. Manufacturers:

   1. Netgear
   2. HP
   3. Alcatel-Lucent

B. Description: The SSI shall provide the quantity of 24-port Layer 2 PoE switches to support all network devices on the security network. Switches shall support PLC hardware, GUI stations, audio communication equipment, security management system and other devices on the security network. Stacking cables shall be installed to connect similar switches at the same location(s). SSI shall provide and install the required quantity of 1GbE SFP optical transceivers at switch locations as required.

C. 24-port Layer 2 PoE Switches:

   1. The Layer 2 PoE switches shall include the following features:

      a. RJ-45 10/100/1000 Ports: 24
      b. Switch capacity with 4xGb/s uplinks: 56 Gb/s
      c. Switch frame rate with 4xGb/s uplinks: 41.66 Mp/s
      d. Gigabit SFP ports: 4
      e. Gigabit/5Gb/s Stacking Ports: 2/2
      f. PoE Ports: 24
      g. Dimensions (WxDxH): 17.32" x 9.92" x 1.73"
      h. Weight: 11 lbs. (5.05 kg)
      i. Operating Temperature: (Min) 32°F – (Max) 113°F [(Min) 0°C – (Max) 45°C]
      j. Operating Humidity: 5 – 95% Non-condensing
      k. Power Supply Nominal Input Voltage: 90-220VAC

l. Power Supply Output Voltage: 12VDC/54VDC
m. Power Supply Wattage: 525W
n. Power Supply PoE power budget: 380W
o. PoE device heat dissipation (BTU): 1296
p. Power Supply efficiency: 85%

2.15 TEMPERATURE SENSOR

A. Manufacturers:

1. Johnson Controls/Penn
2. Omega
3. West Control Solutions

B. Description: The SSI shall provide one or more (as required) temperature sensors to monitor the room temperature for the security electronics system head-end equipment racks located in room A2002. The SSI shall set the low/high temperature thresholds of the sensor(s) in accordance with the temperature ratings of the installed equipment. Upon a low/high temperature alarm, the sensor(s) shall provide an output signal to the PLC system and they shall be annunciated on the GUI station(s). The basis for the specification is Johnson Controls.

C. Temperature Sensor:

1. The temperature sensor shall include the following features:

a. Power Consumption: 1.8VA maximum
b. Supply Power: 24VAC (20 to 30 VAC), 50/60 Hz, Class 2 or Safety Extra-Low Voltage
c. Ambient Conditions: -40 to 150°F (-40 to 66°C), 0 to 95% RH Noncondensing
d. Temperature Control Range: -40 to 212° (-40 to 100°C)
e. Input Signal: 1,035 ohm at 77°F (25°C) for A99 PTC temperature sensors
f. Sensor Offset Range: ±5°F or ±3°C
g. Output Relay Contacts Electrical Ratings: 100VA, 30VAC maximum, Class 2
h. Enclosure Material: Type 1/IP20 high-impact thermoplastic or Type 4X/IP66 watertight, corrosion-resistant, high-impact thermoplastic.
i. Provide Penn Model A421GBF-02C, or approved equal.

2.16 3-BUTTON CONTROL STATION

A. Manufacturers:

1. MMTC
2. Schneider Electric

B. Description: The SSI shall provide 3-button control stations where shown on the Security Drawings. The control stations shall be used to operate sectional doors in the vehicular

sallyport area. Presenting a valid credential to a local proximity reader shall enable each control station. The basis for the specification is MMTC.

C. 3-Button Control Station:

1. The 3-button control station shall include the following features:

a. NEMA 1
b. Flush Mount
c. Fully Guarded
d. Three Button Control (Open-Close-Stop) in Metal Enclosure
e. Button: 10 amp @ 250VAC
f. OPEN: NORMALLY OPEN
g. CLOSE: NORMALLY OPEN
h. STOP: NORMALLY CLOSED
i. Provide MMTC Model PBC-3, or approved equal.

2.17 UNINTERRUPTIBLE POWER SUPPLIES

A. Manufacturers:
1. VERTIV
2. APC

B. Description: Uninterruptible Power Supplies (UPSs) shall be provided to provide battery backup protection for critical electronic security system hardware. The SSI shall provide a 1500VA line interactive UPS for Room B1021 and a 1000VA line interactive UPS for Rooms A1010, A1047, A1050 and B1006. The SSI shall provide a 20kVA on-line UPS for C2002. The basis for the specification is VERTIV.

C. 1000VA Line Interactive UPS
1. Type: Line-interactive
2. Power Rating: 1000VA, or 600W
3. Nominal Input Voltage: 120VAC
4. Input Frequency: 50 or 60 Hz, +/- 5Hz, autosensing
5. Output nominal voltage: 120VAC
6. Receptacles: Five NEMA-15R
7. Provide VERTIV model PSA5-1000MT120

D. 1500VA Line Interactive UPS
1. Type: Line-interactive
2. Power Rating: 1500VA, or 900W
3. Nominal Input Voltage: 120VAC
4. Input Frequency: 50 or 60 Hz, +/- 5Hz, autosensing
5. Output nominal voltage: 120VAC
6. Receptacles: Five NEMA-15R
7. Provide VERTIV model PSA5-1500MT120

E. 20kVA On-line UPS

1. Power Rating: 20kVA
2. UPS Technology: On-Line Double Conversion
3. Input Voltage Range: 208V/120V, 220/127VAC, 60Hz 3-phase, 4-wire plus ground
4. Input Frequency Range: 40-70Hz
5. Power Output Distribution Ports: 2
6. Distribution Option: Provide Quantity of L5-20R (2-pole, 20A, 125V) distribution as required
7. Communications: Provide IS-RELAY card for interface to PLC system and IS-UNITY-DP web card
8. Battery Technology: Valve-regulated lead acid battery
9. Dimensions: 17.3"W x 29.5"D x 63"H
10. Unit Weight: 734 lbs – 1042 lbs
11. Operating Temperature: 32-104°F (0-40°C)
12. Relative Humidity: 0% to 95%
13. Agency/Certification/Conformance: Listed to UL 1778 and CSA certified
14. Runtime: Provide 15 minutes of runtime
15. Approved manufacturer: VERTIV model 53S20GC8A5EE001, or equal by APC

PART 3 - EXECUTION

3.1 EXAMINATION

A. Inspect the conditions under which work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.

B. Verify the accuracy of all dimensions, allowances, and clearances on site prior to commencing with any work that may be affected by those dimensions, allowances, and clearances.

C. Comply with manufacturer's installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in the Contract Documents.

D. Protection shall be taken to guard against electrostatic and electromagnetic susceptibility and interference.

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

3.2 INSTALLATION

A. Provide complete Security Automation System as specified herein.

B. All material furnished shall be new and conform to the applicable requirements of the Underwriters Laboratories and the National Standards Institute.

C. All system equipment to be contained within equipment racks and cabinets. If more or larger equipment racks or cabinets are required than exist or are specified, allow for such additional equipment racks and cabinets in contract price.

D. Provide adequate ventilation for all heat radiating equipment. SSI shall provide fan kits as required to maintain rated operating temperature of installed equipment.

E. All system equipment and field devices to be held securely in place. Fastenings and supports shall be selected to provide a safety factor of three.

F. All system equipment equipped with plug in power connectors to be connected to a dedicated receptacle. Do not use tap connectors for plugging in multiple plugs into a single receptacle.

G. All cable within equipment racks, and cabinets, or on backboards, to be neatly bundled and secured.

3.3 CONNECTIONS

A. Ground equipment according to manufacturer's recommendations.

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: A trained service representative to inspect, test, and adjust PLC system components and equipment installation, including connections, and to assist in field testing.

B. Perform the following field tests and inspections and prepare pass/fail reports:

1. Field Device Test: SSI shall perform an inspection of each field device connected to the PLC system to ensure that each is properly working, installed, and configured for its particular location.
2. The SSI shall also verify that all PLC events are being logged to the Security Management Server

C. Remove and replace malfunctioning units and retest as specified above.

3.5 DEMONSTRATION

A. A trained service representative will perform system maintenance training at the Owner's facility once the final inspection is complete.

B. Training shall be video recorded.

END OF SECTION 284619

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SECTION 284620 – VIDEO GRAPHIC USER INTERFACE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General provisions of the Contract, including General and Supplementary Conditions, and Division 28 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the requirements for the video graphic user interface (GUI). The GUI software shall be the primary interface to the PLC and Electronic Security System. The GUI software operating on the GUI Station PCs shall communicate to the PLC processors for security systems operation.

B. The GUI software shall be programmed and configured to provide all functionality as described in this specification section. The GUI software shall communicate with all required security system components to display, control and monitor all security devices as specified and shown on the plans.

C. GUI stations shall be provided as shown on the plans. The GUI station in Control Room C2004 shall be designated as the "Master GUI station" and shall have the ability to take over all functions and disable/enable all other GUI station locations. The station in Dispatch B1006 shall have the ability to control/monitor all areas of the Jail and disable/enable the station at Booking B1021 if the station in C2004 transfers control to B1006, or an emergency duress is initiated from the station at C2004. The station at B1106 shall not have the ability to initiate a takeover of the station at C2004.

D. The video graphic user interface shall include the following main components:

1. HMI Development Software
2. Door Control
3. Video Monitoring
4. Intercom Communication
5. Utility Control
6. Duress Alarms
7. Emergency Features
8. Additional GUI Features

9. Security Management Server Software

1.3 DEFINITIONS

A. GUI: Graphical User Interface

B. PLC: Programmable Logic Controller

C. HMI: Human Machine Interface

1.4 SUBMITTALS

A. Product Data: Include software datasheets, operating characteristics, and accessories required.

1. Shop Drawings: Provide all Graphical User Interface layouts. Layouts shall be created by the GUI configuration software and shall not consist of line drawings created by CAD programs. The Owner reserves the right to request the Division 28 SSI to make changes (during the submittal process) to the GUI layouts based on the Owner's policies and procedures, without incurring any additional cost to the Owner.

B. Operation and Maintenance Data: Include the following:

1. Detailed operations manual describing all features of the GUI including all administrative features.

2. Schedules detailing IP address, model numbers, locations, titles, and termination locations of all GUI stations in the system.

1.5 QUALITY ASSURANCE

A. All GUI development shall be done by a Certified Partner of the HMI manufacturer and adhere to all recommended development standards.

1.6 WARRANTY

A. The SSI shall warranty the GUI software to be free of defects for a period of 24 months from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 HMI Development Software

A. Manufacturer:
1. Aveva™ Edge (Formerly InduSoft Web Studio)
2. Aveva™ InTouch HMI

B. Description: The GUI application(s) shall be developed using a non-proprietary industrial development suite designed for real-time connections to PLCs and other types of remote I/O devices. The development environment shall allow for the creation of animated operator interface screens utilizing an application tag database.

C. HMI Development Software
1. The HMI shall support the number of I/O tags as required for each application in the system.
2. The HMI shall allow for sophisticated scripting for customizing applications for specific needs.
3. The HMI shall allow for Microsoft ActiveX controls and .NET controls integration.
4. The HMI shall allow for resolution independent graphics and intelligent symbols.
5. The HMI shall allow for template-based development of objects and graphics.

D. HMI Screen Development
1. Provide screens utilizing accurately depicted, properly aligned floor plans. Floor plans shall be displayed as seen from the GUI control station operator's perspective.
2. Provide screens that incorporate the use of screen resolution and color to enhance and simplify the information displayed. Provide a light gray background for all screens. Provide screens that utilize contrasting colors. GUI screens shall use red for alarm conditions, yellow for cautionary conditions and information such as the depiction of interlock groups, use green for audio communication functions and blue for video surveillance.
3. Provide the number of screens that support the sequences of operation as required by the system.

2.2 DOOR CONTROL

A. DOOR ICON – The Door Icon shall activate a door menu which appears next to the selected door icon and contains all functions available for that particular door. Possible functions include: UNLOCK, HOLD OPEN, CLOSE, INTERLOCK OVERRIDE, ISOLATE, and ALARM CLEAR. While the door is selected, a BLUE (flashing) selection ring shall surround the door icon showing the operator which door is under their control. Only after the door has been selected can any other function be selected. This two-keystroke operation for unlocking is important so that doors cannot be accidently unlocked. The same control methods are required for swing, sliding, and overhead doors. When the operator selects a door menu function the GUI shall audibly announce which function was selected. To unlock a door, the operator must first select the door, then from the door menu select the "UNLOCK" function. The GUI will then

announce "Unlock", if the door was a swing door then the door will be unlocked for 3 seconds and then automatically relock. If the door was a sliding door or an overhead it will open fully and stop. To stop the opening or closing of a sliding or overhead door the operator can press the "STOP" button which will stop the motion of the traveling door. To hold a swing door open or unlocked, the operator shall first select the door and from the door menu select "HOLD-OPEN". The door will remain in the unlocked position until the operator selects the door and presses the "CLOSE" button. To close a sliding or overhead door, the operator shall first select the door and from the door menu select the "CLOSE" button. The selected door will then close completely. If a door is selected but no menu function is pressed the door menu will time-out after 5 seconds and disappear.

1. DOOR MENU - When a Door Icon is selected a menu shall appear next to the icon and contain all functions available for that door. Such functions shall include UNLOCK, HOLD OPEN, CLOSE, INTERLOCK OVERRIDE, ISOLATE, and ALARM CLEAR. If no selection is made within 5 seconds the door menu shall timeout and disappear.

2. DOOR INDICATION - The Door Icon shall include a symbolic representation the status of the door. The door symbol should represent the door and its current state (i.e. opened, closed, unlocked, etc). Swing door icons shall look like swing doors opening and closing during operation, sliding doors shall appear to slide open and closed during operation, and overhead door icons shall look like overhead doors opening and closing during operation. The Door Icon shall have the following states:
   a. The door icon button is gray and the door symbol is gray when the door is locked and secured.
   b. The door icon button is red and the door symbol is gray when the door is powered but the lock status switch and the door position switch are still indicating that the door is secure.
   c. The door icon button is red and the door symbol is red when the door is powered and unsecure.
   d. The door icon button is gray and the door symbol is red when the door is not powered but is unsecure.
   e. The door icon button flashes red and the door symbol shows the current status of the door if the door is violated. A door shall be considered 'violated' if it is opened by any other means than the Security Automation System. The GUI shall annunciate "DOOR VIOLATION" until the alarm is acknowledged.
   f. Interlocked doors shown with yellow outlines around their buttons when a door in an interlock group is unsecure. If an interlocked door is attempted to be unlocked, the GUI shall annunciate "Not allowed, door is interlocked."

3. DOOR GROUPS - Doors can also be configured into groups. The Door Groups shall be controlled using the "GROUP" button located within the GUI. To control a group of doors the operator shall first select the appropriate "GROUP" icon which displays the Group Menu. From the menu the operator can select to "UNLOCK", "HOLD OPEN", or "CLOSE" all doors in that group.

4. DOOR ISOLATE - Electrically controlled doors can be isolated such that they cannot be opened from the GUI or from other field devices such as pushbuttons, proximity readers, or motion detectors. To isolate a door, the operator first selects the door which displays the door menu. From the menu, the operator selects "ISOLATE" which places a large red "X" on the door icon. Once isolated, all door unlocking functions will not be available. This feature is also used to isolate doors from being unlocked using the Group Unlock function. The door remains isolated until the operator selects the door and presses the "ISOLATE" button again which removes the large red "X" from the door icon.

5. INTERLOCKS - Interlock groups as defined by the Owner shall be configured as a function of the Security Automation System. These interlock groups are to be programmed into the PLC and not be hardwired or mechanical and are intended to allow only one door in a group to be unlocked at any one time.
   a. When a door in an interlock group becomes unlocked or unsecured all doors in that group including the unsecure door will be shown with a yellow outline around the icon. This denotes an "active interlock".
   b. If the operator tries to unlock a door in an active interlock the GUI shall audibly tell the user "Denied, Door is Interlocked".
   c. Active interlocks shall be displayed on all GUI stations regardless of whether they are in primary control of that area.
   d. To unlock a door within an active interlock group, the operator must use a minimum of two steps to unlock a door.
      1. First select "Interlock Override" from the Door Menu. The GUI shall audibly warn the operator of the risks involved in the action.
      2. The operator must then select "CONTINUE" to override the interlock. The system shall allow the user to unlock one door in the interlock group then reactivate the active interlock group
   e. When all doors in an interlock group are secured the yellow outlines shall disappear.

6. EXTERIOR DOOR CONFIRMATION - The GUI software shall be configured to require a second confirmation step before unlocking exterior doors. After the operator attempts to perform the Unlock command a window shall appear asking the operator to acknowledge the security risk in unlocking an exterior door. The operator must press the YES – UNLOCK button before the system will unlock the door. The other option is to press the NO – ABORT button, which will cancel the function.

2.3 VIDEO MONITORING

A. Video monitoring from the GUI is accomplished by selecting any VIDEO CAMERA ICON. Each Video Camera Icon represents a camera within the system. The orientation of the camera symbol shall be representative of the actual direction of the camera. Once selected, the icon will turn from gray to blue and the video image of the camera will be displayed live within an onscreen video display window. Two onscreen video display windows shall be incorporated into the GUI. One window shall be used for manual camera call-up and the other window shall be used for intercom follow. Selecting another camera icon shall cause its camera to become

active and cancel the previous camera. When cancelled, the camera icon shall change from blue, back to gray. To populate a video display window with a selected camera image, the operator shall right-click on the selected VIDEO CAMERA ICON and a pop-up menu shall display a graphical view of the available video display windows. The operator shall then be able to select the desired video display window to populate with the selected camera. For the two video windows dedicated to manual camera call-up and intercom follow, pressing any Video Camera Icons (or an active intercom follow) will override any camera being displayed.

2.4 INTERCOM COMMUNICATION

A. Establishing Intercom audio communications from the GUI is accomplished by selecting any INTERCOM ICON. These icons shall be placed on the floor plan at the location of each intercom station. Selecting the icon will immediately activate the intercom station and allow the control station to monitor the audio at the station. The Intercom icon will turn from gray to green upon activation and the station ID# is displayed in the "IN USE" field of the GUI. Pressing the "Push-To-Talk" button located at the GUI station shall allow the operator to communicate with the intercom station. Pressing the active Intercom icon again will cancel the connection. Pressing another Intercom icon will automatically connect the operator to that station and cancel the previous connection. If there is a camera in view of the intercom station it shall be automatically connected to the video display window (reference 2.3, A). When connected the Video Camera Icon camera symbol shall display a green indicator showing that it has been called up following the intercom connection. The Intercom Icon shall have the following states:

1. If an intercom call button, located on or at the intercom station, is pressed the INTERCOM ICON flashes green and the GUI shall sound a call notification until the call is connected or the ACKNOWLEDGE button is pressed.
2. Once the call is answered, the INTERCOM ICON shall turn solid green. If another call is incoming while the first is being serviced, that INTERCOM ICON shall flash but the GUI shall wait to annunciate the call notification until the current active intercom is disconnected.

B. ISOLATE INTERCOM – This feature allows the operator to remove the intercom stations ability to audibly call the GUI station. To isolate a station, the operator must first press the "ISOLATE INTERCOM" button then select which station(s) to isolate. The first time the icon is pressed a large red "X" is placed on the Intercom icon denoting it as isolated. The GUI software shall allow the user 3 seconds to select other stations before timing out. To remove the isolation the user shall repeat the process which will remove the large red "X" from the icon.

C. AUDIO LEVEL MONITORING: This feature shall monitor the audio levels in predetermined areas and provide notification when the audio level exceeds the present setting. When the level is exceeded the intercom shall sound the call notification, flash the intercom icon, and display the text "ALARM" in red letters on the intercom icon.

D. INTERCOM AUDIO WINDOW – There shall be an Intercom Audio window integrated into the control menu for displaying the status of the intercom audio system. A portion of this window shall indicate which intercom station is currently active. In addition, there shall be a pending list displaying the 6 oldest intercoms in the queue. To answer a pending intercom the operator can either select the flashing intercom icon or select it out of the queue. Selecting the intercom out of the queue connects the operator to that station and its station ID# shall

appear in the "In Use" field of the intercom audio window. Furthermore, when the station is selected out of the queue the GUI shall automatically switch the operator to the screen that contains the active intercom. To disconnect, the operator can simply press the station ID text in the "In Use" field or press the active intercom icon.

2.5 UTILITY & MISC. CONTROL

A. Utility control is a menu function that once selected displays all Light Icons, TV Receptacle Icons and Inmate Telephone control Icons. The GUI software shall give the operator 5 seconds to select an icon before it is hidden. During this time period, all Intercom Icons and Paging Icons shall be hidden in the background. Once an icon is selected, the timer shall start over and allow 5 more seconds before hiding the icons. Selecting a Utility Icon while the function is active shall cause the utility to turn "ON" if it is "OFF" and "OFF" if it is turned "ON". Utilities groups can also be controlled using the "GROUP" button while the menu selection is still active and the icons are visible. Pressing the "GROUP" button once shall turn all utilities "ON" and pressing again shall turn them all "OFF".

B. During an emergency evacuation event or other emergency occurrence, all lights in the area of the event shall be configured to turn ON (if configured to be controlled via the PLC GUI system).

C. PROXIMITY READER ICONS – Proximity Reader Icons shall be placed on the GUI screens where proximity readers are located. When a proximity reader has a valid credential read that provides access for the user, the Proximity Reader Icon shall turn green for 3 seconds. Proximity Readers shall be able to be isolated (or disabled). When the icon is pressed a large yellow "X" is placed on the Proximity Reader icon denoting it as isolated. To remove the isolation the user shall repeat the process which will remove the large yellow "X" from the icon.

2.6 DURESS ALARMS

A. DURESS ALARM ICONS shall be placed on the GUI screens that represent the physical locations of actual duress pushbuttons stations around the facility. Duress Alarm Icons shall normally be hidden when not active. When a duress alarm pushbutton station is pressed the Duress Alarm Icon shall be displayed and shall flash. The GUI shall annunciate "OFFICER ALARM" until the alarm is acknowledged. Once the alarm is acknowledged, the icon shall continue to flash with no audible alarm until the actual physical pushbutton station is reset by releasing the latched pushbutton. Once the pushbutton station is reset the icon shall be hidden in the background.

2.7 EMERGENCY FEATURES

A. EMERGENCY MENU: Located on GUI menu shall be a button labeled "EMERGENCY." Pressing this button will display the Emergency Menu which consists of various emergency related function buttons. These buttons shall include: RELEASE ALL, and LOCKDOWN.

1. RELEASE ALL button:

a. When pressed, this button shall begin the Emergency Evacuation sequence and display a window explaining the risk of the action. The GUI shall also audibly warn the operator of the risks involved in continuing the action. On the step 1, window there shall be buttons to CONTINUE and ABORT.

b. If the operator continues, the first window shall disappear and a second window shall again warn of the danger and risks involved in continuing. Also the GUI shall place "E" symbols on all controlled doors that will be released and again warn the operator of the dangers involved in continuing. On the step 2 window, there shall be buttons to CONTINUE and ABORT.

c. If the operator chooses to continue, a full screen window shall appear stating that this is the final warning before release. An audible message shall warn the operator that after this step, all doors with "E" symbols will be released. On the step 3 window, there shall be a button to CONTINUE and the ABORT button should at least 10 times larger in size.

d. Pressing continue will begin the unlocking sequence, all doors with "E" symbols will be released or opened.

2. LOCKDOWN button: The Emergency Window shall contain a LOCKDOWN button. This button shall lock all held-open swing doors as well as close all sliding and overhead doors. This feature shall also disable all access devices such as proximity readers and door release pushbuttons.

2.8 ADDITIONAL GUI FEATURES

A. NAVIGATION PANE – There shall be a portion of the GUI screen dedicated to screen navigation for the Security Automation System. This shall be a graphical representation of the floor layout segmented to represent each screen. This area is also used to display Door Violation Indication, Alarm indication and Pending Intercom indication. When a door on particular screen violates the screen associated with that door flashes red indicating to the operator that their attention is required. Other devices that should be indicated by a red flash in the Navigation Pane include: Fire Alarm System Annunciation. Pending Intercom stations shall flash their respective windows green to help assist the operator in finding the pending station. The current active screen shall be displayed as white allowing the user to see their current location

B. ALARM ACKNOWLEDGE - Selecting this icon shall acknowledge and silence the audible notification used to indicate a violated door, intercom station call, or any other alarm.

C. CONTROL ROOM DURESS - Selecting this icon shall immediately DISABLE all functions of the GUI. This feature shall be included on GUI stations outside of Master Control.

D. ADMINISTRATIVE UTILITIES MENU - Located on the menu shall be a button for configuring convenience and maintenance options to the operator.

1. A 'COMMAND FUNCTIONS' button shall allow the operator to shut-down the GUI software applications. Upon selecting the button, the operator is prompted to provide an administrator-level password before the software applications are shut down.

2. A 'VOICE STYLE' selection shall allow the operator to select between a female, male, or basic for common GUI functions. For audible alarm indications, the GUI shall play a male or female voice always.
3. A 'CALIBRATE SCREEN' button shall allow the operator to calibrate the GUI overlay for proper touch alignment.
4. A 'CLEAN SCREEN' button shall allow the operator to clean the surface of the GUI display with a manufacturer approved cleaning product. The screen shall be "blanked" so that no icons or control functions are available to the operator. An onscreen message shall tell the user what types of cleaning products are approved.

2.9 SECURITY MANAGEMENT SERVER SOFTWARE

A. All events that take place within the PLC and Electronic Security System shall be logged to a Security Management Server provided by the SSI. The HMI software installed on the GUI stations shall not be dependent on the security management server and software. The loss of functionality of the security management server shall in no way affect the normal operation of the GUI software.

B. The security management server shall have the following features:
   1. Record Device Events for the following field devices:
      a. Doors
      b. Intercoms
      c. Proximity Readers
      d. Cameras
      e. Utility Control (Lighting, TV Receptacle, Inmate Phone control)
      f. Misc. Alarms (Duress, etc.)
      g. Any other project-specific device
   2. Record Control Point events for each GUI station. These events shall be visibly different from Device Events and display which control point and which user initiated the event. A control point shall consist of events generated by a GUI station. Control Point events shall include the following events;
      a. Touchscreen Status
      b. Interlock Override
      c. Emergency Evacuation
   3. The software shall allow the user to enter a credential, or 4-digit pin for each GUI station.
   4. Event log shall be stored in a SQL database and be archived for retrieval.
   5. The security management server shall provide the user the ability to display the previous 100, 50 or 25 events dynamically updating on the screen.
   6. The security management server shall provide the user the ability to adjust the refresh rate for the events at a rate of 10 seconds, 30 seconds, 60 seconds or 5 minutes.
   7. The user shall be able to filter the dynamic event display by device type.
   8. The dynamic event display shall display columns for Control Point/User, Recorded Audio File, Timestamp (the date and time of the event), Device Name, Event Type, Device Description/Note, Device Type, Area Name (location area name the specific device is grouped in).

9. The user shall be able to generate reports based on database queries for event names or time of occurrences. This report shall be displayed on screen and the user should be allowed to print the report.
10. Devices and their associated events shall have the ability to be grouped based on their respective locations in the building. (i.e. Cell Block A, B, C, Booking, etc.)
11. The user shall have the ability of performing a search function that looks for keywords such as type of event, area of the building, or device names. The search function will replace the dynamic event view with the returned list based on the search criteria. The user can either choose to see the previous 100 events (based on the search criteria) or all events containing the keyword(s) searched.

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

A. Perform and document the following pass/fail tests:
   1. Verify field operation of every icon and button relating to the Electronic Security System GUI.

3.2 ADJUSTING

A. SSI shall provide basic adjustments to text, color, and representation of the facility at no additional charge during the final inspection of the project.

3.3 DEMONSTRATION

A. A Certified Systems Developer will perform the training at the Owner's facility once the final inspection is complete.

B. Training shall be video recorded.

END OF SECTION 28462

SECTION 285123 – IP AUDIO COMMUNICATION SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 01, and Division 28 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the requirements for an IP audio communication system. The IP audio communication system shall be integrated with the overall Electronic Security System. The system shall be configured to support all intercom stations, speakers and touchscreen master modules shown on the security electronics plans.

B. The SSI shall provide an integrated IP audio communication system as specified herein. The system shall include all equipment, installation materials, set up, and testing to form a complete operating system. Independent system functions and integrated system functions to be fully verified as part of system testing and commissioning.

C. The Graphic User Interface (GUI) software (specified in section 284620) shall be the primary interface for the control and monitoring of the IP audio communication system (reference section 284620 for software functional requirements).

D. The SSI shall provide a digital interface between the PLC system and the Digital Communication Controllers for control by the PLC.

E. Digital Communication Controllers and Digital Communication Expanders shall be interconnected to form intercom exchanges. Each Digital Communication Controller (DCC) shall be capable of supporting up to four Digital Communication Expanders (DCEs). The SSI shall provide and install the required number of DCCs and DCEs to support the total number of intercom stations, ceiling speakers and touchscreen master modules in the system. All DCCs shall be connected to each other over a 10/100/1000Base-T network. This network shall provide data communications for the system. Reference section 282300 for network switch requirements.

F. The system shall include station audio level alarm detection (for ceiling speakers requiring this feature, as indicated on the plans) with adjustable detection settings for each individual station. SSI shall include with their bid the head-end equipment required to support this feature. The SSI shall adjust the audio level alarm detection settings for each station, with input from the Owner.

G. The SSI shall provide an audio recording system to digitally record all the audio conversations between each audio master station and intercom stations, ceiling speakers and paging speakers.

H. The SSI shall NOT provide PLC-controlled relay cards to control audio line switching at the security electronics head-end. All switching shall be provided by Harding digital communication controllers (DCCs) and digital communication expanders (DCEs).

I. The IP audio communication system shall include the following main components:

1. Digital Communication Controllers and Expanders

2. Administrator Software

3. Audio Master Stations

4. Intercom Stations & Loudspeakers

5. Visitation Handsets

6. Accessories

7. Audio Recording System

1.3 DEFINITIONS

A. DCC: Digital Communication Controller

B. DCE: Digital Communication Expander

1.4 SUBMITTALS

A. Product Data: Include rated capacities, operating characteristics, and accessories.

B. Shop Drawings: Detail equipment enclosure assemblies and indicate dimensions, loads, required clearances, components, and location of each field connection.

1. Wiring Diagrams: Power, signal, and control wiring.

C. Operation and Maintenance Data: For IP audio communication system to include in operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:

1. Schedules detailing locations, titles, and termination locations of all intercom stations, ceiling speakers and touchscreen master modules in the system.

1.5 QUALITY ASSURANCE

A. All work shall conform to applicable National Electrical Codes (NEC). SSI shall adhere to applicable state and local ordinances and the requirements of the authority having jurisdiction.

B. Intercom system equipment is to be designed and manufactured in accordance with ISO-9001 2000 Quality System Standard.

C. Manufacturer's quality control program to be registered in accordance with the above noted standard.

1.6 WARRANTY

A. Warranty Period: 24 months from date of Substantial Completion. The manufacturer shall repair or replace software and hardware that fails in materials or workmanship within specified warranty period.

1.7 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Intercom Station: Furnish 1 spare intercom station of each type provided.

2. Touchscreen Master Module: Furnish 1 spare touchscreen master module.

PART 2 - PRODUCTS

2.1 DIGITAL COMMUNICATION CONTROLLERS

A. Manufacturer:

1. Harding Instrument Co. Ltd. - MicroComm DXL

B. Description: SSI shall provide required number of Digital Communication Controllers to form an intercom exchange capable of independent local operation. Each exchange capacity shall be increased as required by connecting additional Digital Communication Expanders (maximum of 4) to each DCC. The basis for the specification is Harding Instruments.

C. Digital Communication Controller (DCC):

1. Each DCC shall include the following:

a. Process Control Card (PCC)
b. Master Control Card (MCC)
c. Two Station Control Cards (SCC's)

d. Optional internal PCI card.
e. Front panel keypad/display for system setup and maintenance.
f. 110 VAC, 60 Hz power supply for internal functions.

D. Process Control Card (PCC):

1. Process Control Card shall contain system configuration and data, control exchange operations and switching, and provide exchange network ports.
2. PCC shall include the following:

a. USB network ports for exchange expansion.
b. Ethernet network ports for system expansion and external control by touch screen computers and graphic control panels.
c. Fiber optic or copper digital audio trunk ports.
d. Two serial ports.
e. Internal modem for transmitting and receiving data over a telephone line.

E. Master Control Card (MCC):

1. MCC shall include the following:

a. Include ports for any combination of two intercom or telephone set master stations.
b. Include two line-level audio inputs with status and control.
c. Include two line-level audio outputs with status and control.
d. Convert incoming audio signals to digital format and outgoing signals to analog format.
e. Intercom master station audio, press-to-talk and hook switch status transmitted over two single shielded pair cables with wiring supervision to detect open circuit and short circuit faults.
f. Telephone set master station functions all transmitted over a single wiring pair.

F. Station Control Card (SCC's):

1. SCC's shall include the following:

a. Each provides sixteen half-duplex intercom station ports which can be employed in adjacent pairs for full duplex devices.
b. Provide an interface for intercom stations. Units to convert incoming audio signals to digital format and outgoing signals to analog format. Each channel to monitor the status of up to two (2) switches associated with each intercom station.
c. Each card interfaces with 16 half-duplex channels. Each channel includes a separate audio power amplifier for non-blocking call operation and sixteen (16) independent software-controlled volume settings.
d. All station audio, switch, and power functions on 400 Series and 401 Series cards to be transmitted over a single shielded pair cable with supervision to detect open circuit and short circuit faults.

e. Audio and switch functions on 300 Series (Generic Intercom) station control cards to be transmitted on separate wiring pairs.

2.2 ADMINISTRATOR SOFTWARE

A. Manufacturer:

1. Harding Instrument Co. Ltd. - MicroComm DXL

B. Description: Administrator software shall be included with the IP audio communication system. SSI shall provide one licensed copy of the administrator software to the Owner at final completion. The basis for the specification is Harding Instruments.

C. Administrator Software:

1. Harding Instruments model DXL-SOF-ADM.
2. Administrator Software to function on a standard PC to support system configuration, diagnostics, maintenance, and logging but not be required for system operation.
3. Administrator Software to employ Windows features including views of system tree structure, tables of devices, screens for system settings and adjustments, and tables of operational data.
4. Configuration features to include:

   a. Creation of overall system architecture.
   b. Creation of multiple device templates.
   c. Copy and paste functions with auto-numbering and auto-assignment to create device schedules.
   d. Configuration error detection and alerts.
   e. Device naming and call routing functions.
   f. Device setting and performance functions.

5. Diagnostic and Maintenance features to include:

   a. Verification of system configuration and installation.
   b. Verification of system networks.
   c. Verification of device connections.
   d. Verification of system operation.
   e. Diagnostics via modem or Ethernet ports.

6. Logging features to include:

   a. Display of system activity with filtering options.
   b. Search by time and date.
   c. Search by device.
   d. Search by parameter.

7. SSI shall install a licensed copy of the Administrator software on the Security Management Server.

2.3 AUDIO MASTER STATIONS

A. Manufacturer:

1. Harding Instrument Co. Ltd. - MicroComm DXL

B. Description: VoIP Touchscreen Master Modules shall be provided to interface with the IP audio communication system. One VoIP touchscreen master module shall be provided at each GUI station location. The basis for the specification is Harding Instruments.

C. VoIP Touchscreen Master Module:

1. Harding Instruments model TMM-641-121-1.
2. The VoIP touchscreen master module shall include the following features:

a. Dimensions: 2.01" (H) x 5.35" (W) x 7.07" (D)
b. Operating Temperature: 32° to 122°F (0° to 50°C)
c. Humidity: 0 to 95% non-condensing
d. Field Connections: female RJ-45 connector
e. Power: 22.8Vdc – 37.8Vdc or EEE 802.3af compliant
f. Switch: 1 million operations
g. Speaker: 2.5" Mylar cone
h. Speaker level: 82 dB SPL max. @ 1 meter
i. Audio Output: 1V rms

2.4 INTERCOM STATIONS & LOUDSPEAKERS

A. Manufacturers:

1. Harding Instrument Co. Ltd. - MicroComm DXL
2. Quam-Nichols Co. (for loudspeaker only)
3. Lowell (for loudspeaker only)

B. Description: Intercom stations and loudspeakers shall be provided as shown on the plans. Intercom stations shall be the primary means of communication in the IP audio communication system between the GUI operator and the facility staff and offenders. All intercom stations shall include a call pushbutton switch. Ceiling speakers shown on the plans as designated with a "T" shall include audio threshold detection. The basis for the specification is Harding Instruments.

C. Intercom Stations:

1. Harding Instruments model ICE-420-217-000 for interior locations.
2. Harding Instruments model ICE-420-227-000 for exterior locations.
3. Harding Instruments model ICE-421-CUS-105 for interior locations with included "privacy switch" feature.
4. Harding Instruments model FDH-440-204-111 for interior stations with integrated handset.

5. Harding Instruments model ICE-620-227-000 for exterior site-located, pedestal-mounted IP stations.
6. The intercom stations shall include the following features:

    a. Intercom stations shall be designed for mounting on standard 2-gang outlet boxes. Faceplates shall be constructed of 11-gauge brushed stainless. Internal steel offset grille to restrict inserting objects through speaker grille. Stations shall be ruggedly constructed and resistant to damage from soil and sprays.
    b. Each intercom station shall incorporate an internal loudspeaker, microphone preamplifier and functioning multiplexing circuitry. One pushbutton shall be provided on each station. Pushbuttons shall be software assignable for placement of call requests or control of auxiliary functions.
    c. Pushbuttons shall be single piece stainless steel construction and shall be backstopped to prevent excessive travel. Switch shall have positive tactile action with 1 million-operation lifetime.
    d. Loudspeakers shall be waterproof Mylar cone type.
    e. Stations shall be provided with MTA type insulation displacement connector that requires no wire stripping for installation.
    f. Outdoor intercom stations shall be identical in all respects to standard intercom stations except that all metal plates and hardware shall be stainless steel, and internal circuitry and components shall be conformal coated.

D. Loudspeakers – Surface Mount:

1. Quam model SYSTEM 1VP, or equivalent by Lowell
2. The speaker assembly shall include the following components:

    a. Loudspeaker: Quam model 8C5PAX
    b. Transformer: Integral to unit, 5W, 25 and 70.7V, 5 taps
    c. Enclosure: SE1WVP
    d. Baffle: BS8W

3. The loudspeakers shall include the following audio features:

    a. Average Sensitivity: 92 dB-SPL, 1W / 1M
    b. Power rating: 12W-RMS, EIA 426A Standard
    c. Calculated Output: 99dB-SPL, 5W/ 1M
    d. Frequency Response: 65 Hz -17kHz EIA 426A Standard
    e. Nominal Coverage Angle: 90° Included Angle, -6dB/2kHz, Half Space
    f. Audio Connection: 7" long, color-coded tinned wires, pre-cut

E. Loudspeakers – Flush Mount:

1. Quam model SOLUTION 1, or equivalent by Lowell
2. The speaker assembly shall include the following components:

    a. Loudspeaker: Quam model 8C10PAX
    b. Transformer: Integral to unit, 5W, 25 and 70.7V, 5 taps

c. Back Box: ERD8U
d. Baffle: BR8WS
e. Mounting Device SSB-3

3. The loudspeakers shall include the following audio features:

a. Average Sensitivity: 95 dB-SPL, 1W / 1M
b. Power rating: 20W-RMS, EIA 426A Standard
c. Calculated Output: 102dB-SPL, 5W/ 1M
d. Frequency Response: 60 Hz -17kHz EIA 426A Standard
e. Nominal Coverage Angle: 90° Included Angle, -6dB/2kHz, Half Space
f. Audio Connection: 7" Color Coded Leads

2.5 VISITATION HANDSETS

A. Manufacturer:

1. Harding Instrument Co. Ltd. - MicroComm DXL

B. Description: Visitation Handsets shall be provided as shown on the plans. Visitation Handsets shall be the primary means of communication for users in the public and offender non-contact visitation rooms. The basis for the specification is Harding Instruments.

C. Visitation Handsets:

1. Harding Instruments models VBS-420-213-1 (primary station) and VBS-420-223-1 (secondary station)
2. The visitation handsets shall include the following features:

a. Units shall feature full duplex audio, be hearing aid compatible, include a 32" armored handset cable, include rugged cable strain reliefs, include a rugged metal handset cradle, include an impact resistant handset and feature a heavy-duty brushed stainless-steel faceplate.
b. Units shall include optional volume control for primary and secondary stations.
c. Units shall be designed for mounting on standard 2-gang electrical boxes

2.6 ACCESSORIES

A. Manufacturer:

1. Harding Instrument Co. Ltd.

B. Quick Connect Boards and Interface Cables:

1. Harding Instruments model QCB-120-1 with model CBL-STN-XX-RR interface cable for audio.

2. Harding Instruments model QCB-120-2 with model CBL-SWT-XX-RR interface cable for switches.
3. The quick connect board shall include the following features:

    a. Dimensions: 3.25" x 4.28" x 1.5"
    b. Intercom station field connections: Screw clamp terminals
    c. Exchange field connections: double ended cable

4. The SSI shall provide the required number of quick connect boards and interface cables for all intercom stations and ceiling speakers in the system.

C. Page Zone Expander:

1. Harding Instruments model PZE-110-0
2. The page zone expander shall include the following features:

    a. Dimensions: 1.75" x 19" x 16.13"
    b. General Features: Three relay-controlled paging inputs with six relay-controlled page outputs for each input. Screw terminal connections for both page inputs and outputs. Sixteen supervised input lines. Three status LEDs for "run", "install" and "fault".
    c. Operating Temperature: 32 to 122° F
    d. Storage Temperature: -40 to 158° F
    e. Humidity: 0 to 95% non-condensing
    f. Power Requirements: 95-135 VAC, 47-63 Hz, 150mA MAX
    g. Paging Inputs: Maximum power; 100W max @ 25 Vrms per bank
    h. Paging Outputs: Maximum power; 50W max @ 25 Vrms per channel
    i. Standards: FCC Part 15, UL, CSA

3. The SSI shall provide the required number of PZE-110-0 units to support paging zones as shown on the plans.

D. Talkback Expander:

1. Harding Instruments model TBE-310
2. The talkback expander shall include the following features:

    a. Dimensions: 1.75" x 19" x 16.13"
    b. General Features: 8 amplified outputs that can drive 25 Vrms loudspeaker circuits, 5.0 watts output per channel, adjacent channels can be bridged to obtain higher power, from 2 to 8 channels can be bridged to form a group, up to 4 groups can be formed, loudspeakers can operate in talkback mode, USB connection to exchange, 2 type A and 1 type B USB ports.
    c. Operating Temperature: 32 to 122° F
    d. Storage Temperature: -40 to 158° F
    e. Humidity: 0 to 95% non-condensing
    f. Power Requirements: 95-135 VAC, 47-63 Hz, 1.25A
    g. Paging Outputs: Maximum power; 5W max @ 25 Vrms per channel

h. Standards: FCC Part 15, UL, CSA

3. The SSI shall provide the required number of TBE-310 units to support paging zones as shown on the plans.

E. Intercom Pedestal:

1. The intercom pedestal shall include the following features:

a. Material: 12-gauge steel, powder-coated yellow
b. Minimum Dimensions: 72" (H) x 8" (W) x 8" (D)
c. Mounting: Designed to mount to flat pavement. Unit shall be secured to pavement with a minimum of 4 lag bolts.
d. Intercom Stations: Unit shall include two integral 2-gang back boxes for mounting two weatherproof intercom stations.
e. Site-located pedestals at gate locations shall include an additional 1-gang back box and a 2-gang back box for mounting a proximity reader and fixed dome camera.

2.7 AUDIO RECORDING SYSTEM

A. Manufacturer:

1. Eventide

B. Description: An audio recording system shall be provided to interface with the IP audio communication system. One channel of recording shall be provided for each audio master station location (GUI touchscreen master modules, VoIP telephone masters, etc.) in the system. The basis for the specification is Eventide.

C. Audio Recording System:

1. Eventide model NexLog740DX.
2. Recording system shall passively receive IP streams from IP audio system.
3. System shall provide G.711 encoded audio for clear and intelligible recordings.
4. Called party, calling party, time and duration shall be provided for search, analysis and retrieval.
5. System shall include browser-based HTML5 interface for search, replay, incident reconstruction, incident export, live monitoring and instant recall functionality.
6. The audio recorder shall include the following features:

a. Form Factor: 3U rack-mountable
b. CPU: Core i5
c. RAM: 16GB DDR4
d. NIC: (2) 100/1000 ports
e. Drives: 2 x 1TB fixed-mount HDDs (configured RAID1)
f. OS: Embedded Linux

g. Software: NexLog DX-Series software & MediaWorks DX web-based configuration manager with licenses for 8 concurrent users.
h. Front Panel: Audio controls and amplified speaker
i. Power: Dual hot-swap 120-240VAC 50/60Hz
j. Recording Channels: Provide 1 recording channel per each audio master station location.

EXECUTION

2.8 EXAMINATION

A. Verify the accuracy of all dimensions, allowances, and clearances on site prior to commencing with any work that may be affected by those dimensions, allowances, and clearances.

B. Comply with manufacturer's installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in the Contract Documents.

C. Precautions shall be taken to guard against electrostatic and electromagnetic susceptibility and interference.

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

2.9 INSTALLATION

A. Provide complete IP audio communication system as specified herein.

B. All material furnished shall be new and conform to the applicable requirements of the Underwriters Laboratories and the National Standards Institute.

C. All system equipment to be contained within equipment racks or cabinets.

D. Provide adequate ventilation for all heat radiating equipment. SSI shall provide fan kits as required to maintain rated operating temperature of installed equipment.

E. All system equipment and field devices to be held securely in place. Fastenings and supports shall be selected to provide a safety factor of three.

F. All system equipment equipped with plug in power connectors to be connected to a dedicated receptacle. Do not use tap connectors for plugging in multiple plugs into a single receptacle.

G. All cable within equipment racks, and cabinets, or on backboards, to be neatly bundled and secured.

H. Wires shall not be nicked, have strands removed, or have frayed strands when removing insulation or terminating.

I. Wiring shall be executed in strict adherence to standard broadcast practices.

J. All field device cables terminating to quick connector boards shall be labeled for easy identification.

2.10 CONNECTIONS

A. All IP audio communication system equipment connections shall be completed per manufacturer's recommendations and per SSI shop drawings.

B. Ground equipment according to manufacturer's recommendations.

2.11 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust IP audio communication system components and equipment installation, including connections, and to assist in field testing. Report results in writing.

B. Perform the following field tests and inspections and prepare pass/fail reports:

1. Intercom station inspection: SSI shall perform an inspection of each intercom station to ensure that each station pushbutton works correctly and that the volume of the speaker is adjusted to the optimum level.
2. Audio master stations shall be tested for proper operation.
3. Ceiling speakers with audio threshold detection shall be tested for proper operation.

C. Remove and replace malfunctioning units and retest as specified above.

2.12 ADJUSTING

A. SSI shall provide IP audio communication system configuration and adjustments. All intercom stations, loudspeakers and audio master stations shall be adjusted for optimum performance.

B. Occupancy Adjustments: Refer to specifications 280500, 3.5B.

2.13 DEMONSTRATION

A. Provide qualified personnel to train Owner's maintenance personnel to adjust, operate, and maintain the IP audio communication system. Refer to Division 01 Section "Demonstration and Training."

B. Training shall be video recorded.

END OF SECTION 281500