

SECTION 02411 - SELECTIVE DEMOLITION

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. Demolition and removal of selected portions of building or structure.
- B. Related Requirements:
 - 1. Section 01010 "Summary of Work" for restrictions on the use of the premises, Department-occupancy requirements, and phasing requirements.

1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.
- C. Remove and Reinstall/Relocate: Detach items from existing construction, prepare for reuse, and reinstall/relocate where indicated. If an item is noted to be relocated and is shown at or near the previous location, it is assumed that the final location is dependent on changing conditions, such as new casework. The final location may require an extension of conduit and conductors, relocation of mounting brackets, or other work to facilitate the installation.
- D. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.4 MATERIALS OWNERSHIP

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

1.5 INFORMATIONAL SUBMITTALS

- A. Proposed Protection Measures: Submit report, including drawings, that indicates the measures proposed for protecting individuals and property , for environmental protection , for dust control and , for noise control. Indicate proposed locations and construction of barriers.
- B. Schedule of Selective Demolition Activities: Indicate the following:
 - 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Department's on-site operations are uninterrupted.
 - 2. Interruption of utility services. Indicate how long utility services will be interrupted.
 - 3. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.

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1.6 FIELD CONDITIONS

- A. Department will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Department as far as practical.
- C. Notify Department of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
 - 1. If suspected hazardous materials are encountered, do not disturb; immediately notify Department's Contracting Officer's Representative. Hazardous materials will be removed by Department under a separate contract.
- E. Storage or sale of removed items or materials on-site is not permitted.
- F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 - 1. Maintain fire-protection facilities in service during selective demolition operations.
 - 2. Maintain building security controls during building demolition operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

2.2 REPAIR MATERIALS

- A. Use repair materials identical to existing materials.
 - 1. If identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
 - 2. Use materials whose installed performance equals or surpasses that of existing materials.
- B. Comply with material and installation requirements specified in individual Specification Sections.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Review record documents of existing construction provided by Department. Department does not guarantee that existing conditions are same as those indicated in record documents.

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C. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Department's Contracting Officer's Representative.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

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

1. Comply with requirements for existing services/systems interruptions specified in Section 01010 "Summary of Work."

3.3 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
 2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 3. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
 4. Maintain adequate ventilation when using cutting torches.
 5. Do not over-saw openings in concrete or masonry.
 6. Dispose of demolished items and materials promptly.
- B. Removed and Reinstalled Items:
1. Clean and repair items to functional condition adequate for intended reuse.
 2. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- C. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Department, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.4 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site.
 - 1. Do not allow demolished materials to accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn demolished materials.
- C. Disposal: Transport demolished materials off Department's property and legally dispose of them.

3.5 CLEANING

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

END OF SECTION

SECTION 04200 - UNIT MASONRY

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. Concrete masonry units.
- 2. Mortar and grout.
- 3. Steel reinforcing bars.

1.3 DEFINITIONS

- A. CMU(s): Concrete masonry unit(s).
- B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.4 PERFORMANCE REQUIREMENTS

- A. Provide unit masonry that develops indicated net-area compressive strengths at 28 days.
 - 1. Determine net-area compressive strength of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.

1.5 ACTION SUBMITTALS

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

1.6 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For each type and size of the following:
 - 1. Masonry units.
 - a. Include data on material properties.
 - b. For masonry units, include data and calculations establishing average net-area compressive strength of units.
 - 2. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
 - 3. Grout mixes. Include description of type and proportions of ingredients.
 - 4. Reinforcing bars.

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- B. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91 for air content.
 2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.

1.7 QUALITY ASSURANCE

- A. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Deliver preblended, dry mortar mix in moisture-resistant containers designed for use with dispensing silos. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in covered weatherproof dispensing silos.

PART 2 - PRODUCTS

2.1 MASONRY UNITS, GENERAL

- A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects will be exposed in the completed Work.

2.2 CONCRETE MASONRY UNITS

- A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
 2. Provide square-edged units for outside corners unless otherwise indicated.
- B. CMUs: ASTM C 90.
1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2150 psi.
 2. Density Classification: Normal weight.
 3. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.

2.3 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
- D. Masonry Cement: ASTM C 91.
- E. Mortar Cement: ASTM C 1329.
- F. Aggregate for Mortar: ASTM C 144.
- G. Aggregate for Grout: ASTM C 404.
- H. Water: Potable.

2.4 REINFORCEMENT

- A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60.

2.5 MISCELLANEOUS MASONRY ACCESSORIES

- A. Epoxy Adhesive: Two-component fast cure epoxy, ICC approved for rebar installation. Hilti HIT-HY 150 MAX-SD or approved substitution.

2.6 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.
 - 1. Do not use calcium chloride in mortar or grout.
 - 2. For reinforced masonry, use masonry cement or mortar cement mortar.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C 270, Property Specification. Provide the following types of mortar for applications stated unless another type is needed to provide required compressive strength of masonry.
 - 1. For reinforced masonry, use Type N.
 - 2. For interior non-load-bearing partitions, Type O may be used instead of Type N.
- D. Grout for Unit Masonry: Comply with ASTM C 476.
 - 1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
 2. Verify that foundations are within tolerances specified.
 3. Verify that reinforcing dowels are properly placed.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- B. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.

3.3 TOLERANCES

- A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation do not vary by more than plus 1/2 inch or minus 1/4 inch.
2. For location of elements in plan do not vary from that indicated by more than plus or minus 1/2 inch.
3. For location of elements in elevation do not vary from that indicated by more than plus or minus 1/4 inch in a story height.

- B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls do not vary from level by more than 1/4 inch in 10 feet, or 1/2 inch maximum.
2. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.
3. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch maximum.
4. For lines and surfaces do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.
5. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet maximum.

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6. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch except due to warpage of masonry units within tolerances specified for warpage of units.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.
5. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch from one masonry unit to the next.

3.4 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.
- C. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.
- D. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- E. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
- F. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.
- G. Build non-load-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.

3.5 MORTAR BEDDING AND JOINTING

- A. Lay hollow CMUs as follows:
 1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
 2. With webs fully bedded in mortar in grouted masonry, including starting course.

- B. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

3.6 REINFORCED UNIT MASONRY INSTALLATION

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in ACI 530.1/ASCE 6/TMS 602.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
1. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
 2. Limit height of vertical grout pours to not more than 60 inches.

3.7 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 2. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
 3. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.

3.8 MASONRY WASTE DISPOSAL

- A. Salvageable Materials: Excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.

END OF SECTION

SECTION 05500 - METAL FABRICATIONS

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. Steel framing and supports for applications where framing and supports are not specified in other Sections.

1.3 ACTION SUBMITTALS

- A. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide Shop Drawings for the following:

- 1. Steel framing and supports for applications where framing and supports are not specified in other Sections.

1.4 INFORMATIONAL SUBMITTALS

- A. Welding certificates.
- B. Research/Evaluation Reports: For post-installed anchors, from ICC-ES.

1.5 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.6 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 METALS

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- C. Steel Tubing: ASTM A 500/A 500M, cold-formed steel tubing.

2.2 FASTENERS

- A. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 325, Type 3; with hex nuts, ASTM A 563, Grade C3; and, where indicated, flat washers.
- C. Anchors, General: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488/E 488M, conducted by a qualified independent testing agency.
- D. Post-Installed Anchors: Torque-controlled expansion anchors.

- 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.

2.3 MISCELLANEOUS MATERIALS

- A. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.

2.4 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form exposed work with accurate angles and surfaces and straight edges.
- D. Weld corners and seams continuously to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- E. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use security type flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
- F. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- G. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

2.5 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
- C. Fabricate steel support columns for supporting security doors construction from steel tubes with steel baseplates and top plates as indicated. Drill or punch baseplates and top plates for anchor and connection bolts and weld to pipe with fillet welds all around. Make welds the same size as pipe wall thickness unless otherwise indicated.
1. Unless otherwise indicated, provide 1/2-inch baseplates with four 5/8-inch anchor bolts and 1/4-inch top plates.

2.6 FINISHES, GENERAL

- A. Finish metal fabrications after assembly.
- B. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.7 STEEL AND IRON FINISHES

- A. Shop prime iron and steel items with universal shop primer.
- B. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- C. Field Welding: Comply with the following requirements:
1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

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- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.

3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.
- B. Anchor supports for Detention doors securely to, and rigidly brace from, building structure.

3.3 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.
- B. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Section 09900 "Painting."

END OF SECTION

SECTION 06411-PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS

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. Plastic-laminate-faced architectural cabinets.
2. Wood furring, blocking, shims, and hanging strips for installing plastic-laminate-faced architectural cabinets unless concealed within other construction before cabinet installation.

- B. Related Requirements:

1. Section 12362 "Plastic-Laminate-Clad Countertops."

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product, including panel products high-pressure decorative laminate adhesive for bonding plastic laminate and cabinet hardware and accessories.
1. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.
- B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
1. Show details full size.
 2. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.

1.4 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance. Installer Qualifications: Fabricator of products.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver cabinets until painting and similar operations that could damage woodwork have been completed in installation areas. If cabinets must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

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1.6 FIELD CONDITIONS

- A. Field Measurements: Where cabinets are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- B. Established Dimensions: Where cabinets are indicated to fit to other construction, establish dimensions for areas where cabinets are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS

- A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of architectural plastic-laminate cabinets indicated for construction, finishes, installation, and other requirements.
1. The Contract Documents contain selections chosen from options in the quality standard and additional requirements beyond those of the quality standard. Comply with those selections and requirements in addition to the quality standard.
- B. Grade: Custom.
- C. Type of Construction: Frameless.
- D. Cabinet, Door, and Drawer Front Interface Style: Flush overlay.
- E. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by woodwork quality standard.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- a. Formica Corporation.
 - b. Nevamar Decorative Surfaces.
 - c. Wilsonart International; Div. of Premark International, Inc.
- F. Laminate Cladding for Exposed Surfaces:
- 1. Horizontal Surfaces: Grade HGS.
 - 2. Vertical Surfaces: Grade HGS.
 - 3. Edges: PVC tape, 0.018-inch minimum thickness, matching laminate in color, pattern, and finish.
- G. Materials for Semiexposed Surfaces:
1. Surfaces Other Than Drawer Bodies: Thermoset decorative panels.
- a. Edges of Thermoset Decorative Panel Shelves: PVC or polyester edge banding.

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2. Drawer Sides and Backs: Thermoset decorative panels with PVC or polyester edge banding.
 3. Drawer Bottoms: Thermoset decorative panels.
- H. Concealed Backs of Panels with Exposed Plastic-Laminate Surfaces: High-pressure decorative laminate, NEMA LD 3, Grade BKL.
- I. Drawer Construction: Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.
1. Join subfronts, backs, and sides with glued rabbeted joints supplemented by mechanical fasteners.
- J. Colors, Patterns, and Finishes: Provide materials and products that result in colors and matte finish of exposed laminate surfaces complying with the following requirements:

Manufacturer	Cabinets
Formica Corporation.	7815-58 Nature Solidz
Nevamar	MR5004T Shale Green Matrix
Wilsonart International	4885-38 Green Soapstone

2.2 WOOD MATERIALS

- A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of woodwork and quality grade specified unless otherwise indicated.
1. Wood Moisture Content: 5 to 10 percent.

2.3 CABINET HARDWARE AND ACCESSORIES

- A. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 100 degrees of opening, self-closing.
- B. Wire Pulls: Back mounted, solid metal, 5 inches long, 2-1/2 inches deep, and 5/16 inch in diameter.
- C. Adjustable Shelf Standards and Supports: BHMA A156.9, B04071; with shelf rests, B04081.
- D. Shelf Rests: BHMA A156.9, B04013; plastic shelf rests with shelf hold-down clip and steel pins.
- E. Drawer Slides: BHMA A156.9.
1. Grade 1 and Grade 2: Side mounted; full-extension type; zinc-plated steel with polymer rollers.
 2. Grade 1HD-100 and Grade 1HD-200: Side mounted; full-extension type; zinc-plated-steel ball-bearing slides.
 3. For drawers not more than 3 inches high and not more than 24 inches wide, provide Grade 1.
 4. For drawers more than 3 inches high but not more than 6 inches high and not more than 24 inches wide, provide Grade 1.

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- 5. For drawers more than 6 inches high or more than 24 inches wide, provide.
- F. Door and Drawer Silencers: BHMA A156.16, L03011.
- G. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.
 - 1. Satin Chromium Plated: BHMA 626 for brass or bronze base; BHMA 652 for steel base.
 - 2. Satin Stainless Steel: BHMA 630.

H. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

2.4 MISCELLANEOUS MATERIALS

- A. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors.
- B. Adhesive for Bonding Plastic Laminate: Unpigmented contact cement.
 - 1. Adhesive for Bonding Edges: Hot-melt adhesive.

2.5 FABRICATION

- A. Fabricate cabinets to dimensions, profiles, and details indicated.
- B. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
- C. Shop-cut openings to maximum extent possible to receive hardware and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before installation, condition cabinets to average prevailing humidity conditions in installation areas.
- B. Before installing cabinets, examine shop-fabricated work for completion and complete work as required.
- C. Verify electrical items affecting work are placed and ready to receive work.

3.2 INSTALLATION

- A. Grade: Install cabinets to comply with same grade as item to be installed.
- B. Assemble cabinets and complete fabrication at Project site to the extent that it was not completed in the shop.
- C. Install cabinets level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches.

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- D. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- E. Anchor cabinets to anchors or blocking built in or directly attached to substrates.
- F. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
 - 1. Install cabinets with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
 - 2. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches o.c..

3.3 ADJUSTING AND CLEANING

- A. Adjust for maximum offset of true alignment with different adjacent materials to 1/32 inch.
- B. Adjust for true alignment of same materials to flush.
- C. Repair damaged and defective cabinets, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.
- D. Clean, lubricate, and adjust hardware.
- E. Clean cabinets on exposed and semiexposed surfaces.

END OF SECTION

SECTION 07920 - JOINT SEALANTS

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. Silicone joint sealants.
 - 2. Epoxy joint sealants.
- B. Related Requirements:
 - 1. Section 08885 "Security Glazing" for glazing sealants.

1.3 ACTION SUBMITTALS

- A. Product Data: For each joint-sealant product.

1.4 INFORMATIONAL SUBMITTALS

- A. Manufacturer's Installation Instructions: Indicate special procedures, surface preparations, and perimeter conditions requiring special attention.
- B. Product Test Reports: For each kind of joint sealant, for tests performed by a qualified testing agency.
- C. Sample Warranties: For special warranties.

1.5 QUALITY ASSURANCE

- A. Product Testing: Test joint sealants using a qualified testing agency.
 - 1. Testing Agency Qualifications: Qualified according to ASTM C 1021 to conduct the testing indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration date, pot life, curing time, and mixing instructions for multicomponent materials.
- B. Store and handle materials in compliance with manufacturer's written instructions to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.7 FIELD CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
 - 1. When joint substrates are wet.

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2. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
3. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.8 WARRANTY

- A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period indicated below.
 1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 1. Warranty Period: 20 years from date of Substantial Completion for silicone sealants.
 2. Warranty Period: 1 year from date of Substantial Completion for epoxy sealants
- C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
 1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
 2. Disintegration of joint substrates from causes exceeding design specifications.
 3. Mechanical damage caused by individuals, tools, or other outside agents.
 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- B. VOC Content of Interior Sealants: Sealants and sealant primers used inside the weatherproofing system shall comply with the following:
 1. Architectural silicone sealants shall have a VOC content of 250 g/L or less.
- C. Colors of Exposed Joint Sealants: As selected by Contracting Officer's Representative from manufacturer's full range.

2.2 SILICONE JOINT SEALANTS

- A. Silicone, S, NS, 50, NT: Single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Use NT.

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1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Dow Corning Corporation; 791.
 - b. GE Construction Sealants; SCS2000 SilPruf.
 - c. Pecora Corporation; 895.
 - d. Tremco Incorporated; Spectrum 2.
2. Applications: Wall applications as follows:
 - a. Horizontal and vertical joints from metal to metal in non-secure areas.
 - b. Metal to gypsum wallboard joints in non-secure areas.
 - c. Interior metal to concrete joints in non-secure areas.
3. Color: Match wall color.

2.3 EPOXY JOINT SEALANTS

- A. Multicomponent, Nonsag, Epoxy Joint Sealant: ASTM C 881, Type I and III, Grade 3, Classes B and C.
 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Pecora Corporation; DynaPoxy
 - b. Sika Corporation; Sikadur 51 NS.
 2. Applications: Wall applications as follows:
 - a. Metal to wall joints within security areas.
 3. Color: Match wall color

2.4 JOINT-SEALANT BACKING

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

2.5 MISCELLANEOUS MATERIALS

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

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 - 2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
 - a. Concrete.
 - b. Masonry.
 - 3. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
 - a. Metal.
 - b. Plastic laminate.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
1. Oversize backing 30 to 50 percent of joint width.
 2. Do not leave gaps between ends of sealant backings.
 3. Do not stretch, twist, puncture, or tear sealant backings.
 4. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
1. Place sealants so they directly contact and fully wet joint substrates.
 2. Completely fill recesses in each joint configuration.
 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.
 - a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

3.4 CLEANING

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

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- B. Repair or replace defaced or disfigured finishes caused by work of this Section.

3.5 PROTECTION

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

END OF SECTION

SECTION 08346 - DETENTION DOORS AND FRAMES

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. Swinging detention doors.
 - 2. Sliding detention doors.
 - 3. Detention frames.
- B. Related Requirements:
 - 1. Section 08716 "Detention Door Hardware" for door hardware for detention doors.

1.3 DEFINITIONS

- A. Minimum-Thickness Steel: Indicated as the specified minimum thicknesses for base metal without coatings, according to NAAMM-HMMA 803.
- B. Nominal-Thickness Stainless Steel: Indicated as the specified thicknesses for which over- and under-thickness tolerances apply, according to ASTM A 480/A 480M.

1.4 COORDINATION

- A. Coordinate anchorage installation for detention doors and frames. Coordinate measurements with existing frames.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, core descriptions, label compliance, and finishes for each detention door and frame type specified.
- B. Shop Drawings: In addition to requirements below, provide a schedule using same reference numbers for details and openings as those on Drawings:
 - 1. Elevations of each door type.
 - 2. Direction of swing or slide.
 - 3. Inmate and non-inmate sides.
 - 4. Details of doors, including vertical and horizontal edge details, and metal thicknesses.
 - 5. Details of frames, including dimensioned profiles, and metal thicknesses.
 - 6. Locations of reinforcement and preparations for hardware.

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7. Details of each different wall opening condition.
8. Details of anchorages, joints, field splices, and connections.
9. Details of moldings, removable stops, and glazing.
10. Details of conduits, junction boxes, and preparations for electrically operated door hardware.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Welding certificates.
- C. Product Test Reports: For each type of detention hollow-metal door and frame assembly including vision and side lights, for tests performed by manufacturer and witnessed by a qualified testing agency.

1.7 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. Security Fasteners: Furnish not less than one box of each type and size of security fastener installed.
 2. Tools: Provide two sets of tools for installing and removing security fasteners.

1.8 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. Welding Qualifications: Qualify procedures and personnel according to the following:
 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver detention hollow-metal work palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
- B. Deliver welded detention frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store detention hollow-metal work vertically under cover at Project site with head up. Place on minimum 4-inch- high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design: Subject to compliance with requirements, provide Trussbilt; an ASSA ABLOY Group company or approved substitution. Substitution criteria will include weight of door.
- B. Source Limitations: Obtain detention doors and frames from single source from single manufacturer.

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2.2 DETENTION DOOR AND FRAME ASSEMBLIES

A. Detention Door and Frame Assemblies: Provide detention door and frame assemblies that comply with the following, based on testing manufacturer's standard units in assemblies similar to those indicated for this Project:

1. Security Grade: Assemblies pass testing requirements in ASTM F 1450 for security grades specified.
2. Bullet Resistance: Level 3 rated when tested according to UL 752.
3. Tool-Attack Resistance: Small-tool-attack-resistance rated when tested according to UL 437 and UL 1034.

B. Detention Frames: Provide sidelight and borrowed-light detention frames that comply with ASTM F 1592 and removable stop test according to NAAMM-HMMA 863, based on testing manufacturer's standard units in assemblies similar to those indicated for this Project.

2.3 DETENTION DOORS

A. General: Provide flush-design detention doors of seamless hollow construction, 2 inches thick unless otherwise indicated. Construct detention doors with smooth, flush surfaces without visible joints or seams on exposed faces or stile edges.

1. For single-acting swinging detention doors, bevel both vertical edges 1/8 inch in 2 inches.
2. For sliding detention doors, square both vertical edges.

B. Core Construction: Provide the following core construction of same material as detention door face sheets, welded to both detention door faces:

1. Truss-Stiffened Core: 0.013-inch- thick, steel, truncated triangular stiffeners extending between face sheets and for full height and width of door; with stiffeners welded to face sheets not more than 3 inches o.c. vertically and 2-3/4 inches horizontally. Fill spaces between stiffeners with insulation.

C. Vertical Edge Channels: 0.123-inch- thick, continuous channel of same material as detention door face sheets, extending full-door height at each vertical edge; welded to top and bottom channels to create a fully welded perimeter channel. Noncontiguous channel is permitted to accommodate lock-edge hardware only if lock reinforcement is welded to and made integral with channel.

D. Top and Bottom Channels: 0.123-inch- thick metal channel of same material as detention door face sheets, spot welded, not more than 4 inches o.c., to face sheets.

1. Reinforce top edge of detention door with 0.053-inch- thick closing channel, welded so channel web is flush with top door edges.

E. Hardware Reinforcement: Fabricate reinforcing plates from same material as detention door face sheets to comply with the following minimum thicknesses:

1. Maximum-Security Surface Hinges: 0.250 inch thick.
2. Strike Reinforcements: 0.187 inch thick.
3. Slide-Device Hanger Attachments: As recommended by device manufacturer.

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4. Lock Fronts, Concealed Holders, and Surface-Mounted Closers: 0.093 inch thick.
 5. All Other Surface-Mounted Hardware: 0.093 inch thick.
 6. Lock Pockets: 0.123 inch thick at non-inmate side, welded to face sheet.
- F. Hardware Enclosures: Provide enclosures and junction boxes for electrically operated detention door hardware of same material as detention door face sheets, interconnected with UL-approved, 1/2-inch- diameter conduit and connectors.
1. Access Plates: Where indicated for wiring installation, provide access plates to junction boxes, fabricated from same material and thickness as face sheet and fastened with at least four security fasteners spaced not more than 6 inches o.c.
- G. Interior Detention Doors: Construct interior doors to comply with materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances indicated in NAAMM-HMMA 863 and as specified.
1. Security Grade 1: Provide doors with face sheets of 0.093-inch- minimum-thickness, cold-rolled steel.

2.4 DETENTION FRAMES

- A. General: Provide fully welded detention frames with integral stops, of seamless construction without visible joints or seams. Fabricate detention frames with contact edges closed tight and corners mitered, reinforced, and continuously welded full depth and width of detention frame.
- B. Stop Height: Provide minimum stop height of 0.625 inch for detention door openings and minimum stop height of 1-1/4 inches in security glazing or detention panel openings unless otherwise indicated.
- C. Interior Detention Frames: Construct interior frames to comply with materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances indicated in NAAMM-HMMA 863 and as specified.
1. Security Grade 1: Provide frames fabricated from 0.093-inch- minimum-thickness, cold-rolled steel.
- D. Hardware Reinforcement: Fabricate reinforcing plates from same material as detention frame to comply with the following minimum thicknesses:
1. Hinges and Pivots: 0.187 inch thick by 1-1/2 inches wide by 10 inches long.
 2. Strikes and Closers: 0.187 inch thick.
 3. Surface-Mounted Hardware: 0.093 inch thick.
 4. Lock Pockets: 0.123 inch thick at non-inmate side, welded to face sheet. Provide 0.123-inch- thick, lock protection plate for attachment to lock pocket with security fasteners.
- E. Hardware Enclosures: Provide enclosures and junction boxes for electrically operated detention door hardware, interconnected with UL-approved, 1/2-inch- diameter conduit and connectors.
1. Access Plates: Where indicated for wiring installation, provide access plates to junction boxes, fabricated from same material and thickness as face sheet and fastened with at least four security fasteners spaced not more than 6 inches o.c.

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F. Jamb Anchors: Weld jamb anchors to detention frames near hinges and directly opposite on strike jamb or as required to secure detention frames to adjacent construction.

1. Number of Anchors: Provide two anchors per jamb plus the following:
 - a. Detention Door Frames: One additional anchor for each 18 inches, or fraction thereof, above 54 inches in height.
 - b. Detention Frames with Security Glazing or Detention Panels: One additional anchor for each 18 inches, or fraction thereof, above 36 inches in height.
2. Postinstalled Anchors: Minimum 1/2-inch- diameter concealed bolts with expansion shields or inserts. Provide conduit spacer from detention frame to wall, welded to detention frame. Reinforce detention frames at anchor locations.
- G. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, formed of same material and thickness as detention frame, and as follows:
 1. Monolithic Concrete Slabs: Clip anchors, with two holes to receive fasteners, welded to bottom of jambs and mullions with at least four spot welds per anchor.
- H. Rubber Door Silencers: Except on weather-stripped detention doors, drill stops in strike jambs to receive three silencers on single-detention-door frames and drill head jamb stop to receive two silencers on double-detention-door frames. Keep holes clear during construction.
- I. Grout Guards: Provide factory-installed grout guards of same material as detention frame, welded to detention frame at back of hardware cutouts, silencers, and glazing-stop screw preparations to close off interior of openings and prevent mortar or other materials from obstructing hardware operation or installation.

2.5 MOLDINGS AND STOPS

- A. Provide fixed moldings on inmate side of glazed openings and removable stops on non-inmate side.
 1. Height: As required to provide minimum 1-inch glass engagement, but not less than 1-1/4 inches.
 2. Fixed Moldings: Formed from same material as detention door and frame face sheets, but not less than 0.093 inch thick, and spot welded to face sheets a maximum of 5 inches o.c.
 3. Removable Stops: Formed from 0.123-inch- thick angle, of same material as detention door face sheets. Secure with button head security fasteners spaced uniformly not more than 6 inches o.c. and not more than 2 inches from each corner, and as necessary to satisfy performance requirements. Form corners with notched or mitered hairline joints.
- B. Coordinate rabbet width between fixed and removable stops with glass or panel type and installation type indicated.

2.6 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, CS (Commercial Steel), Type B.
- B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- C. Concealed Bolts: ASTM A 307, Grade A unless otherwise indicated.

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- D. Post-Installed Anchors: Torque-controlled expansion anchors.
 - 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.
- E. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- F. Glazing: Comply with Section 08885 "Security Glazing."
- G. Grout: Comply with ASTM C 476, with a slump of not more than 4 inches as measured according to ASTM C 143/C 143M.
- H. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.7 FABRICATION

- A. Fabricate detention doors and frames rigid, neat in appearance, and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Weld exposed joints continuously; grind, fill, dress, and make smooth, flush, and invisible. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- B. Tolerances: Fabricate detention doors and frames to comply with manufacturing tolerances indicated in NAAMM-HMMA 863.
- C. Hardware Preparation: Factory prepare detention doors and frames to receive mortised hardware, including cutouts, reinforcement, mortising, drilling, and tapping, according to final Door Hardware Schedule and templates provided by detention door hardware supplier.
 - 1. Reinforce detention doors and frames to receive surface-mounted door hardware. Drilling and tapping may be done at Project site.
 - 2. Locate door hardware according to NAAMM-HMMA 863.
- D. Factory cut openings in detention doors.
- E. Weld components to comply with referenced AWS standard. Weld before finishing components to greatest extent possible. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

2.8 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish detention doors and frames after assembly.

2.9 STEEL SHEET FINISHES

- A. Surface Preparation: Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning".

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- B. Factory Priming for Field-Painted Finish: Apply shop primer specified in "Shop Primer" Subparagraph below immediately after surface preparation and pretreatment. Apply a smooth coat of even consistency to provide a uniform dry film thickness of not less than 0.7 mil.

1. Shop Primer: Manufacturer's or fabricator's standard, fast-curing, corrosion-inhibiting, lead- and chromate-free, universal primer complying with SDI A250.10 acceptance criteria; compatible with substrate and field-applied finish paint system indicated; and providing a sound foundation for field-applied topcoats despite prolonged exposure.

2.10 SECURITY FASTENERS

- A. Operable only by tools produced by fastener manufacturer or other licensed fabricator for use on specific fastener type. Provide drive-system type, head style, material, and protective coating as required for assembly, installation, and strength, and as follows:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Acument Global Technologies North America.
 - b. Bryce Fastener.
 - c. Safety Socket LLC.
 - d. Tamperproof Screw Co., Inc.
 - e. Tamper-Pruf Screws.
2. Drive-System Type: Pinned Torx-Plus.
3. Fastener Strength: 120,000 psi.
4. Socket Button Head Fasteners:
 - a. Heat-treated alloy steel, ASTM F 835.
5. Socket Flat Countersunk Head Fasteners:
 - a. Heat-treated alloy steel, ASTM F 835.
6. Socket Head Cap Fasteners:
 - a. Heat-treated alloy steel, ASTM A 574.
7. Protective Coatings for Heat-Treated Alloy Steel:
 - a. Zinc and clear trivalent chromium where indicated.

2.11 ACCESSORIES

- A. Concealed Bolts: ASTM A 307, Grade A unless otherwise indicated.
- B. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for embedded and built-in anchors to verify actual locations of detention frame connections before detention frame installation.
- C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory.
- B. Before installation and with shipping spreaders removed, adjust detention frames for squareness, alignment, twist, and plumbness to the following tolerances:
 1. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb and perpendicular to frame head.
 2. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of face.
 3. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of door rabbet.
 4. Plumbness: Plus or minus 1/16 inch, measured at jambs on a perpendicular line from head to floor.

3.3 INSTALLATION

- A. General: Install detention doors and frames plumb, rigid, properly aligned, and securely fastened in place, complying with Drawings, schedules, and manufacturer's written recommendations.
- B. Anchorage: Set detention frame anchorage devices according to details on Shop Drawings and according to anchorage device manufacturer's written instructions.
 1. Postinstalled Anchors: Drill holes in existing construction at locations to match bolt locations, and install bolt expansion shields or inserts.
- C. Apply bituminous coating to backs of frames before filling with grout.
- D. Placing Detention Frames: Install detention frames of sizes and profiles indicated. Set detention frames accurately in position; plumb, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
 1. Embedded Anchors: Remove jamb faces from detention frames and set detention frames into opening. Weld steel connector angle to frame angle and to embedded plate with 1-inch- long welds at each end of connector angle to form a rigid frame assembly that is solidly anchored. Reinstall jamb faces using security fasteners.

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2. Postinstalled Anchors: Install bolt. After bolt is tightened, weld bolt head to provide nonremovable condition. Grind, dress, and finish smooth welded bolt head.
 3. Install detention frames with removable stops located on non-inmate side of opening.
- E. Grout: Fully grout detention frame jambs and heads in masonry construction. Completely fill space between frames and adjacent substrates. Hand trowel grout and take other precautions, including bracing detention frames, to ensure that frames are not deformed or damaged by grout forces.
- F. Swinging Detention Doors: Fit non-fire-rated detention doors accurately in their frames, with the following clearances:
1. Between Doors and Frames at Jambs and Head: 1/8 inch.
 2. At Door Sills without Threshold: 3/4 inch.
 3. Between Door Bottom and Nominal Surface of Floor Covering: 1/2 inch.
- G. Sliding Detention Doors: Fit sliding detention doors in their frames according to manufacturer's written instructions and as required to allow doors to slide without binding.
- H. Installation Tolerances: Comply with installation tolerances indicated in NAAMM-HMMA 863.
- I. Glazing: Comply with installation requirements in Section 08885 "Security Glazing" unless otherwise indicated.

3.4 FIELD QUALITY CONTROL

- A. Inspect installed products to verify compliance with requirements. Prepare inspection reports and indicate compliance with and deviations from the Contract Documents.
- B. Detention work will be considered defective if it does not pass tests and inspections.
- C. Perform additional inspections to determine compliance of replaced or additional work.
- D. Prepare field quality-control certification that states installed products comply with requirements in the Contract Documents.
- E. Prepare test and inspection reports.

3.5 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including detention doors and frames that are warped, bowed, or otherwise unacceptable.
- B. Clean grout and other bonding material off detention doors and frames immediately after installation.
- C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying primer.
 1. After finishing smooth field welds, apply air-drying primer.

END OF SECTION

SECTION 08716 - DETENTION DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes detention door hardware for the following:

1. Swinging detention doors.
2. Sliding detention doors.

1.3 COORDINATION

- A. Templates: Obtain and distribute, to the parties involved, templates for detention doors, frames, and other work specified to be factory prepared for installing detention door hardware.
- B. Electrical System Roughing-In: Coordinate layout and installation of electrically powered detention door hardware with connections to power supplies and detention monitoring and control system.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of detention door hardware.
- B. Shop Drawings: For each type of detention door hardware.
 1. Include plans, elevations, sections, and attachment details.
 2. Include diagrams for power, signal, and control wiring; differentiate between manufacturer-installed and field-installed wiring for detention door hardware. Include the following:
 - a. System schematic.
 - b. Point-to-point wiring diagram, including location of connections.
 - c. Riser diagram.
 - d. Elevation of each detention door type.
 3. Detail interface between electrically powered detention door hardware and detention monitoring and control system.

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

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

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer and supplier.
- B. Product Certificates: For each type of detention door hardware.
- C. Product Test Reports: For each type of detention lock and latch security door closer and sliding detention door device, for tests performed by manufacturer and witnessed by a qualified testing agency.
- D. Field quality-control reports documenting inspections of installed products.
 1. Field quality-control certification signed by Contractor.
- E. Sample Warranties: For special warranties.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For detention door hardware to include in emergency, operation, and maintenance manuals.
 1. In addition to items specified in Division 01 include the following:
 - a. Normal remote security operation.
 - b. Normal local security operation.
 - c. Emergency security operation.

1.7 MAINTENANCE MATERIAL SUBMITTALS

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

1.8 QUALITY ASSURANCE

- A. **Installer Qualifications:** An entity that employs installers and supervisors who are trained and approved by manufacturer and an authorized representative of detention door hardware manufacturer for installation and maintenance of units required for this Project.
- B. **Supplier Qualifications:** Detention door hardware supplier with 10-years minimum experience in warehousing facilities in Project's vicinity who is, or employs, a qualified Architectural Hardware Consultant, available during the course of the Work to consult with Contractor, Architect, and Owner about detention door hardware and keying.
- C. **Detention Door Hardware Supplier Qualifications:** An experienced detention door hardware supplier who has completed projects with electrically powered detention door hardware similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance, and who is acceptable to manufacturer of primary materials.
 - 1. **Engineering Responsibility:** Prepare data for electrically powered detention door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
 - 2. **Scheduling Responsibility:** Preparation of Detention Door Hardware and Keying coordination.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Inventory detention door hardware on receipt and provide secure lockup for detention door hardware delivered to Project site.
- B. Tag each item or package separately with identification related to the Detention Door Hardware Schedule, and include basic installation instructions with each item or package.

1.10 WARRANTY

- A. **Special Warranty:** Manufacturer agrees to repair or replace components of detention door hardware that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including excessive deflection, cracking, or breakage.
 - b. Faulty operation of operators and detention door hardware.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering or detention use.
 - 2. **Warranty Period:** Three years from date of Substantial Completion.
 - 3. **Warranty Period for Security Door Closers:** 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Swinging Detention Door Assemblies: Provide detention door hardware as part of a detention door assembly that complies with security grade indicated, when tested according to ASTM F 1450, based on testing manufacturer's standard units in assemblies similar to those indicated for this Project.
1. Bullet Resistance: Comply with Level 3 rating when tested according to UL 752.
 - a. Listed and labeled as bullet resistant by a testing agency acceptable to authorities having jurisdiction.
 2. Tool-Attack Resistance: Comply with small-tool-attack-resistance rating when tested according to UL 1034 and UL 437.

2.2 DETENTION DOOR HARDWARE, GENERAL

- A. Provide detention door hardware for each door as scheduled in "Detention Door Hardware Schedule" Article to comply with requirements in this Section.
1. Detention Door Hardware Sets: Provide quantity, item, size, finish, or color indicated.
 2. Sequence of Operation: Provide electrically powered detention door hardware function, sequence of operation, and interface with other building control systems indicated.
- B. Electrically Powered Detention Door Hardware: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Detention Door Hardware Control and Monitoring: Provide detention door hardware with features, functions, and internal equipment required to perform control and monitoring functions indicated in Division 16.
- D. Source Limitations: Obtain mechanical detention door hardware from same manufacturer as that of electrically powered detention door hardware.

2.3 DETENTION HINGES

- A. Full-Mortise Detention Hinges: Extra heavy weight; two heavy-duty thrust bearings with hardened-steel ball bearings; fabricated from investment-cast stainless steel with integral security studs; case-hardened, non-removable steel hinge pin.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Airteq Systems, a division of Norment Security Group; Airteq Systems Series 604FMCS.

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- b. Southern Folger Detention Equipment Company, Folger Adam Products; Folger Adam Model No. 4-1/2FM-ICS.
 - c. Southern Folger Detention Equipment Company, Southern Steel Products; Southern Steel Model No. 204FMSS.
- 2. Leaves: Drilled for countersunk security fasteners.
 - 3. Size: Minimum 4-1/2 by 4-1/2.
 - 4. Security Grade: 1 according to ASTM F 1758.
 - 5. Finish: BHMA 600.

2.4 MECHANICAL DETENTION LOCKS AND LATCHES

A. Lock Mountings:

- 1. Hollow-Metal Detention Doors: Mount detention lock to back of 0.179-inch nominal-thickness steel cover plate for installation in lock pocket fabricated into detention door. Attach cover plate to hollow-metal detention door with security fasteners.
- 2. Steel-Plate Detention Doors: Mount detention lock to inside surface of 0.179-inch nominal-thickness steel enclosure with integrally formed mounting flanges. Attach enclosure to steel-plate detention door with security fasteners.

2.5 ELECTROMECHANICAL DETENTION LOCKS AND LATCHES

- A. Connectors: Provide electromechanical detention locks and latches with factory-wired plug connector with 6-inch wire pigtail.
 - 1. Provide security ring for installation of electromechanical detention lock in hollow-metal detention frame, welded to frame or access cover.
 - 2. Equip direct-current, solenoid-operated detention locks and latches with diode transient voltage protection at each locking device.
- B. Sliding-Door, Motor-Operated Deadlatches, Paracentric Cylinder:
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Southern Folger Detention Equipment Company, Folger Adam Products; Folger Adam Series 50 HBM.
 - b. Southern Folger Detention Equipment Company, Southern Steel Products; Southern Steel Series 1058M.

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2. Function: Remote switch activates electric motor that raises hookbolt; spring-loaded actuator pin pushes door open 1 to 3 inches; automatic latching and deadlocking when door is closed (slam locking). Hookbolt can be mechanically raised by tumbler paracentric cylinder; keyed two sides; if hookbolt is raised by key, it remains raised until relocked by key.
 - a. Latchback: Hookbolt remains raised until door is opened 2 inches (51 mm), then lowers.
 - b. If power fails, hookbolt automatically deadlocks (fail secure).
 3. Hookbolt: 1-3/4- by 1/2-inch- (44- by 13-mm-) thick, case-hardened steel; 3/4-inch (19-mm) throw.
 4. Provide internal deadlock indicator switch.
 5. Provide case-hardened-steel deadlock actuator.
 6. Voltage: 120-V ac.
 7. Security Grade: 1 according to ASTM F 1577.
- C. Motor-Operated Deadlatches, Mogul Cylinder:
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Airteq Systems, a division of Norment Security Group; Airteq Systems Series 9724.
 - b. Southern Folger Detention Equipment Company, Folger Adam Products; Folger Adam Series 120M.
 - c. Southern Folger Detention Equipment Company, Southern Steel Products; Southern Steel Series 10120AM.
 2. Function: Remote switch activates electric motor that retracts latchbolt; automatic latching and deadlocking when door is closed (slam locking). Latchbolt can be mechanically retracted by mogul cylinder; keyed two sides.
 - a. Latchback: Latchbolt remains retracted until door is opened 2 inches, then releases.
 - b. Key Holdback: If latchbolt is retracted by key, it remains retracted until relocked by key.
 - c. If power fails, latchbolt automatically deadlocks (fail secure).
 3. Latchbolt: 1-1/2-inch-high by 3/4-inch- thick hardened steel; 1-inch throw.
 4. Provide internal deadlock indicator switch.
 5. Provide roller-type deadlock actuator.

6. Voltage: 120-V ac.
7. Listed and labeled for use on fire doors.
8. Security Grade: 1 according to ASTM F 1577.

2.6 DETENTION CYLINDERS AND KEYING

- A. Source Limitations: Subject to compliance with requirements, provide cylinders and keying for paracentric and mogul cylinders by same manufacturer as for detention locks and latches.
- B. Paracentric Cylinders: Manufacturer's standard lever-tumbler type, constructed from one-piece spring-tempered brass; with tumblers activated by phosphor bronze springs; five tumblers per lock.
- C. Mogul Cylinders: Manufacturer's standard pin-tumbler type, minimum 2-inch diameter; body constructed from brass or bronze, stainless steel, or nickel silver; with stainless-steel tumblers and engaging cylinder balls; complying with the following:

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

3. Finish: BHMA 626.

2.7 SWITCHES

- A. General: Provide switches configured with contact type required for functions indicated, including multiple circuiting where required by functional performance of Section 16903 "Detention PLC Control System."
- B. Concealed, Magnetic Door Position Switches: Consist of actuating magnet mortised into detention door and switch mortised into frame; with stainless-steel faceplates; 24-V dc, factory wired with plug connector. Wire in series with lock monitors. Attach with security fasteners.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Airteq Systems, a division of Norment Security Group; Airteq Systems Series DPS 6200.
 - b. Southern Folger Detention Equipment Company, Folger Adam Products; Folger Adam Series ASSW-105A.
 - c. Southern Folger Detention Equipment Company, Southern Steel Products; Southern Steel Series 200MRS.

2.8 DETENTION OPERATING TRIM

- A. Standard: BHMA A156.6, Grade 1.
- B. Surface-Mounted Door Pulls: 1-inch stainless steel pull, 7-inch overall length and 3-inch projection; attach to door with two concealed security fasteners and two stainless steel plates, 4 by 16 inch, 0.125-inch thick.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Rockwood Manufacturing; Model 110-6SP with 73C.
 - b. Stanley Security Solutions, Inc., Division of The Stanley Works; Series 2003 with plates.
 - 2. Material: Stainless steel with BHMA 630 finish.
- C. Flush Door Pulls: 5 inches high by 4 inches wide by 1 inch deep, with 1/8-inch- thick faceplate; attach to door with four security fasteners.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Airteq Systems, a division of Norment Security Group; Airteq Systems Series 614.
 - b. Southern Folger Detention Equipment Company, Southern Steel Products; Southern Steel Series 214S.
 - c. Stanley Security Solutions, Inc., Division of The Stanley Works; Series 1004.
 - 2. Material: Formed, wrought, or cast brass/bronze with BHMA 606 finish.
- D. Metal Protective Trim Units: BHMA A156.6; fabricated from 0.125-inch- thick stainless steel; with manufacturer's standard machine or self-tapping screw fasteners.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. IVES Hardware; an Ingersoll-Rand company. (IVES)
 - b. Rockwood Manufacturing Company. (RM)
 - c. Trimco. (TR)
 - 2. Kick Plates: 10 inches high by door width with allowance for frame stops.

2.9 SECURITY DOOR CLOSERS

- A. Standard: BHMA A156.4, Grade 1.
- 1. Certified Products: Provide security door closers listed in BHMA's "Directory of Certified Door Products."
- B. Concealed Security Door Closers:
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. LCN Closers, an Ingersoll-Rand company; Series 2210.
 - b. Norton Door Controls, an ASSA ABLOY Group company; Series 7970.
 - c. Sargent Manufacturing Company, an ASSA ABLOY Group company; Series 268.
 - 2. Construction: Forged-steel arm; security roller; with track concealed in head of detention door, designed to eject foreign objects during opening and closing; fabricated with joints designed to prevent disassembly with ordinary hand tools. Closer arm and track fully concealed when door is closed.
 - 3. Cover Plates: Heavy-duty metal, attached with security fasteners.
- C. Unit Size: Comply with manufacturer's written recommendations for size of security door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to comply with field conditions and requirements for opening force.

2.10 DETENTION DOOR STOPS

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

2.11 SLIDING DETENTION DOOR DEVICE ASSEMBLIES

- A. Performance Requirements: Provide sliding detention door device assemblies, including locking device, receiver, overhead door hanger, bottom door guide, lock column, and enclosure, as a complete assembly, complying with Grade 1 according to ASTM F 1643, as determined by testing manufacturers' standard units representing those indicated for Project.
- B. Assembly Construction:
 - 1. Enclosure: Fabricated from 0.179-inch nominal-thickness steel plate, with 0.134-inch nominal-thickness steel hinged cover. Baffle openings in enclosure. Provide closures for ends of housings.
 - a. Provide sloping-top housings.

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2. Lock Column: Vertical tube enclosure fabricated from 0.134-inch nominal-thickness steel, providing mechanical locking control of detention sliding door at door location; operated by paracentric key. Doors shall be capable of being locked at top and bottom, at rear of door, in both open and closed positions, with no components projecting into door opening.
 3. Receiver: Fabricated from 0.134-inch nominal-thickness steel plate.
 4. Hanger Assembly: Extend steel carrier full width of door plus full extent of door travel required for clear door opening. Provide antifriction ball-bearing steel rollers with hardened members and grease shield.
 5. Finish: Factory prime painted.
- A. Mechanical-Locking, Manual-Door-Movement, Sliding-Door Device Assemblies: Doors are manually opened and closed and mechanically locked by means of jamb-mounted mechanical detention lock specified elsewhere in this Section.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Airteq Systems, a division of Norment Security Group; Airteq Systems Model 7205.
 - b. Southern Folger Detention Equipment Company, Folger Adam Products; Folger Adam Series 102.
 - c. Southern Folger Detention Equipment Company, Southern Steel Products; Southern Steel Model 1300.

2.12 FABRICATION

- A. Base Metals: Produce detention door hardware units of base metal, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified detention door hardware units and BHMA A156.18 finishes.
- B. Fasteners: Provide flat-head security fasteners with finished heads to match surface of detention door hardware.
1. Security Fasteners: Fabricate detention door hardware using security fasteners with head style appropriate for fabrication requirements, strength, and finish of adjacent materials.
 2. Concealed Fasteners: For detention door hardware units that are exposed when detention door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching detention door hardware. Where using through bolts on hollow-metal detention door and frame construction, provide sleeves for each through bolt.

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3. Steel Through Bolts: For the following fire-rated applications unless door blocking is provided:
 - a. Security door closers to detention doors and frames.
 4. Spacers Bolts: For through bolting of hollow-metal detention doors.
- C. Detention Lock Construction: Fabricate detention lock case and cover plate from steel plate. Fabricate bolts from solid sections; laminated construction is unacceptable.

2.13 HARDWARE FINISHES

- A. Standard: Comply with BHMA A156.18.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. BHMA Designations: Comply with base material and finish requirements indicated by the following:
 1. BHMA 606: Satin brass, clear coated, over brass base metal.
 2. BHMA 626: Satin chromium plated over nickel, over brass or bronze base metal.
 3. BHMA 630: Stainless steel, satin, over stainless-steel base metal.
 4. BHMA 652: Satin chromium plated over nickel, over steel base metal.

2.14 SECURITY FASTENERS

- A. Operable only by tools produced by fastener manufacturer or other licensed fabricator for use on specific fastener type. Provide drive-system type, head style, material, and protective coating as required for assembly, installation, and strength, and as follows:
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Acument Global Technologies North America.
 - b. Bryce Fastener.
 - c. Safety Socket LLC.
 - d. Tamperproof Screw Co., Inc.
 - e. Tamper-Pruf Screws.
 2. Drive-System Type: Pinned Torx-Plus.
 3. Fastener Strength: 120,000 psi.

4. Socket Button Head Fasteners:
 - a. Heat-treated alloy steel, ASTM F 835.
5. Socket Flat Countersunk Head Fasteners:
 - a. Heat-treated alloy steel, ASTM F 835.
6. Socket Head Cap Fasteners:
 - a. Heat-treated alloy steel, ASTM A 574.
7. Protective Coatings for Heat-Treated Alloy Steel:
 - a. Zinc and clear trivalent chromium where indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine detention doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance of the Work.
- B. Verify locations of detention door hardware with those indicated on Shop Drawings.
- C. Examine roughing-in for electrical power systems to verify actual locations of connections before detention door hardware installation.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

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

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

3.3 INSTALLATION

- A. Mounting Heights: Mount detention door hardware units at heights indicated in DHI's "Recommended Locations for Builders' Hardware for Custom Steel Doors and Frames."
- B. Install each detention door hardware item to comply with Shop Drawings and manufacturer's written instructions. Where cutting and fitting are required to install detention door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.
1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.

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

C. Hinge Installation:

1. Security Fasteners: Provide socket flat countersunk head machine screws; finish screw heads to match surface of detention hinges. Install into drilled and tapped holes.

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

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

3.4 FIELD QUALITY CONTROL

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

B. Perform the following tests and inspections:

1. After installing electrically powered detention door hardware and after electrical circuitry has been energized, test detention door hardware for compliance with requirements.

- a. Test: Operate lock of each door and group of doors in normal remote, normal local, and emergency operating modes. Verify that remote controls operate correct door locks and in correct sequence.

2. Verify that lock bolts engage strikes with required bolt projection.

3. Verify that detention door hardware is installed, connected, and adjusted according to the Contract Documents.

4. Verify that electrical wiring installation complies with manufacturer's submittal and written installation requirements.

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

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

E. Prepare field quality-control certification that states installed products comply with requirements in the Contract Documents.

F. Prepare test and inspection reports.

3.5 ADJUSTING

- A. Adjust and check each operating item of detention door hardware and each detention door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust detention door-control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
1. Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.

3.6 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by detention door hardware installation.
- B. Clean operating items as necessary to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure that detention door hardware is without damage or deterioration at time of Substantial Completion.

3.7 DETENTION DOOR HARDWARE SCHEDULE

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

Door Hardware Set No. D01

Door No. 208A; each to have the following:

No.	Item	Manufacturer	Description	Finish
3 EA.	HINGE	SSF	204FMSS	630
1 EA.	LOCKSET	SSF	10120AM-2	600
2 EA.	CYLINDER	SSF	MOGUL	626
1 EA.	DOOR POSITION SWITCH	SSF	200MRS	628
2 EA.	PUSH/PULL	RM	110-6SPX73C	630
1 EA.	CLOSER	LCN	2210	626
1 EA.	KICKPLATE	RM	K1125	630
3 EA.	SILENCER			
1 EA.	FLOOR STOP	----	SEE DETAIL	600

Door Hardware Set No. D02

Door No. 213; each to have the following:

No.	Item	Manufacturer	Description	Finish
1 EA.	TRACK SET	SSF	1300	600
1 EA.	LOCKSET	SSF	1058M-2	600
2 EA.	CYLINDER	SSF	PARACENTRIC	
1 EA.	STOP	----	SEE DETAIL	600
1 EA.	PULL	RM	110-6SPX73C	626
1 EA.	FLUSH PULL	SSF	214S	630

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Door Hardware Set No. D3

Door No. 212, 221, 224, 225, 229, 235; each to have the following:

No.	Item	Manufacturer	Description	Finish
1 EA.	LOCKSET	SSF	1058M-2	600
2 EA.	CYLINDER	SSF	PARACENTRIC	600
1 EA.	TRACK SET	SSF	1300	600

REUSE BALANCE OF DOOR HARDWARE

END OF SECTION

SECTION 08870 – GLAZING SURFACE FILMS

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 security films on existing glazing.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Glazing Film Samples: For each type of film used; 6 inches square.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For installers.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing film according to manufacturer's written instructions. Prevent damage from condensation, temperature changes, direct exposure to sun, or other causes.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A single manufacturer with minimum ten years experience.
- B. Installer Qualifications: An installer authorized by the film manufacturer.

1.7 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to replace glazing film that deteriorates within specified warranty period. Deterioration of glazing film is defined as excessive or unusual loss of color, adhesive failure, bubbling, cracking, crazing, delamination, demetalization, or peeling. Warranty to cover labor for removal and reinstallation.
 - 1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Glazing Film: Obtain glazing film from single source from single manufacturer.

2.2 SECURITY GLAZING, GENERAL

- A. Optical Performance Properties: Provide glazing film with performance properties specified, as indicated in manufacturer's published test data, based on construction products indicated and on procedures indicated below:
 - 1. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

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2.3 GLAZING FILM

- A. Film: Clear polyethylene film with sputter coated silver alloy.
 - 1. Products: Subject to compliance with requirements, provide available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Matico Window Films; Silver 20 DA SR.
 - b. Saint-Gobain; SolarGard Silver 35 or approved substitution.
 - c. Solutia, Inc.; Llumiar R-20 SR CDF (Silver)
 - B. Adhesive: As recommended by film manufacturer.
 - C. Properties (On 6mm clear float glass):
 - 1. Visible Light Reflectance (Interior): 56 percent minimum, 62 percent maximum.
 - 2. Visible Light Reflectance (Exterior): 56 percent minimum, 62 percent maximum.
 - 3. Visible Light Transmittance: 14 percent minimum, 16 percent maximum.
 - 4. Glare Reduction: 75 percent minimum.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine glazing to receive film.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer.

3.3 INSTALLATION

- A. Film Installation:
 - 1. Install in accordance with manufacturer's instructions.
 - 2. Cut film edges neatly and tight to window sealant. Use new blade tips after 3 to 4 cuts.
 - 3. Install in one continuous length free of air bubbles, blisters, or other defects.

3.4 CLEANING AND PROTECTION

- A. Immediately after installation remove nonpermanent labels and clean surfaces.

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- B. Protect glazing film from contact with contaminating substances resulting from construction operations.
1. If, despite such protection, contaminating substances do come into contact with glazing film, remove substances immediately as recommended in writing by glazing film manufacturer. Remove and replace glazing film that cannot be cleaned without damage.
- C. Wash glazing on Control Room side not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash security glazing as recommended in writing by glazing film manufacturer.

END OF SECTION

SECTION 08885 - SECURITY GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes laminated polycarbonate for the following applications:

- 1. Doors.
- 2. Interior borrowed lites.

1.3 DEFINITIONS

- A. Glazing Manufacturers: Firms that produce primary glass, monolithic plastic glazing, or fabricated security glazing, as defined in referenced glazing publications.

1.4 COORDINATION

- A. Coordinate glazing channel dimensions to provide necessary bite on security glazing, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Security Glazing Samples: For each type of security glazing; 12 inches square.
- C. Security Glazing Schedule: List security glazing types and thicknesses for each size opening and location. Use same designations indicated on Drawings. Indicate coordinated dimensions of security glazing and construction that receives security glazing, including clearances and glazing channel dimensions.

1.6 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of product indicated, from manufacturer.
- B. Product Test Reports: For each type of security glazing, for tests performed by manufacturer and witnessed by a qualified testing agency.
- C. Sample Warranties: For special warranties.

1.7 QUALITY ASSURANCE

- A. Security Glazing Testing Agency Qualifications: Subject to compliance with requirements, testing agency is one of the following:
 - 1. H. P. White Laboratory, Inc.
 - 2. Underwriters Laboratories, Inc.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Protect security glazing and glazing materials according to manufacturer's written instructions. Prevent damage from condensation, temperature changes, direct exposure to sun, or other causes.

1.9 WARRANTY

- A. Manufacturer's Special Warranty for Monolithic Polycarbonate Sheet: Manufacturer's standard form in which glazing manufacturer agrees to replace polycarbonate sheet that deteriorates within specified warranty period. Deterioration is defined as defects developed from normal use that are not attributed to maintaining and cleaning polycarbonate sheet contrary to manufacturer's written instructions. Defects include yellowing and loss of light transmission.
1. Warranty Period: Seven years from date of Substantial Completion.
- B. Manufacturer's Special Warranty for Laminated Polycarbonate: Manufacturer agrees to replace laminated polycarbonate that deteriorates within specified warranty period. Deterioration of laminated polycarbonate is defined as defects developed from normal use that are not attributed to maintaining and cleaning laminated polycarbonate contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glazing, blemishes exceeding those allowed by referenced standard, yellowing, and loss of light transmission.
1. Warranty Period: One year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Security Glazing: Obtain security glazing from single source from single manufacturer using the same types of lites, plies, interlayers, and spacers for each security glazing type indicated.
- B. Source Limitations for Glazing Sealants: Obtain from single source from single manufacturer for each product and installation method.

2.2 PERFORMANCE REQUIREMENTS

- A. General:
1. Installed security glazing shall withstand security-related loads and forces without damage to the glazing beyond that allowed by referenced standards.
- B. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.

2.3 SECURITY GLAZING, GENERAL

- A. Glazing Publications: Comply with published recommendations of security glazing and glazing material manufacturers and organizations below unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. GANA Publications: "Laminated Glazing Reference Manual" and "Glazing Manual."

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- B. Plastic Glazing Labeling: Identify plastic sheets with appropriate markings of applicable testing and inspecting agency, indicating compliance with required fire-test-response characteristics.
- C. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glazing, glass thickness, and safety glazing standard with which glazing complies.
- D. Fire-Test-Response Characteristics of Polycarbonate Sheets: As determined by testing polycarbonate sheets identical to those used in security glazing products by a qualified testing agency acceptable to authorities having jurisdiction.
 - 1. Self-ignition temperature of 650 deg F or more when tested according to ASTM D 1929 on plastic sheets in thicknesses indicated for the Work.
 - 2. Smoke-Developed Index of 450 or less when tested according to ASTM E 84, or smoke density of 75 or less when tested according to ASTM D 2843 on plastic sheets in thicknesses indicated for the Work.
 - 3. Burning extent of 1 inch or less when tested according to ASTM D 635 at a nominal thickness of 0.060 inch or thickness indicated for the Work.

2.4 POLYCARBONATE SECURITY GLAZING

- A. Monolithic Polycarbonate Sheet: ASTM C 1349, Appendix X1, Type II, coated, mar-resistant, UV-stabilized polycarbonate with coating on exposed surfaces and Type I, standard, UV-stabilized polycarbonate where no surfaces are exposed.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Makrolon AR by Bayer MaterialScience or approved substitution.
 - 2. Detention Security Grade: Grade 4 per ASTM F 1915 torch and small blunt impactor test.
 - 3. Thickness: 0.12 inch.
 - 4. Color: Clear.
 - 5. Flammability: Conforming to UL 94.
 - 6. Safety Glazing: Conforming to CPSC 16 CFR 1201 Safety Standard.
- B. Laminated Polycarbonate: Polycarbonate sheets laminated with clear urethane interlayer that complies with ASTM C 1349, Appendix X2, and has a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation. Provide laminated units that comply with requirements of ASTM C 1349 for maximum allowable laminating process blemishes and haze.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Makrolon Hygard by Bayer MaterialScience or approved substitution.
 - 2. Detention Security Grade: Grade 1 per UL 752.

3. Forced-Entry Resistance: Level I per HPW-TP-0500.02.
4. Number of Plies: Two.
5. Overall Unit Thickness: 3/8 inch.
6. Outer Plies: 0.19-inch polycarbonate.

2.5 GLAZING SEALANTS

A. General:

1. Compatibility: Provide glazing sealants that are compatible with one another and with other materials they contact, including security glazing, seals of insulating security glazing and air-gap security glazing, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
2. Suitability: Comply with sealant and security glazing manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
3. Field-applied sealants shall have a VOC content of 250 g/L or less.
4. Colors of Exposed Glazing Sealants: Closest color matching doors from manufacturer's full range.

B. Security Sealant: Manufacturer's standard, nonsag, tamper-resistant sealant for joints with low movement complying with ASTM C 920, Grade NS, Class 12.5 or 25, Use NT, and with a Shore A hardness of at least 45 when tested according to ASTM C 661.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

- a. BASF Construction Chemicals, LLC, Building Systems; Sonolastic Ultra.
- b. Pecora Corporation; DynaFlex.

2.6 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and security glazing manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:

1. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.

2.7 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of security glazing and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

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- C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by security glazing manufacturer to maintain security glazing lites in place for installation indicated.
- E. Edge Blocks: Elastomeric material of hardness needed to limit security glazing lateral movement (side walking).
- F. Vision Films: Silver reflective film, 15 percent visible light transmission, applied to inside face of polycarbonate security glazing panels.

2.8 FABRICATION OF SECURITY GLAZING

- A. Fabricate security glazing in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine framing for security glazing, with Installer present, for compliance with the following:
 - 1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
 - 2. Minimum required face or edge clearances.
 - 3. Minimum required bite.
 - 4. Effective sealing between joints of framing members.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean glazing channels and other framing members receiving security glazing immediately before glazing. Remove coatings not firmly bonded to substrates.
- B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that will leave visible marks in the completed work.

3.3 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of security glazing, sealants, gaskets, and other glazing materials unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Protect edges of security glazing from damage during handling and installation. Remove damaged security glazing from Project site and legally dispose of off Project site. Damaged security glazing includes units with edge or face damage or other imperfections that, when installed, could weaken security glazing and impair performance and appearance.
- C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

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- D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications unless otherwise required by glazing unit manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- E. Do not exceed edge pressures stipulated by security glazing manufacturers for installing lites.
- F. Provide spacers for security glazing lites where the length plus width is larger than 50 inches.
 - 1. Locate spacers directly opposite each other on both inside and outside faces of security glazing. Install correct size and spacing to preserve required face clearances unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with performance requirements.
 - 2. Provide 1/8-inch minimum bite of spacers on glazing lites and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- G. Provide edge blocking where indicated or needed to prevent security glazing from moving sideways in glazing channel, as recommended in writing by security glazing manufacturer and according to requirements in referenced glazing publications.
- H. Set security glazing in each series with uniform pattern, draw, bow, and similar characteristics.
- I. Provide one layer of monolithic polycarbonate security glazing on each side of laminated polycarbonate glazing.
- J. Apply vision film to concealed side of non-inmate side of monolithic polycarbonate glazing where scheduled.

3.4 TAPE GLAZING

- A. Position tapes on fixed stops so that, when compressed by security glazing, their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Do not remove release paper from tape until just before each glazing unit is installed.
- F. Center security glazing in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
- G. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 SEALANT GLAZING (WET)

- A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between security glazing and glazing stops to maintain face clearances and to prevent sealant from extruding into glazing channel and blocking weep systems. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

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- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to security glazing and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial washaway from security glazing.

3.6 CLEANING AND PROTECTION

- A. Immediately after installation remove nonpermanent labels and clean surfaces.
- B. Protect security glazing from contact with contaminating substances resulting from construction operations, including weld splatter. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.
 - 1. If, despite such protection, contaminating substances do come into contact with security glazing, remove substances immediately as recommended in writing by security glazing manufacturer. Remove and replace security glazing that cannot be cleaned without damage.
- C. Wash security glazing on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash security glazing as recommended in writing by security glazing manufacturer.

3.7 LAMINATED-POLYCARBONATE SECURITY GLAZING SCHEDULE

- A. Security Glazing: Laminated polycarbonate.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Bayer MaterialScience; Hygard CG 375.
 - b. Global Security Glazing; Lexgard MPC375 with coating.
 - c. Palram Americas; Palshield FE 375.
 - 2. Detention Security Grade: Grade 1 according to ASTM F 1915 torch and small blunt impactor test.
 - 3. Forced-Entry Resistance: Level I according to HPW-TP-0500.02.
 - 4. Maximum Overall Unit Thickness: 0.0375-inch.
 - 5. Number of Plies: Two.
 - 6. Outer and Inner Plies: 0.188-inch polycarbonate.
 - 7. Interlayer Material: Polyurethane.
 - 8. Interlayer Thicknesses: 0.025 inch minimum.
 - 9. Abuse Resistance Coating: All exposed faces.

END OF SECTION

SECTION 09221 - NON-STRUCTURAL METAL FRAMING

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. Non-load-bearing steel framing systems for interior gypsum board assemblies.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Notify manufacturer of damaged materials received prior to installing.
- B. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- C. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling as required in AISI's "Code of Standard Practice".

PART 2 - PRODUCTS

2.1 FRAMING SYSTEMS

- A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
 - 1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
 - 2. Protective Coating: ASTM A 653/A 653M, G40, hot-dip galvanized unless otherwise indicated.
- B. Studs and Runners: ASTM C 645.
 - 1. Steel Studs and Runners:
 - a. Minimum Base-Metal Thickness: 0.036 inch.
 - b. Depth: 3-5/8 inches.
- C. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
 - 1. Minimum Base-Metal Thickness: 0.063 inch.
- D. Cold-Rolled Channel Bridging: Steel, 0.053-inch minimum base-metal thickness, with minimum 1/2-inch- wide flanges.
 - 1. Depth: 1-1/2 inches.
 - 2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.068-inch- thick, galvanized steel.

2.2 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.
- 1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames and structural framing, for compliance with requirements and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C 754.
- 1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.

3.3 INSTALLING FRAMED ASSEMBLIES

- A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
 - 1. Single-Layer Application: 16 inches o.c. unless otherwise indicated.
- B. Install studs so flanges within framing system point in same direction.
- C. Install tracks (runners) at floors and hard ceiling framing.
 - 1. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
 - a. Install two studs at each jamb unless otherwise indicated.
 - 2. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
- D. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

END OF SECTION

SECTION 09290 - GYPSUM BOARD

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. Interior gypsum board.
2. Plywood sheathing.

- B. Related Requirements:

1. Section 09221 "Non-Structural Metal Framing" for non-structural framing and suspension systems that support gypsum board panels.

1.3 ACTION SUBMITTALS

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

1. Include data for fire-retardant treatment for plywood from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Include physical properties of treated materials.
2. For fire-retardant treatments, include physical properties of treated plywood both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5516.
3. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
4. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

1.4 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For following products, from ICC-ES:

1. Fire-retardant-treated plywood.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.6 FIELD CONDITIONS

- A. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 INTERIOR GYPSUM BOARD

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. CertainTeed Corporation.
 2. Georgia-Pacific Building Products.
 3. National Gypsum Company.
 4. USG Corporation.
- B. Gypsum Board, Type X: ASTM C 1396/C 1396M.
 1. Thickness: 5/8 inch.
 2. Long Edges: Tapered.

2.2 WOOD PANEL PRODUCTS

- A. Factory mark panels to indicate compliance with applicable standard.
- B. Plywood: Either DOC PS 1 or DOC PS 2 unless otherwise indicated.
- C. Nominal Thickness: 3/4-inch.

2.3 FIRE-RETARDANT-TREATED PLYWOOD

- A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
- B. Fire-Retardant-Treated Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.
 1. Use treatment that does not promote corrosion of metal fasteners.
 2. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.
 3. Kiln-dry material after treatment to a maximum moisture content of 15 percent. Do not use material that is warped or does not comply with requirements for untreated material.
 4. Identify fire-retardant-treated plywood with appropriate classification marking of qualified testing agency.

- E. Application: Treat all plywood.

2.4 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.
1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
 2. Shapes:
 - a. Cornerbead.
 - b. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - c. L-Bead: L-shaped; exposed long flange receives joint compound.

2.5 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475/C 475M.
- B. Joint Tape:
1. Interior Gypsum Board: Paper.
- C. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
1. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use drying-type, all-purpose compound.
 2. Fill Coat: For second coat, use drying-type, all-purpose compound.
 3. Finish Coat: For third coat, use drying-type, all-purpose compound.

2.6 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates including welded hollow-metal frames and framing, with Installer present, for compliance with requirements and other conditions affecting performance.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS, GENERAL

- A. Comply with ASTM C 840.

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- B. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
- C. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- D. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- E. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

3.3 APPLYING INTERIOR GYPSUM BOARD

- A. Single-Layer Application:
 - 1. On partitions/walls, apply gypsum panels horizontally (perpendicular to framing) and minimize end joints.
 - a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
 - 2. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

3.4 INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Interior Trim: Install in the following locations:
 - 1. Cornerbead: Use at outside corners.
 - 2. LC-Bead: Use at exposed panel edges.
 - 3. L-Bead: Use where LC-Bead cannot be installed.

3.5 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- C. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
 - 1. Level 4: At panel surfaces that will be exposed to view.

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3.6 PROTECTION

- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION

SECTION 09512 - ACOUSTICAL TILE CEILINGS

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. Acoustical tiles for ceilings.
 - 2. Direct attachment of tiles to substrates with adhesive.

1.3 ACTION SUBMITTALS

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

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical tiles, suspension-system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical tiles, permit them to reach room temperature and a stabilized moisture content.
- C. Handle acoustical tiles carefully to avoid chipping edges or damaging units in any way.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: Comply with ASTM E 1264 for Class A materials.
 - 2. Smoke-Developed Index: 50 or less.

2.2 ACOUSTICAL TILES, GENERAL

- A. Low-Emitting Materials: Acoustical tile ceilings shall comply with the testing and product requirements of the California Department of Health Services "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- B. Source Limitations:
 - 1. Acoustical Ceiling Tile: Obtain each type from single source from single manufacturer.

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C. Acoustical Tile Standard: Provide manufacturer's standard tiles of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances unless otherwise indicated.

D. Acoustical Tile Colors and Patterns: Match appearance characteristics indicated for each product type.

1. Where appearance characteristics of acoustical tiles are indicated by referencing pattern designations in ASTM E 1264 and not manufacturers' proprietary product designations, provide products selected by Architect from each manufacturer's full range that comply with requirements indicated for type, pattern, color, light reflectance, acoustical performance, edge detail, and size.

2.3 ACOUSTICAL TILES

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

1. Armstrong World Industries, Inc.
2. CertainTeed Corp.
3. USG Interiors, Inc.; Subsidiary of USG Corporation.

B. Classification: Provide tiles complying with ASTM E 1264 for type, form, and pattern as follows:

1. Type and Form: Type III, mineral base with painted finish; Form 2, water felted.
2. Pattern: CD (perforated, small holes and fissured).

C. Color: White.

D. LR: Not less than 0.80.

E. NRC: Not less than 0.55.

F. Edge/Joint Detail: Square, kerfed and rabbeted; tongue and grooved; or butt.

G. Thickness: 5/8 inch.

H. Modular Size: 12 by 12 inches.

2.4 MISCELLANEOUS MATERIALS

A. Acoustical Tile Adhesive: Type recommended by acoustical tile manufacturer, bearing UL label for Class 0-25 flame spread.

1. Adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 INSTALLATION OF DIRECTLY ATTACHED ACOUSTICAL TILE CEILINGS

- A. Adhesive Installation: Install acoustical tile by bonding to substrate, using amount of acoustical tile adhesive and procedure recommended in writing by tile manufacturer and as follows:
 - 1. Prime ceiling according to CISCA's "Ceiling Systems Handbook."
 - 2. Remove loose dust from backs of tiles by brushing.
 - 3. Install splines in joints between tiles; maintain level of bottom surface of tiles to a tolerance of 1/8 inch in 12 feet and not exceeding 1/4 inch cumulatively.
 - 4. Maintain tight butt joints, aligned in both directions and coordinated with ceiling fixtures.

3.3 CLEANING

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

END OF SECTION

SECTION 09651-RESILIENT TILE FLOORING

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. Rubber floor tile.

1.3 ACTION SUBMITTALS

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

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs workers for this Project who are competent in techniques required by manufacturer for floor tile installation and seaming method indicated.

1. Engage an installer who employs workers for this Project who are trained or certified by floor tile manufacturer for installation techniques required.

- B. Source Limitations: Obtain each type, color, and pattern of product specified from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to Project site in manufacturer's original, unopened cartons and containers, each bearing names of product and manufacturer, Project identification, and shipping and handling instructions.

- B. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F. Store floor tiles on flat surfaces.

1.6 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive floor tile during the following time periods:

1. 48 hours before installation.

2. During installation.

3. 48 hours after installation.

- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.

- C. Close spaces to traffic during floor tile installation.

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- D. Close spaces to traffic for 48 hours after floor tile installation.
- E. Install floor tile after other finishing operations, including painting, have been completed.

1.7 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace resilient flooring that do not comply with requirements or that fail in materials within specified warranty period.
 - 1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For resilient tile flooring, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.

- 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

2.2 SQUARE EDGE RUBBER FLOOR TILE (RFT)

- A. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Burke Mercer Flooring Products, Division of Burke Industries Inc; Endura Flecksibles.
 - 2. Flexco; Spextones.
 - 3. Johnsonite; A Tarkett Company; Microtone.
 - 4. Roppe Corporation, USA; Fiesta Rubber Tile.
- B. Tile Standard: ASTM F 1344, Class I-B, homogeneous rubber tile, through mottled.
- C. Hardness: Not less than 85 as required by ASTM F 1344, measured using Shore, Type A durometer per ASTM D 2240.
- D. Wearing Surface: Textured (hammered).
- E. Thickness: 0.125 inch.
- F. Size: 24 by 24 inches.
- G. Edge: Square
- H. Colors and Patterns: Putty color as selected by Contracting Officer's Representative from manufacturer's full color line.

2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated.

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- B. Adhesives: Water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.

1. Adhesives shall comply with the following limits for VOC content:
 - a. Rubber Floor Adhesives: 60 g/L or less.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates: Prepare according to ASTM F 710.
1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install floor tiles until they are the same temperature as the space where they are to be installed.
1. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.

- E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

3.3 FLOOR TILE INSTALLATION

- A. Comply with manufacturer's written instructions for installing floor tile.
- B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
1. Lay tiles square with room axis.
- C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.

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- D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.
- E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.
- F. Center transitions under doors.
- G. Adhere floor tiles to flooring substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.
- B. Perform the following operations immediately after completing floor tile installation:
 - 1. Remove adhesive and other blemishes from exposed surfaces.
 - 2. Sweep and vacuum surfaces thoroughly.
 - 3. Damp-mop surfaces to remove marks and soil.
- C. Protect floor tile from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

END OF SECTION

SECTION 09678-RESILIENT BASE AND ACCESSORIES

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. Resilient base.
 - 2. Resilient molding accessories.

1.3 ACTION SUBMITTALS

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

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type and color of product specified from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F.

1.6 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive resilient products during the following time periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C. Install resilient products after other finishing operations, including painting, have been completed.

1.7 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace resilient base and accessories that do not comply with requirements or that fail in materials within specified warranty period.
 - 1. Warranty Period: Two years from date of Substantial Completion.

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PART 2 - PRODUCTS

2.1 THERMOPLASTIC-RUBBER BASE

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Armstrong World Industries, Inc.
 2. Burke Mercer Flooring Products, Division of Burke Industries Inc.
 3. Johnsonite; A Tarkett Company.
 4. Roppe Corporation, USA.
- B. Product Standard: ASTM F 1861, Type TP (rubber, thermoplastic).
1. Group: II (layered).
 2. Style: B, Cove.
- C. Thickness: 0.125 inch.
- D. Height: 4 inches.
- E. Lengths: Cut lengths 48 inches long.
- F. Outside Corners: Job formed.
- G. Inside Corners: Job formed.
- H. Colors: Match existing putty color.

2.2 VINYL MOLDING ACCESSORY

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Armstrong World Industries, Inc.
 2. Burke Mercer Flooring Products, Division of Burke Industries Inc.
 3. Johnsonite; A Tarkett Company.
 4. Roppe Corporation, USA.
- B. Description: Vinyl transition strips.
- C. Profile and Dimensions: As indicated below.
1. Resilient tile to sheet vinyl; Johnsonite CTA-XX-X or approved substitution.
- D. Colors and Patterns: Match floor base color.

2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
 - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
 - 1. Installation of resilient products indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- C. Do not install resilient products until they are the same temperature as the space where they are to be installed.
 - 1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.
- D. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.3 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.

G. Job-Formed Corners:

1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length.
 - a. Form without producing discoloration (whitening) at bends. Shave back of base vertically at fold point and at two diagonal additional stress relief gouges on the vertical surface, approximately 1/2-inch long, 1-inch from the center gouge.
2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length.
 - a. Miter or cope corners to minimize open joints.

3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.
- B. Perform the following operations immediately after completing resilient-product installation:
 1. Remove adhesive and other blemishes from exposed surfaces.
 2. Sweep and vacuum horizontal surfaces thoroughly.
 3. Damp-mop horizontal surfaces to remove marks and soil.
- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

END OF SECTION

SECTION 09681 - SHEET CARPETING

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. Tufted carpet.

- B. Related Requirements:

- 1. Section 09651 "Resilient Base and Accessories" for resilient wall base and accessories installed with carpet.

1.3 DEFINITIONS

- A. Pile Thickness: Yarn tuft height above top surface of backing.

1.4 ACTION SUBMITTALS

- A. Product Data: For the following, including installation recommendations for each type of substrate:

- 1. Carpet: For each type indicated. Include manufacturer's written data on physical characteristics, durability, and fade resistance.

- B. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.

- 1. Carpet: 12-inch- square Sample.

1.5 INFORMATIONAL SUBMITTALS

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

- B. Sample Warranties: For special warranties.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For carpet to include in maintenance manuals. Include the following:

- 1. Methods for maintaining carpet, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
 - 2. Precautions for cleaning materials and methods that could be detrimental to carpet.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

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1. Carpet: Full-width rolls equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd..

1.8 QUALITY ASSURANCE

- A. Fire-Test-Response Ratings: Where indicated, provide carpet identical to those of assemblies tested for fire response per NFPA 253 by a qualified testing agency.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Comply with CRI 104.

1.10 WARRANTY

- A. Special Warranty for Carpet: Manufacturer agrees to repair or replace components of carpet installation that fail in materials or workmanship within specified warranty period.
 1. Warranty does not include deterioration or failure of carpet due to unusual traffic, failure of substrate, vandalism, or abuse.
 2. Failures include, but are not limited to, more than 10 percent loss of face fiber, edge raveling, snags, runs, loss of tuft bind strength, and delamination.
 3. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work are limited to the products specified.
 - a. Substitutions will be evaluated on overall performance, yarn performance, warranty, yarn colors, and size of pattern.

2.2 TUFTED CARPET

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

1. Patcraft Commercial Carpet; A Shaw Company; Splash!
2. Tandus; A Tarkett Company; Crayon.

B. Color:

1. Patcraft Commercial Carpet; A Shaw Company; 74411 Splish
2. Tandus; A Tarkett Company; 48003 Blizzard Blue.

C. Fiber Content: 100 percent nylon 6, 6.

D. Pile Characteristic: Multilevel-loop pile.

- A. Density: 6,500 oz./cu. yd. minimum based on pile thickness.

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- B. Pile Thickness: 0.117 to 0.143 for finished carpet per ASTM D 6859.
- C. Stitches: 8.2 to 9.67 stitches per inch.
- D. Gage: 0.10 ends per inch.
- E. Face Weight: 26 to 28 oz./sq. yd..
- F. Primary Backing: Woven polypropylene.
- G. Backcoating: Manufacturer's standard cushioned vinyl.
- H. Width: 6 or 12 feet.
- I. Applied Soil-Resistance Treatment: Manufacturer's standard material.
- J. Performance Characteristics: As follows:
 - 1. Appearance Retention Rating: Heavy traffic, 3.0 minimum per ASTM D 7330.
 - 2. Critical Radiant Flux Classification: Not less than 0.45 W/sq. cm.
 - 3. Electrostatic Propensity: Less than 3.5 kV per AATCC 134.

2.3 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet and is recommended or provided by carpet manufacturer.
 - 1. Use adhesives with VOC content not more than 50 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet performance. Examine carpet for type, color, pattern, and potential defects.
- B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:
 - 1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by carpet manufacturer.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Comply with CRI 104, Section 7.3, "Site Conditions; Floor Preparation," and with carpet manufacturer's written installation instructions for preparing substrates.

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- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider, and protrusions more than 1/32 inch, unless more stringent requirements are required by manufacturer's written instructions.
- C. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by carpet manufacturer.
- D. Broom and vacuum clean substrates to be covered immediately before installing carpet.

3.3 INSTALLATION

- A. Comply with CRI 104 and carpet manufacturer's written installation instructions for the following:
 - 1. Carpet with Attached-Cushion Installation: Comply with CRI 104, Section 11, "Attached-Cushion Installations."
- B. Comply with carpet manufacturer's written recommendations for seam locations and direction of carpet; maintain uniformity of carpet direction and lay of pile. At doorways, center seams under the door in closed position.
- C. Cut and fit carpet to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, and thresholds. Bind or seal cut edges as recommended by carpet manufacturer.
- D. Extend carpet into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- E. Comply with carpet cushion manufacturer's written recommendations.
- F. Double cut carpet seams, with accurate pattern match. Make cuts straight, true and unfrayed. Apply seam adhesive to cut edges of woven carpet immediately.
- G. Apply contact adhesive to floor uniformly at rate recommended by manufacturer. After sufficient open time, press carpet into adhesive.
- H. Apply seam adhesive to the base of the edge glued down. Lay adjoining piece with seam straight, not overlapped or peaked and free of gaps.
- I. Roll with appropriate roller not exceeding 75 pounds for complete contact of adhesive to carpet backing.

3.4 CLEANING AND PROTECTING

- A. Perform the following operations immediately after installing carpet:
 - 1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet manufacturer.
 - 2. Remove yarns that protrude from carpet surface.
 - 3. Vacuum carpet using commercial machine with face-beater element.
- B. Protect installed carpet to comply with CRI 104, Section 16, "Protecting Indoor Installations."

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- C. Protect carpet against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet manufacturer and carpet adhesive manufacturer.

END OF SECTION

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SECTION 09900 - PAINTING

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 surface preparation and field painting of exposed interior items and surfaces.
1. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.
- B. Paint exposed surfaces, except where these Specifications indicate that the surface or material is not to be painted or is to remain natural. If an item or a surface is not specifically mentioned, paint the item or surface the same as similar adjacent materials or surfaces. If a color of finish is not indicated, Contracting Officer's Representative will select from standard colors and finishes available.
1. Painting includes field painting of exposed electrical conduits and junction boxes exposed to occupied rooms installed as part of this Work.
- C. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, labels.
1. Prefinished items including, but not limited to, the following factory-finished components:
- a. Light fixtures.
2. Finished metal surfaces including, but not limited to, the following:
- a. Anodized aluminum.
- b. Stainless steel.
- c. Chromium plate.
- d. Bronze and brass.
3. Operating parts include, but not limited to, moving parts of operating equipment and the following:
- a. Valve and damper operators.
- b. Linkages.
- c. Sensing devices.
- d. Motor and fan shafts.
4. Labels: Do not paint over UL, FMG, or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.

1.3 DEFINITIONS

- A. General: Standard coating terms defined in ASTM D 16 apply to this Section.
1. Flat refers to a lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter.
 2. Eggshell refers to low-sheen finish with a gloss range between 20 and 35 when measured at a 60-degree meter.
 3. Semigloss refers to medium-sheen finish with a gloss range between 35 and 70 when measured at a 60-degree meter.
 4. Full gloss refers to high-sheen finish with a gloss range more than 70 when measured at a 60-degree meter.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
- B. Samples for Verification: For each type of paint system and each color and gloss of topcoat.
1. Submit three Samples on 8-by-10 inch cardstock for Contracting Officer's Representative's review of color only:
 2. Label each coat of each Sample.
 3. Label each Sample for location and application area.
- C. Product List: For each product indicated, include the following:
1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
 2. VOC content.

1.5 QUALITY ASSURANCE

- A. Applicator Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.
- B. Source Limitations: Obtain block fillers and primers for each coating system from the same manufacturer as the finish coats.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label.
- B. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
1. Maintain containers in clean condition, free of foreign materials and residue.
 2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Glidden Professional Paints/PPG Amercoat Industrial, Devoe Light Industrial
2. PPG Industries, Inc. (Pittsburgh Paints).
3. Sherwin-Williams Co. (Sherwin-Williams).

- B. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to products listed in other Part 2 articles for the paint category indicated.

2.2 PAINT MATERIALS, GENERAL

- A. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

- B. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint-material containers not displaying manufacturer's product identification will not be acceptable.

1. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed substitutions.

- A. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction.

1. Flat Paints and Coatings: 50 g/L.
2. Nonflat Paints and Coatings: 150 g/L.
3. Primers, Sealers, and Undercoaters: 200 g/L.
4. Pretreatment Wash Primers: 420 g/L.

- B. Colors: Match existing.

2.3 CONCRETE UNIT MASONRY BLOCK FILLERS

- A. Concrete Unit Masonry Block Filler: Factory-formulated high-performance latex block fillers.
1. Glidden Professional Paints; 3010 Concrete Block Filler/Primer: Applied at a dry film thickness of not less than 6.0 to 10.0 mils.
 2. Pittsburgh Paints; 6-15 SpeedHide Interior/Exterior Acrylic Masonry Block Filler: Applied at a dry film thickness of not less than 7.2 mils.
 3. Sherwin-Williams; PrepRite Interior/Exterior Block Filler B25W25: Applied at a dry film thickness of not less than 8.0 mils.

2.4 INTERIOR PRIMERS

- A. Interior Concrete and Masonry Primer: Factory-formulated alkali-resistant acrylic-latex interior primer for interior application.
1. Glidden Professional Paints; 3030-1200 Bond-Prep Interior/Exterior Waterborne Pigmented Bonding Primer: Applied at a dry film thickness of not less than 1.8 mils.
 2. Pittsburgh Paints; 4-603 Perma-Crete Interior/Exterior Alkali Resistant Primer: Applied at a dry film thickness of not less than 1.2 mils.
 3. Sherwin-Williams; Loxon Concrete & Masonry Primer A24W8300: Applied at a dry film thickness of not less than 3.0 mils.
- B. Interior Gypsum Board Primer: Factory-formulated latex-based primer for interior application.
1. Glidden Professional Paints; 1090-1200 Ultra Basecoat Interior Latex Wall Primer/Sealer: Applied at a dry film thickness of not less than 1.2 mils.
 2. Pittsburgh Paints; 6-2 SpeedHide Interior Quick-Drying Latex Sealer: Applied at a dry film thickness of not less than 1.0 mil.
 3. Sherwin-Williams; PrepRite 200 Latex Wall Primer B28W200 Series: Applied at a dry film thickness of not less than 1.6 mils.
- C. Interior Ferrous-Metal Primer: Factory-formulated quick-drying rust-inhibitive alkyd-based metal primer.
1. Glidden Professional Paints; 4160-6130 Devguard Multi-Purpose Tank and Structural Primer: Applied at a dry film thickness of not less than 2.0 mils.
 2. Pittsburgh Paints; 90-712 Pitt-Tech One Pack Interior/Exterior Primer/Finish DTM Industrial Enamel: Applied at a dry film thickness of not less than 2.0 mils.
 3. Sherwin-Williams; Pro Industrial Pro-Cryl Universal Primer B66W00310: Applied at a dry film thickness of not less than 3.0 mils.

2.5 INTERIOR FINISH COATS

- A. Interior Semigloss Acrylic Enamel: Factory-formulated semigloss acrylic-latex enamel for interior application.
1. Glidden Professional Paints; 1406 Ultrahide 250 Acrylic Semi-Gloss Interior Wall & Trim Enamel: Applied at a dry film thickness of not less than 1.5 mils.

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2. Pittsburgh Paints; 6-500 Series SpeedHide Interior Semi-Gloss Latex: Applied at a dry film thickness of not less than 1.0 mil.
3. Sherwin-Williams; ProMar 200 Latex Semi-Gloss, B31 Series: B31W200 Series: Applied at a dry film thickness of not less than 1.3 mils.

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

- A. General: Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.
- B. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- C. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.
 1. Provide barrier coats over incompatible primers or remove and reprime.
- D. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.
- E. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer.

- F. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

3.3 APPLICATION

- A. General: Apply paint according to manufacturer's written instructions.
1. Use applicators and techniques suited for paint and substrate indicated.
 2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
 3. Paint entire exposed surface of window frames and sashes.
 4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- C. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
1. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.
 2. Sand lightly between each succeeding enamel or varnish coat.
- D. Block Fillers: Apply block fillers to concrete masonry block at a rate to ensure complete coverage with pores filled.
- E. Prime Coats: Before applying finish coats, apply a prime coat, as recommended by manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.
- F. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.
- G. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

3.4 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

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C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.5 INTERIOR PAINT SCHEDULE

A. Concrete Unit Masonry: Provide the following finish systems over interior concrete masonry:

1. Semigloss Acrylic-Enamel Finish: Two finish coats over a block filler.
 - a. Block Filler: Concrete unit masonry block filler.
 - b. Finish Coats: Interior semigloss acrylic enamel.

B. Gypsum Board: Provide the following finish systems over interior gypsum board surfaces:

1. Semigloss Acrylic-Enamel Finish: Two finish coats over a primer.
 - a. Primer: Interior gypsum board primer.
 - b. Finish Coats: Interior semigloss acrylic enamel.

C. Ferrous Metal: Provide the following finish systems over ferrous metal:

1. Semigloss Acrylic Enamel Finish: Two finish coats over a primer.
 - a. Primer: Interior ferrous-metal primer.
 - b. Finish Coats: Interior semigloss acrylic enamel.

END OF SECTION

SECTION 10142 - PANEL SIGNAGE

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. Panel signs.
- B. Related Requirements:
 - 1. Division 16 for labels, tags, and nameplates for electrical equipment.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For panel signs.
 - 1. Show message list, typestyles, graphic elements, and layout for each sign at least half size. Include size of signs.

PART 2 - PRODUCTS

2.1 SIGNS

- A. Panel Sign : Sign with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:
 - 1. Solid-Sheet Sign: Brass and stainless-steel sheet as scheduled with finish specified in "Surface Finish and Applied Graphics" Subparagraph below and as follows:
 - a. Thickness: 0.060 inch.
 - b. Surface-Applied Graphics: Applied vinyl film.
 - c. Etched and Filled Graphics: Sign face etched or routed to receive enamel-paint infill.
 - 2. Mounting: Surface mounted to door with adhesive.
 - 3. Surface Finish and Applied Graphics:
 - a. Integral Metal Finish: Dull brass.
 - 4. Text and Typeface: Match existing size and font.
 - 5. Flatness Tolerance: Sign panel shall remain flat or uniformly curved under installed conditions as indicated and within a tolerance of plus or minus 1/16 inch measured diagonally from corner to corner.

2.2 FIELD-APPLIED, VINYL-CHARACTER SIGNS

- A. Field-Applied, Vinyl-Character Sign: Prespaced characters die cut from 3- to 3.5-mil thick, weather-resistant vinyl film with release liner on the back and carrier film on the front for on-site alignment and application.
1. Text and Font: Match existing size, font, and colors.

2.3 PANEL-SIGN MATERIALS

- A. Brass Sheet (Yellow Brass): ASTM B 36/B 36M, alloy recommended by manufacturer and finisher for finish indicated.
- B. Stainless-Steel Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304, stretcher-leveled standard of flatness.
- C. Vinyl Film: UV-resistant vinyl film of nominal thickness indicated, with pressure-sensitive, permanent adhesive on back; die cut to form characters or images as indicated and suitable for exterior applications.

2.4 ACCESSORIES

- A. Adhesives: As recommended by sign manufacturer and with a VOC content of 70 g/L or less for adhesives used inside the weatherproofing system and applied on-site when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.5 FABRICATION

- A. Surface-Engraved Graphics: Machine engrave characters and other graphic devices into panel surface indicated to produce precisely formed copy, incised to uniform depth.
1. Engraved Metal: Fill engraved graphics with manufacturer's standard baked enamel.

2.6 GENERAL FINISH REQUIREMENTS

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Directional Finishes: Run grain with long dimension of each piece and perpendicular to long dimension of finished trim or border surface unless otherwise indicated.
- C. Organic, Anodic, and Chemically Produced Finishes: Apply to formed metal after fabrication but before applying contrasting polished finishes on raised features unless otherwise indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.
1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
 2. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.

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PANEL SIGNAGE**

B. Mounting Methods:

1. Adhesive: Clean bond-breaking materials from substrate surface and remove loose debris. Apply linear beads or spots of adhesive symmetrically to back of sign and of suitable quantity to support weight of sign after cure without slippage. Keep adhesive away from edges to prevent adhesive extrusion as sign is applied and to prevent visibility of cured adhesive at sign edges. Place sign in position, and push to engage adhesive. Temporarily support sign in position until adhesive fully sets.

3.2 ADJUSTING AND CLEANING

- A. Remove and replace damaged or deformed signs and signs that do not comply with specified requirements. Replace signs with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.
- B. Remove temporary protective coverings and strippable films as signs are installed.

3.3 SIGNAGE SCHEDULE

Material	Text	Location	Remarks
Dull Brass	"208A" Engraved with black text	High on door 208A	Provide on each side of door
Stainless Steel	"208A" Vinyl red text on white background	Low on door 208A	Provide on each side of door.
Dull Brass	"213" Engraved with black text	High on door 213	

END OF SECTION

SECTION 11190 - DETENTION EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes detention transaction drawer.

1.3 COORDINATION

- A. Coordinate installation of anchorages for transaction drawer. Furnish templates, and directions for installing anchorages, including sleeves, concrete inserts, bolts.

1.4 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 transaction drawer.
- B. Shop Drawings:
1. Include plans, elevations, sections, dimensions, and attachment details.

1.5 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to the following:
1. AWS D1.6, "Structural Welding Code - Stainless Steel."

1.6 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace transaction drawer that fail(s) in materials or workmanship within specified warranty period.
1. Warranty Period: One year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Armortex Transaction Drawer Model SS10D-D or comparable product by one of the following:
1. Creative Industries, Inc.
2. Pacific Bulletproof Company.

2.2 ASSEMBLY DESCRIPTION

- A. Transaction Drawer: Welded stainless steel drawer unit and front flange, movable drawer assembly on ball bearing slides. Case unit to be 16 ga. painted steel. Drawer to extend 12 inch minimum travel beyond flange. Drawer to be minimum 9 inches deep and 16 inches wide operated by stainless steel handle from secure side.

2.3 MATERIALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, CS (Commercial Steel), Type B; suitable for exposed applications.
- C. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, CS (Commercial Steel), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- D. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666 or ASTM A 240/A 240M, austenitic stainless steel, Type 304.

2.4 FABRICATION

- A. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly.
- B. Coordinate dimensions and attachment methods of equipment with those of adjoining construction to produce integrated assemblies with closely fitting joints and with edges and surfaces aligned unless otherwise indicated.
- C. Shear and punch metals cleanly and accurately. Remove burrs.
- D. Form and grind edges and corners to be free of sharp edges or rough areas.
- E. Form metal in maximum lengths to minimize joints. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing the Work.
- F. Weld corners and seams continuously to comply with referenced AWS standard and the following:
1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. Finish exposed welds and surfaces smooth and blended at exposed connections so that no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
 5. Weld before finishing components to greatest extent possible. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- G. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to secure equipment rigidly in place and to support expected loads. Build in straps, plates, and brackets as needed to support and anchor fabricated items to adjoining construction. Reinforce formed-metal units as needed to attach and support other construction.

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- H. Cut, reinforce, drill, and tap detention gun lockers as indicated to receive hardware, fasteners, and similar items.
- I. Form exposed work true to line and level with accurate angles, surfaces, and straight sharp edges.
- J. Form exposed connections with hairline joints, flush and smooth using concealed fasteners where possible. Locate joints where least conspicuous.

2.5 ACCESSORIES

- A. Concealed Bolts: ASTM A 307, Grade A unless otherwise indicated.
 - 1. Threaded or wedge type; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed; hot-dip galvanized per ASTM A 153/A 153M or ASTM F 2329.
- B. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

2.6 FINISHES

- A. 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.
 - 1) Run grain of directional finishes with long dimension of each piece.
 - 2) When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
 - 3) Directional Satin Finish: No. 3.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Finish products after assembly.

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 INSTALLATION

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing equipment to in-place construction. Include threaded fasteners for masonry inserts, and other connectors.
- B. Cutting, Fitting, and Placement: Obtain manufacturer's written approval for cutting, drilling, and fitting required for installing equipment. Set equipment accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

Section 11190
DETENTION EQUIPMENT

- C. Equipment Installation: Install equipment in accordance with manufacturer's written instructions.
- D. Adjust drawer of transaction drawer to operate easily without binding.

END OF SECTION

SECTION 12362-PLASTIC-LAMINATE-CLAD COUNTERTOPS

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 plastic-laminate countertops.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product, including panel products high-pressure decorative laminate adhesive for bonding and plastic laminate.
- B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

1.4 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
- B. Installer Qualifications: Fabricator of products.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver countertops until painting and similar operations that could damage countertops have been completed in installation areas. If countertops must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.6 FIELD CONDITIONS

- A. Field Measurements: Where countertops are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- B. Established Dimensions: Where countertops are indicated to fit to other construction, establish dimensions for areas where countertops are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 PLASTIC-LAMINATE COUNTERTOPS

- A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades indicated for construction, installation, and other requirements.
 - 1. The Contract Documents contain selections chosen from options in the quality standard and additional requirements beyond those of the quality standard. Comply with those selections and requirements in addition to the quality standard.

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Construction Documents

KETCHIKAN CORRECTIONAL CENTER

DOOR LOCK AND SECURITY CONTROLS REPLACEMENT

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Section 12362

PLASTIC-LAMINATE-CLAD COUNTERTOPS

- B. Grade: Custom.
- C. High-Pressure Decorative Laminate: NEMA LD 3, Grade HGS.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- a. Formica Corporation.
 - b. Nevamar Decorative Surfaces
 - c. Wilsonart International; Div. of Premark International, Inc.
- D. Colors, Patterns, and Finishes: Provide materials and products that result in colors and matte finishes of exposed laminate surfaces complying with the following requirements:

Manufacturer	Countertops
---------------------	--------------------

Formica Corporation.	934-58 Pearl
Nevamar	S6005T Putty
Wilsonart International	1503-60 Putty

- E. Edge Treatment: Same as laminate cladding on horizontal surfaces.
- F. Core Material: Particleboard.
- G. Core Thickness: 3/4 inch.
1. Build up countertop thickness to 1-1/2 inches at front, back, and ends with additional layers of core material laminated to top.
- H. Backer Sheet: Provide plastic-laminate backer sheet, NEMA LD 3, Grade BKL, on underside of countertop substrate.

2.2 WOOD MATERIALS

- A. Wood Products: Provide materials that comply with requirements of referenced quality standard unless otherwise indicated.

1. Wood Moisture Content: 5 to 10 percent.

2.3 ACCESSORIES

- A. Grommets for Cable Passage through Countertops: 2-inch OD, black, molded-plastic grommets and matching plastic caps with slot for wire passage.

2.4 MISCELLANEOUS MATERIALS

- A. Adhesive for Bonding Plastic Laminate: Unpigmented contact cement.

1. Adhesive for Bonding Edges: Hot-melt adhesive.

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PLASTIC-LAMINATE-CLAD COUNTERTOPS

- B. Countertop Support Brackets: Steel bracket with 0.25 inch thick, 2 inch wide legs and curved gusset made from 0.179 inch thick Type 304 stainless steel, equal length legs sized to fit within 4-inches of the countertop edge.

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

- a. Federal Brace; Arrowwood.
- b. Outwater Plastics, Industries Inc; California

2.5 FABRICATION

- A. Fabricate countertops to dimensions, profiles, and details indicated. Provide front and end overhang of 1 inch over base cabinets. Ease edges to radius indicated for the following:
- B. Complete fabrication, including assembly, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
- C. Shop cut openings to maximum extent possible to receive appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

1. Seal edges of openings in countertops with a coat of varnish.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before installation, condition countertops to average prevailing humidity conditions in installation areas.
- B. Before installing countertops, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

3.2 INSTALLATION

- A. Grade: Install countertops to comply with same grade as item to be installed.
- B. Assemble countertops and complete fabrication at Project site to the extent that it was not completed in the shop.
1. Seal edges of cutouts by saturating with varnish.
- C. Field Jointing: Where possible, make in the same manner as shop jointing, using dowels, splines, adhesives, and fasteners recommended by manufacturer. Prepare edges to be joined in shop so Project-site processing of top and edge surfaces is not required. Locate field joints where shown on Shop Drawings.
1. Secure field joints in plastic-laminate countertops with concealed clamping devices located within 6 inches of front and back edges and at intervals not exceeding 24 inches. Tighten according to manufacturer's written instructions to exert a constant, heavy-clamping pressure at joints.

- D. Install countertops level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches.

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- E. Scribe and cut countertops to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- F. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.
 - 1. Install countertops with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
 - 2. Seal junctures of tops and walls with mildew-resistant silicone sealant or another permanently elastic sealing compound recommended by countertop material manufacturer.

3.3 ADJUSTING AND CLEANING

- A. Repair damaged and defective countertops, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.
- B. Clean countertops on exposed and semiexposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION

SECTION 16010 - BASIC ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. General Requirements specifically applicable to Division 16, in addition to Division 1 provisions.

1.2 WORK SEQUENCE

- A. Construct Work in sequence under provisions of Division 1.

1.3 COORDINATION

- A. Coordinate the Work specified in this Division under provisions of Division 1.
- B. Prepare drawings showing proposed rearrangement of Work to meet job conditions, including changes to Work specified under other Sections. Obtain permission of Owner/Engineer prior to proceeding.

1.4 REFERENCES

- A. ANSI/NFPA 70 - National Electrical Code, latest adopted edition including all state and local amendments.
- B. NECA - Standard of Installation.

1.5 REGULATORY REQUIREMENTS

- A. Conform to ANSI/NFPA 70.
- B. Conform to the latest adopted edition of the International Building Code and the International Fire Code including all state and local amendments thereto.
- C. Obtain electrical permits, plan review, and inspections from authority having jurisdiction.

1.6 SUBMITTALS

- A. Submit inspection and permit certificates under provisions of Division 1.
- B. Include certificate of final inspection and acceptance from authority having jurisdiction.
- C. Submittal review is for general design and arrangement only and does not relieve the Contractor from any requirements of Contract Documents. Submittal not checked for quantity, dimension, fit or proper operation. Where deviations of substitute product or system performance have not been specifically noted in the submittal by the Contractor, provisions of a complete and satisfactory working installation is the sole responsibility of the Contractor.
- D. In addition to requirements referenced in Division 1, the following is required for work provided under this division of the specification.

- 1. Provide material and equipment submittals containing complete listings of material and equipment shown on Electrical Drawings and specified herein, bound in hard cover, loose-leaf binders separate from work furnished under other divisions. Index and clearly

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identify all material and equipment by item, name or designation used on drawings and in specifications.

2. Submit only pages which are pertinent; mark each copy of standard printed data to identify pertinent products, referenced to Specification Section and Article number. Show reference standards, performance characteristics, and capacities; wiring diagrams and controls; component parts; finishes; dimensions; and required clearances.
3. Modify manufacturer's standard schematic drawings and diagrams to supplement standard information and to provide information specifically applicable to the work. Delete information not applicable.
4. Review submittals prior to transmittal; determine and verify field measurements, field construction criteria, manufacturer's catalog numbers, and conformance of submittal with requirements of Contract Documents.
5. Coordinate submittals with requirements of work and of Contract Documents.
6. Sign or initial each sheet of shop drawings and product data, and each sample label to certify compliance with requirements of Contract Documents. Notify Architect/Engineer in writing at time of submittal, of any deviations from requirements of Contract Documents.
7. Do not fabricate products or begin work which requires submittals until return of submittal with Architect/Engineer acceptance.
8. Equipment scheduled by manufacturer's name and catalog designations, manufacturer's published data and/or specification for that item, in effect on bid date, are considered part of this specification. Approval of other manufacturer's item proposed is contingent upon compliance therewith.
9. Submittals for Division 16 shall be complete and submitted at one time. Unless given prior approval, partial submittals will be returned unreviewed.

1.7 PROJECT RECORD DRAWINGS

- A. Maintain project record drawings in accordance with Division 1.
- B. In addition to the other requirements, mark up a clean set of drawings as the work progresses to show the dimensioned location and routing of all electrical work which will become permanently concealed. Show routing of work in permanently concealed blind spaces within the building. Show complete routing and sizing of any significant revisions to the systems shown.
- C. Record drawing field mark-ups shall be maintained on-site and shall be available for examination of the Owner's Representative at all times.

1.8 OPERATION AND MAINTENANCE MANUALS

- A. Provide operation and maintenance manuals for training of Owner's Representative in operation and maintenance of systems and related equipment. In addition to requirements referenced in Division 1, the following is required for work provided under this section of the specifications.
- B. Manuals shall be hard cover, loose-leaf binders with pages reinforced to prevent pullout and shall be separate from work furnished under other divisions. Prepare a separate chapter for instruction of each class of equipment or system. Index and clearly identify each chapter and provide a table of contents.

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- C. Unless otherwise noted in Division 1, provide one copy of all material for approval. After approval, provide five corrected approved copies.
- D. The following is the suggested outline for operation and maintenance manuals and is presented to indicate the extent of items required in manuals.
1. List chapters of information comprising the text. The following is a typical Table of Contents:
 - a. Touchscreen Security System
 - b. Programmable Controller
 - c. Low-Voltage Switching System
 - d. Detention Intercom System
 - e. Other chapters as necessary
 2. Provide the following items in sequence for each chapter shown in Table of Contents:
 - a. Describe the procedures necessary for personnel to operate the system including start-up, operation, emergency operation and shutdown.
 - 1) Give complete instructions for energizing equipment and making initial settings and adjustments whenever applicable.
 - 2) Give step-by-step instructions for shutdown procedure if a particular sequence is required.
 - 3) Include test results of all tests required by this and other sections of the specifications.
 - b. Maintenance Instructions:
 - 1) Provide instructions and a schedule of preventive maintenance, in tabular form, for all routine cleaning and inspection with recommended lubricants if required for the following:
 - a) Touchscreen computer
 - b) Programmable controllers
 - c) Relay switching system
 - d) Detention intercom system
 - 2) Provide instructions for minor repair or adjustments required for preventive maintenance routines, limited to repairs and adjustments which may be performed without special tools or test equipment and which requires no special training or skills.
 - 3) Provide manufacturers' descriptive literature including approved shop drawings covering devices used in system, together with illustrations,

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exploded views, etc. Also include special devices provided by the Contractor.

- 4) Provide any information of a maintenance nature covering warranty items, etc., which have not been discussed elsewhere.
- 5) Include list of all equipment furnished for project, where purchased, technical representative if applicable and a local parts source with a tabulation of descriptive data of all electrical-electronic spare parts and all mechanical spare parts proposed for each type of equipment or system. Properly identify each part by part number and manufacturer.

1.9 DEMONSTRATION OF ELECTRICAL SYSTEMS

A. During substantial completion inspection:

1. Conduct operating test for approval under provisions of Division 1.
2. Demonstrate installation to operate satisfactorily in accordance with requirements of Contract Documents.
3. Should any portion of installation fail to meet requirements of Contract Documents, repair or replace items failing to meet requirements until items can be demonstrated to comply.
4. Have instruments available for measuring light intensities, voltage and current values, and for demonstration of continuity, grounds, or open circuit conditions.
5. Provide personnel to assist in taking measurements and making tests.

1.10 INSTRUCTION OF OPERATING PERSONNEL

- A. In accordance with the requirements of Division 1, this section, and other Division 16 sections, provide services of qualified representative of supplier of each item or system listed below to instruct designated personnel of Owner in operation and maintenance of item or system.
- B. Make instruction when system is complete, of number of hours indicated, and performed at time mutually agreeable.

System or Equipment	Hours of Instruction
Intercom/security/CCTV/PLC system	As specified in 16727

1.11 EXTRA MATERIALS

- A. As specified in other Division 16 sections.

1.12 WARRANTY AND MAINTENANCE CONTRACT

- A. Warrant all materials and equipment to be new and free from defects in material and workmanship for a period of one year under provisions of Division 1.
- B. Copies of manufacturer product warranties for all equipment shall be included in the operation and installation manuals.
- C. Provide a maintenance contract to maintain the security system for one year from the date of substantial completion for the project. At the end of one year, the Owner shall have the option of extending or canceling the contract.

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1.13 ELECTRICAL REFERENCE SYMBOLS

- A. The Electrical "Legend" on drawings is standardized version for this project. All symbols shown may not be used on drawings. Use legend as reference for symbols used on plans.

1.14 ELECTRICAL DRAWINGS

- A. Drawings are diagrammatic; complimentary to the Architectural drawings; not intended to show all features of work. Install material not dimensioned on drawings in a manner to provide a symmetrical appearance. Do not scale drawings for exact equipment locations. Review Architectural Drawings and adjust work to conform to conditions shown thereon. Field verification of dimensions, locations and levels is directed.

1.15 DEFINITIONS

- A. "BASIS OF DESIGN" - Particular specialized products around which a system was designed. In such cases, the products specified may be critical with regard to physical sizes and performance characteristics. Where variations or substitutions to products are made, the Contractor is solely responsible for resolving all impacts of such a deviation. Approval of a substitution and/or variation request does not relieve the Contractor of responsibility for complying with the design intent.
- B. "EQUAL" - A product, system or installation which:
1. Meets or exceeds all ratings, performance characteristics, standard features and denoted options of specified item.
 2. Includes primary characteristics identified in the drawings and specifications.
 3. Complies with requirements similar to the "Basis of Design."
 4. Is produced by a manufacturer specifically listed as an acceptable manufacturer on the drawings, or in the specifications.
 5. Is acceptable and approved to the Architect/Engineer specifically addressed in writing.
- C. "EXPOSED" - Exposed to view after construction is completed.
- D. "FURNISH" - Purchase materials as shown and specified. Deliver to project site at location shown to be installed by supporting crafts.
- E. "INSTALL" - Set in place and connect equipment furnished by others for a complete and ready to use installation.
- F. "PRODUCT" - Term which includes materials, equipment, fixtures, devices for any tangible item used on the project.
- G. "PROVIDE" - Furnish all products, equipment, subcontracts, labor, testing, etc., required and install for a complete ready to use installation.
- H. "SHOP DRAWING" - Detailed, dimensioned working construction drawing drawn to a particular scale adequately showing installation intent, details and coordination of interrelated trades.
- I. "SUBSTITUTION" - A product, system or installation which is not listed as an acceptable manufacturer, but the Contractor warrants meets or exceeds specified equipment denoted in

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the contract documents. Approval through submittal process is required to establish product or system is "equal".

- J. "WIRING" - Electrical conductors, raceway, devices, connections and associated accessories, or any combination of labor and material thereof in order to provide a complete and operable system.
- K. "WEATHERPROOF" - Electrical equipment noted as weatherproof or "WP" shall be provided with raintight enclosures or device plates as applicable.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- A. All Materials and Equipment shall be new and shall be listed by Underwriter's Laboratories or equivalent third party listing agency for the use intended.
- B. Materials and Equipment shall be acceptable to the authority having jurisdiction as suitable for the use intended when installed per listing and labeling instructions.
- C. No materials or equipment containing asbestos in any form shall be used. Where materials or equipment provided by this Contractor are found to contain asbestos such items shall be removed and replaced with non-asbestos containing materials and equipment at no cost to the Owner.
- D. In describing the various items of equipment, in general, each item will be described singularly, even though there may be numerous similar items.

PART 3 - EXECUTION

3.1 WORKMANSHIP

- A. Install Work using procedures defined in NECA Standard of Installation and/or the manufacturer's installation instructions.

3.2 TESTS

- A. Notify Contracting Officer at least 72 hours prior to conducting any tests.
- B. Following completion of installation, test system ground and all feeders with appropriate meggers, or other approved instruments and methods, to determine ground and insulation resistance values. Submit logs of values obtained, and nameplate data of instruments used prior to final inspection. Include a copy of all data in the power distribution section of the Operation and Maintenance Manuals.
- C. Perform additional tests required under other sections of these specifications.
- D. Perform all tests in the presence of the Owner's authorized representative.

3.3 PENETRATIONS OF FIRE BARRIERS

- A. All holes or voids created to extend electrical systems through fire rated floors, walls or ceiling shall be sealed with an asbestos-free intumescent fire stopping material capable of expanding 8 to 10 times when exposed to temperatures 250° F or higher.

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- B. Materials shall be suitable for the fire stopping of penetrations made by steel, glass, plastic and shall be capable of maintaining an effective barrier against flame, smoke and gases in compliance with the requirements of ASTM E814 and UL 1479.
- C. The rating of the fire stops shall be the same as the time-rated floor, wall or ceiling assembly.
- D. Install fire stopping materials in accordance with the manufacturer's instructions.

END OF SECTION

SECTION 16060 - MINOR ELECTRICAL DEMOLITION FOR REMODELING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Electrical demolition.

1.2 RELATED SECTIONS

- A. Division 1 - Alteration Project Procedures.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- A. Materials and equipment for patching and extending work: As specified in individual Sections.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify field measurements and circuiting arrangements are as shown on Drawings.
- B. Verify that abandoned wiring and equipment serve only abandoned facilities.
- C. Demolition Drawings are based on casual field observation and existing record documents. Report discrepancies to Architect/Engineer before disturbing existing installation.
- D. Beginning of demolition means installer accepts existing conditions.

3.2 PREPARATION

- A. Disconnect electrical systems in walls, floors, and ceilings scheduled for removal.
- B. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.

3.3 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

- A. Demolish and extend existing electrical work under provisions of Division 1 and this Division.
- B. Remove, relocate, and extend existing installations to accommodate new construction.
- C. Remove abandoned wiring to source of supply.
- D. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.
- E. Remove exposed abandoned wire and cable, including abandoned wire and cable above accessible ceiling finishes. Patch and paint surfaces where removed cables pass through building finishes that are existing to remain.

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- F. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets which are not removed.
- G. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.
- H. Repair adjacent construction and finishes damaged during demolition and extension work. T-bar ceiling tiles damaged under normal construction conditions or having voids where junction boxes were removed shall be replaced by the Contractor.
- I. Maintain access to existing electrical installations which remain active.
- J. Extend existing installations using materials and methods as specified.

3.4 CLEANING AND REPAIR

- A. Clean and repair existing materials and equipment which remain or are to be reused.

3.5 INSTALLATION

- A. Install relocated materials and equipment under the provisions of Division 1.

END OF SECTION

SECTION 16120 - WIRE AND CABLE

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Building wire.
- B. Cable.
- C. Wiring connections and terminations.

1.2 REFERENCES

- A. ANSI/NEMA WC 70-2009 – Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy.

PART 2 - PRODUCTS

2.1 BUILDING WIRE

- A. Thermoplastic-insulated Building Wire: NEMA WC 70.
- B. Branch Circuits 10 AWG and Smaller: Solid or stranded copper conductor, 600 volt insulation, THHN/THWN or XHHW-2.
- C. Branch Circuit Wire Color Code:
 - 1. Color code wires by line or phase as follows:
 - a. Black, red, blue and white for 120/208V systems.
 - 2. For conductors 10 AWG and smaller, insulation shall be colored.
 - 3. When two or more neutrals are installed in one conduit, identify each with the proper circuit number in accordance with Section 16195.
 - 4. Grounding conductors 10 AWG and smaller shall have green colored insulation.
- D. Control Circuits: Copper, stranded conductor 600 volt insulation, XHHW-2.

2.2 METAL CLAD CABLE

- A. UL 83, 1479, 1569, and 1581 listed, meets Federal Specification A-A-59544 (formerly J-C-30B). UL rated for installation in cable trays and environmental air handling spaces. Fire wall rated for 1, 2, and 3-hour through penetrations.
- B. Type MC Cable, Size 12 Through 10 AWG: Solid copper conductor, 600 volt thermoplastic insulation, rated 90° C, insulated green grounding conductor, and galvanized steel armor over mylar.
- C. Control Type MC Cable, Size 18 through 12 AWG: Complying with UL 62, 83, 1424, 1479, 1569, 1581, and NFPA 262 (formerly UL 910), solid copper conductor, 300 volt thermoplastic insulation, rated 105° C, insulated green grounding conductor, and red-striped galvanized steel armor over mylar.

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- D. All metal clad cable shall be provided with color-coded insulation on all ungrounded conductors in accordance with NEC 210.5(C) and Part 3 of this section.

2.3 REMOTE CONTROL AND SIGNAL CABLE

- A. Control Cable for Class 1 Remote Control and Signal Circuits: Copper conductor, 600 volt insulation, rated 90° C, individual conductors twisted together, shielded, and covered with an overall PVC jacket; UL listed.
- B. Control Cable for Class 2 or Class 3 Remote Control and Signal Circuits: Copper conductor, 300 volt insulation, rated 90° C, individual conductors twisted together, unshielded and covered with a PVC jacket; UL listed.
- C. Plenum Cable for Class 2 or Class 3 Remote Control and Signal Circuits: Copper conductor, 300 volt insulation, rated 90° C, individual conductors twisted together, unshielded and covered with a nonmetallic jacket; UL listed for use in air handling ducts, hollow spaces used as ducts, and plenums.

2.4 WIRING CONNECTIONS AND TERMINATIONS

- A. For conductors 10 AWG and smaller:
1. Dry interior areas: Spring wire connectors, pre-insulated "twist-on" rated 105 degrees C per UL 468C. Where stranded conductors are terminated on screw type terminals, install crimp insulated fork or ring terminals.
 2. Wet or exterior: Spring wire connectors, pre-insulated "twist-on", resin filled rated for direct burial per UL 486D.

PART 3 - EXECUTION

3.1 GENERAL WIRING METHODS

- A. Use no wire smaller than 12 AWG for power circuits, and no smaller than 18 AWG for control wiring.
- B. Use 10 AWG conductor for 20 ampere, 120 volt branch circuit home runs longer than 75 feet.
- C. Splice only in junction or outlet boxes.
- D. Do not share neutral conductors. Provide a dedicated neutral conductor for each branch circuit that requires a neutral.

3.2 WIRING INSTALLATION IN RACEWAYS

- A. Pull all conductors into a raceway at the same time.
- B. Conductors shall be carefully inspected for insulation defects and protected from damage as they are installed in the raceway. Where the insulation is defective or damaged, the cable section shall be repaired or replaced at the discretion of the Owner and at no additional cost to the Owner.
- C. Route conductors from each system in independent raceway system and not intermix in the same raceway, enclosure, junction box, wireway, or gutter as another system unless otherwise shown on the plans.

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- D. No more than three current carrying conductors shall be installed in any homerun unless otherwise indicated on the drawings.
- E. Completely and thoroughly swab raceway system before installing conductors.

3.3 CABLE INSTALLATION

- A. Provide protection for exposed cables where subject to damage.
- B. Support cables above accessible ceilings; do not rest on ceiling tiles. Use spring metal clips or cable ties to support cables from structure. Do not support cables from ceiling suspension system. Include bridle rings or drive rings.
- C. Use suitable cable fittings and connectors.

3.4 WIRING CONNECTIONS AND TERMINATIONS

- A. Splice only in accessible junction boxes.
- B. Thoroughly clean wires before installing lugs and connectors.
- C. Make splices, taps and terminations to carry full ampacity of conductors without perceptible temperature rise.
- D. Terminate spare conductors with wire nuts.
- E. Do not exceed manufacturer's recommended pull tensions.

3.5 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Division 1.
- B. Inspect wire and cable for physical damage and proper connection.
- C. Perform continuity test on all power and equipment branch circuit conductors. Verify proper phasing connections.

3.6 WIRE AND CABLE INSTALLATION SCHEDULE

- A. All Locations: Building wire and/or remote control and signal cable in raceways.

END OF SECTION

SECTION 16132 – RACEWAY AND BOXES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Metal conduit.
- B. Flexible metal conduit.
- C. Liquidtight metal conduit.
- D. Electrical metallic tubing.
- E. Surface metal raceway.
- F. Fittings and conduit bodies.
- G. Wall and ceiling outlet boxes.
- H. Pull and junction boxes.

1.2 RELATED SECTIONS

- A. The Work under this section is subject to requirements of the Contract Documents including the General Conditions, Supplementary Conditions,
- B. Division 1 - General Requirements, Summary, Administrative Requirements
- C. Section 16010 – Basic Electrical Requirements
- D. Section 16120 – Wire and Cable.
- E. Section 16141 – Wiring Devices.
- F. Section 16195 – Electrical Identification.
- G. Section 16727 – Detention Monitoring and Control System.

1.3 REFERENCES

- A. American National Standards Institute (ANSI):
 - 1. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated.
 - 2. ANSI C80.3 - Electrical Metallic Tubing, Zinc Coated.
- B. American Society for Testing and Materials (ASTM):
 - 1. ASTM A 123 – Specification for Zinc Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars and Strip.
- C. National Electrical Manufacturers Association (NEMA):

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1. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
 2. NEMA OS 1 - Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports.
 3. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
- D. National Fire Protection Association (NFPA):
1. NFPA 70 - National Electrical Code.
- E. Telecommunications Industry Association (TIA) and Electronics Industries Association (EIA)
1. ANSI/TIA/EIA 568-B Commercial Building Telecommunications Cabling Standard
- F. Building Industry Consulting Service International (BICSI):
1. BICSI Telecommunication Design Methods Manual
- G. International Building Code (IBC):
1. IBC chapters 16 and 17 seismic requirements.

1.4 RACEWAY AND BOX INSTALLATION SCHEDULE

- A. Raceway Minimum Size: Provide 3/4 inch minimum. Size all raceways not shown on the drawings to not exceed the percentage fill specified in the NEC Table 1, Chapter 9 using the conduit dimensions of the NEC Table 4, Chapter 9 and conductor properties of the NEC Table 5, Chapter 9. Where specific cable is not listed, use cable diameter provided by the manufacturer.

B. Through CMU walls:

1. Raceway: Provide rigid steel conduit or intermediate metal conduit. EMT conduit may penetrate through CMU walls where the EMT is installed in a sleeve and does not come in direct contact with the CMU.

2. Boxes and Enclosures: Provide sheet-metal boxes.

C. Concealed Dry Locations:

1. Raceway: Provide rigid steel conduit, intermediate metal conduit, or electrical metallic tubing.
2. Boxes and Enclosures: Provide sheet-metal boxes.
3. Fittings: Provide galvanized malleable iron and steel.

D. Exposed Dry Locations Not Accessible to Inmates:

1. Raceway: Provide rigid steel conduit or intermediate metal conduit. EMT conduit may be used where exposed conduit is allowed, where it is not subject to physical damage, or where installed on the ceiling or a minimum of ten feet above the floor or adjacent platforms.

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2. Boxes and Enclosures: Provide sheet-metal boxes with raised steel covers.
3. Fittings: Provide galvanized malleable iron and steel.
4. Surface Raceway and Boxes. Where specifically noted on the Drawings, provide surface raceway and boxes.

E. Exposed Dry Locations in Inmate-Accessible Areas with Constant Supervision:

1. Raceway: Provide rigid steel conduit or intermediate metal conduit.
2. Boxes and Enclosures: Provide cast boxes with no pre-punched knockouts.
3. Fittings: Provide galvanized malleable iron and steel. Conduit straps shall be 2-hole type and installed at half the distance shown in NEC table 344.30(B)(2) to allow conduit to be secured to wall without any gaps between conduit and wall.
4. Fasteners: Provide center-pin torx plus screws for all exposed fasteners.
5. Surface Raceway and Boxes. Where specifically noted on the Drawings, provide surface raceway and boxes.

F. Exposed Dry Locations in Inmate-Accessible Areas without Constant Supervision:

1. Raceway: Provide rigid steel conduit or intermediate metal conduit.
2. Boxes and Enclosures: Provide cast boxes with no pre-punched knockouts.
3. Fittings: Provide galvanized malleable iron and steel. Conduit straps shall be 2-hole type and installed at half the distance shown in NEC table 344.30(B)(2) to allow conduit to be secured to wall without any gaps between conduit and wall.
4. Fasteners: Provide center-pin torx plus screws for all exposed fasteners.
5. Surface Raceway and Boxes. Where specifically noted on the Drawings, provide surface raceway and boxes.
6. Provide conduit shroud as detailed on Drawings.

1.5 DESIGN REQUIREMENTS

A. Raceway Minimum Size:

1. Line Voltage Circuits: Raceway is sized on the drawings for copper conductors with 600-Volt type XHHW insulation, unless otherwise noted. Where a raceway size is not shown on the drawings, it shall be calculated to not exceed the percentage fill specified in the NEC Table 1, Chapter 9 using the conduit dimensions of the NEC Table 4, Chapter 9 and conductor properties of the NEC Table 5, Chapter 9.
2. Intercom and other Low-Voltage Circuits: Raceway size shall be calculated to not exceed the percentage fill specified in the NEC Table 1, Chapter 9, using the conduit dimensions of the NEC Table 4, Chapter 9, and cable diameter provided by the manufacturer.

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RACEWAY AND BOXES**

- B. Box Minimum Size: Provide all boxes sized and configured per NEC Article 370 and as specified in this section.
- C. Seismic Support: Provide support in accordance with section 16190.
- D. Telecommunication Pathways Layout and Configuration: BICSI Telecommunication Design Methods Manual and ANSI/TIA/EIA 568-B Commercial Building Telecommunications Cabling Standard.

1.6 SUBMITTALS

- A. Submit product data under provisions of Division 1.
- B. Product Data: Submit data for products to be provided.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

PART 2 - PRODUCTS

2.1 RIGID METAL CONDUIT (RMC)

- A. Rigid Steel Conduit: ANSI C80.1, UL 6.
- B. Fittings and Conduit Bodies: NEMA FB 1, UL 514B; Galvanized malleable iron with threaded hubs for all conduit entries. Provide threaded connections and couplings only. Set Screw and running thread fittings are not permitted.
- C. Provide insulated throat bushings at all conduit terminations.

2.2 INTERMEDIATE METAL CONDUIT (IMC)

- A. Product Description: ANSI C80.6, UL 1242; Galvanized Steel Conduit.
- B. Fittings and Conduit Bodies: NEMA FB 1, UL 514B; use fittings and conduit bodies specified above for rigid steel conduit.

2.3 FLEXIBLE METAL CONDUIT (FMC)

- A. Product Description: UL 1, FS WW-C-566; galvanized or zinc-coated flexible steel, full-wall or reduced-wall thickness
- B. Fittings and Conduit Bodies: ANSI/NEMA FB 1; steel or malleable iron with insulated throat bushings. Die cast zinc or threaded inside throat fittings are not acceptable.

2.4 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

- A. Product Description: UL 360, flexible metal conduit with interlocked steel construction and PVC jacket.
- B. Fittings and Conduit Bodies: ANSI/NEMA FB 1; liquid tight steel or malleable iron with insulated throat bushings. Die cast fittings are not acceptable.

2.5 ELECTRICAL METALLIC TUBING (EMT)

- A. Product Description: ANSI C80.3, UL 797; galvanized steel tubing.
- B. Fittings and Conduit Bodies: ANSI/NEMA FB 1; steel or malleable iron, compression or set screw type with insulated throat bushings. Zinc die cast or indented fittings are not acceptable.
- C. Maximum size shall be 2". Provide factory elbows on sizes 1-½" and larger.

2.6 SURFACE METAL RACEWAY

- A. Dual-Channel
 - 1. Manufacturers:
 - a. Wiremold, 5000 series.
 - b. Mono Systems, SnapMark SMS4200-I series.
 - c. Hubbell, HBL4750 series.
 - d. Substitutions: Under the provisions of Division 1.
 - 2. Product Description: Dual-channel surface steel raceway with fitted snap on cover and steel accessories, suitable for use as multi-outlet assembly. Keep data and power conductors separate at all times. Provide radius fittings and components. Inserts or limiting cable fill is not acceptable. Raceway covers with knockouts for accessories or cable entries are not acceptable.
 - 3. Size: 4-3/4 inches wide x 1-3/4 inches deep. Two equal compartments.
 - 4. Receptacles: Provide accessories to accept receptacles as specified in Section 16141.
 - 5. Telecommunication Outlets: As specified in Section 16755.
 - 6. Device Spacing: As indicated on drawings.
 - 7. Channel Finish: Ivory.
 - 8. Fittings: Furnish manufacturer's standard couplings, entrance fittings, elbows, device brackets, end caps, seam covers, wire clips, device faceplates and connectors.
 - a. Divided Entrance End Fitting: Wiremold #V4010DFO, #SnapMark SMS4205-3-I, Hubbell #HBL4710DFOIV for power and telecom.
 - b. Internal Elbows: Wiremold #V4017FO, SnapMark #SMS4214FO-I, Hubbell #4717DFOIV.
 - c. External Elbows: Wiremold #V4018FO, SnapMark #SMS4218FO-I, Hubbell #4718DFOIV.
 - d. Flat Elbow: Wiremold #V4011FO, SnapMark #SMS4209FO-I, Hubbell #4711DFOIV.

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- e. Divided TEE: Wiremold #V4015DFO, SnapMark #SMS4211FO-I, Hubbell #4715DFOIV.
 - f. Blank End: Wiremold #4010B, SnapMark #SMS4204-I, Hubbell #4710BIV.
 - g. Device Back Plate: Wiremold #V4007C-1R special order without adjacent channel knock-out or #V4007C-1 where device will accommodate device width, SnapMark #SMS4231-I, Hubbell #HBL4717BXIV.
 - h. Divider: Wiremold #G4000D and #G4001D, SnapMark #SMS4201 and #SMS4207, Hubbell #HBL4750 DGY.
 - i. Wire Clip: Wiremold #G4000WC, SnapMark #SMS4206, Hubbell #HBL4750WCGY
 - j. Couplings: Wiremold G4001, SnapMark #SMS4202, Hubbell #HBL4751AC
9. Cuts: Perform all cuts with raceway base and cover shear specifically designed for installed raceway system. Wiremold #640B and #640C, SnapMark #642-B and #642-C, Hubbell #HBL640B and #HBL640C.

2.7 OUTLET BOXES

- A. Sheet Metal Outlet Boxes: ANSI/NEMA OS 1, UL514A galvanized steel, with plaster ring where applicable.
 - 1. Minimum Size: 4 inches square or octagonal, 1-1/2 inches deep, unless otherwise noted.
 - 2. Equipment Supporting Boxes: Rated for weight of equipment supported; furnish 1/2 inch male fixture studs where required. Minimum Size: 4 inches square or octagonal, 2-1/8 inches deep.
 - 3. Telecommunications Outlets: Minimum size 4 inches square, 2-1/8 inches deep.
 - 4. Cut-In Boxes: Minimum size 2" x 3" x 2-1/2" deep. Provide cut-in outlet boxes where required for installation in existing hollow walls.
- B. Cast Boxes: NEMA FB 1, Type FD, galvanized malleable iron. Furnish gasketed cover by box manufacturer. Furnish threaded hubs. "Bell" boxes are not acceptable.
- C. Wall Plates: As specified in Section 16141.

2.8 PULL AND JUNCTION BOXES

- A. Sheet Metal Pull and Junction Boxes: ANSI/NEMA OS 1, UL514A galvanized steel.
 - 1. Minimum Size: 4 inches square or octagonal, 1-1/2 inches deep, unless otherwise noted.
- B. Sheet Metal Boxes Larger Than 12 Inches in Any Dimension: Hinged enclosure.

2.9 EXPANSION FITTINGS

- A. Galvanized malleable iron, galvanized with grounding bond jumper.

2.10 BUSHINGS

- A. Non-grounding: Threaded impact resistant plastic.
- B. Grounding: Insulated galvanized malleable iron/steel with hardened screw bond to raceway and conductor lug.

2.11 LOCKNUTS

- A. Threaded Electro Zinc Plated Steel designed to cut through protective coatings for ground continuity.

2.12 WIREWAY

- A. Product Description: General purpose type wireway. Size per NEC minimum fill capacity required.
- B. Knockouts: Field-installed, no factory knockouts acceptable.
- C. Cover: Screw cover.
- D. Fittings and Accessories: Include factory couplings, offsets, elbows, adapters and support straps required for a complete system. Provide internal ground bonding jumper bonded to each section.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Ground and bond raceway and boxes in accordance with NEC Requirements.
- B. Provide seismic support and fasten raceway and box supports to structure and finishes in accordance with Section 16190.
- C. Identify raceway and boxes with origin and destination in accordance with Section 16195.
- D. Unless otherwise noted, do not inter-mix conductors from separate panelboards or any other system in the same raceway system or junction boxes.

3.2 INSTALLATION - GENERAL RACEWAY

- A. Install raceway for all systems, unless otherwise noted.
- B. Install an equipment grounding conductor inside of all raceways containing line voltage conductors.
- C. Provide raceways concealed in construction unless specifically noted otherwise, or where installed at surface cabinets, motor and equipment connections and in Mechanical and Electrical Equipment rooms. Do not route conduits on roofs, outside of exterior walls, or along the surface of interior finished walls unless specifically noted on the plans.
- D. Raceway routing and boxes are shown in approximate locations unless dimensioned. Where raceway routing is not denoted, field-coordinate to provide complete wiring system.

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- E. Do not route raceways on floor. Arrange raceway and boxes to maintain a minimum of 6 feet 6 inches of headroom and present a neat appearance. Install raceways level and square to a tolerance of 1/8" per 10 feet. Route exposed raceways and raceways above accessible ceilings parallel and perpendicular to walls, ceiling, and adjacent piping.
- F. Maintain minimum 6-inch clearance between raceway and mechanical and piping and ductwork. Maintain 12-inch clearance between raceway and heat sources such as flues, steam pipes, heating pipes, heating appliances, and other surfaces with temperatures exceeding 104 degrees F.
- G. Seal raceway penetrations of fire-rated walls, ceilings, floors in accordance with the requirements of Section 16010.
- H. Where raceway penetrates fire-rated walls and floors, provide firestopping with UL listed fire rating equal to wall or floor rating. Seal opening around conduit with UL listed firestop sealant or intumescent firestop, preserving the fire time rating of the construction. Install in accordance with manufacturer requirements.
- I. No cutting of reinforcing bars shall be permitted unless specifically approved. Should structural members prevent the installation of conduit or equipment, notify the Contracting Officer before proceeding.
- J. Arrange raceway supports to prevent misalignment during wiring installation. Support raceway using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.
- K. Do not attach raceway to ceiling support wires or other piping systems and do not fasten raceway with wire or perforated pipe straps. Remove all wire used for temporary raceway support during construction, before conductors are pulled. Raceway shall be installed to permit ready removal of equipment, piping, ductwork, or ceiling tiles.
- L. Group raceway in parallel runs where practical and use conduit rack constructed of steel channel with conduit straps or clamps, as specified in Section 16190. Provide space on each rack for 25 percent additional raceway.
- M. Cut conduit square; de-burr cut ends. Bring conduit to the shoulder of fittings and couplings and fasten securely. Where locknuts are used, install with one inside box and one outside with dished part against box
- N. Use threaded raintight conduit hubs for fastening conduit to cast boxes, and for fastening conduit to sheet metal boxes in damp or wet locations. Sealing locknuts are not acceptable.
- O. Install no more than the equivalent of three 90-degree bends between boxes.
- P. Install conduit bodies to make sharp changes in direction, such as around beams. "Goosenecks" in conduits are not acceptable.
- Q. Provide protective plastic bushings or insulated throat bushings at each raceway termination not installed to an enclosure. Bushings shall be threaded to the raceway end or connector.
- R. Avoid moisture traps; install junction box with drain fitting at low points in raceway system.
- S. Install fittings and flexible metal conduit to accommodate 3-axis movements where raceway crosses seismic joints

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- T. Install fittings designed and listed to accommodate expansion and contraction where raceway crosses control and expansion joints.
- U. Use cable sealing fittings forming a watertight non-slip connection to pass cords and cables into conduit. Size cable sealing fitting for the conductor outside diameter. Use Appleton CG series or equal cable sealing fittings.
- V. Use suitable caps to protect installed raceway against entrance of dirt and moisture.
- W. Provide nylon "jet-line" or approved equal pull string in empty raceway, except sleeves and nipples. Where an existing pull string is used to pull cables into an existing raceway, it shall be replaced with a new pull string that is pulled in with new cables.
- X. Paint all exposed conduit to match surface to which it is attached or crosses. Clean greasy or dirty conduit prior to painting in accordance with paint manufacturer's instructions. Where raceway penetrates non-rated ceilings, floors or walls, provide patching, paint and trim to retain architectural aesthetics similar to surroundings

3.3 INSTALLATION – SURFACE RACEWAY

- A. Install flat-head screws, clips, and straps to fasten raceway channel to surfaces; mount plumb and level. Install insulating bushings and inserts at connections to outlets and corner fittings. Provide divider to keep power and data pathways separate at all times. Bond each section together to provide electrically continuous system.
- B. Close ends and unused openings in wireway and surface raceway.
- C. Install Surface Raceway cover with no gaps, scratches, or deformities. Covers not acceptable to Owner shall be replaced by the Contractor.

3.4 INSTALLATION – GENERAL BOXES

- A. Provide electrical boxes as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections, and code compliance. All electrical box locations shown on Drawings are approximate unless dimensioned.
- B. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only. Where installation is inaccessible, install outlet and junction boxes no more than 6 inches from ceiling access panel or from removable recessed luminaries. Coordinate locations and sizes of required access doors.
- C. Coordinate layout and installation of boxes to provide adequate headroom and working clearance. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.
- D. Align wall-mounted outlet boxes for switches, thermostats, and similar devices.
- E. Use multiple-gang boxes where more than one device are mounted together; do not use sectional boxes. Provide barriers to separate wiring of different voltage systems and where normal and emergency power circuits occur in the same box.
- F. Adjust box location up to 6 feet prior to rough-in to accommodate intended purpose.
- G. Orient boxes to accommodate wiring devices oriented as specified in Section 16141.

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- H. Locate and install boxes to maintain headroom and to present a neat appearance.
- I. Provide knockout closures for unused openings.
- J. Install boxes in walls without damaging wall insulation or reducing its effectiveness.
- K. Install with minimum 24 inches separation in fire rated walls. Limit penetrations in fire rated walls to 16 square inches each and a maximum total combined penetration area of 100 square inches in any given 100 square feet of wall. Where penetrations are in excess of these requirements provided UL listed fire stop wrap acceptable to Authority having Jurisdiction.
- L. Do not fasten boxes to ceiling support wires or other piping systems.
- M. Support boxes independently of conduit.
- N. Clean interior of boxes to remove dust, debris, and other material and clean exposed surfaces and restore finish
- O. Provide blank covers or plates for all boxes that do not contain devices.

END OF SECTION

SECTION 16141 - WIRING DEVICES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Receptacles.
- B. Device plates and box covers.

1.2 REFERENCES

- A. FS W-C-596 - Electrical Power Connector, Plug, Receptacle, and Cable Outlet.
- B. NEMA WD 1 - General-Purpose Wiring Devices.

1.3 SUBMITTALS

- A. Submit product data under provisions of Division 1.
- B. Provide product data showing configurations, finishes, dimensions, and manufacturer's instructions.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS - RECEPTACLES

- A. Hubbell.
- B. Leviton.
- C. Pass & Seymour.
- D. Substitutions: Under provisions of Division 1.

2.2 RECEPTACLES

- A. Convenience and Straight-blade Receptacles: NEMA WD 1, Federal Specification FS W-C-596, and UL 498.
- B. Convenience Receptacle Configuration: NEMA WD 1 and WD 6; Type 5-20R, ivory nylon face.

2.3 ACCEPTABLE MANUFACTURERS - DEVICE PLATES

- A. Hubbell.
- B. Leviton.
- C. Pass & Seymour.
- D. Mullberry.
- E. Substitutions: Under provisions of Division 1.

2.4 WALL PLATES

- A. Decorative Cover Plate: Smooth 430 or 302 stainless steel with metal, counter sunk screws to match device plate.
- B. Exposed Work Cover Plate: ½ inch raised, square, pressed, galvanized or cadmium plated steel cover plate supporting devices independent of the outlet box.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install convenience receptacles 18 inches above floor, 4 inches above counters or backsplash, grounding pole on bottom.
- B. Install decorative plates on receptacles in finished areas.
- C. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface-mounted outlets.
- D. Install devices and wall plates flush and level.
- E. Ground receptacles to boxes with a grounding wire. Grounding through the yoke or screw contact is not an acceptable alternate to the ground wire.

END OF SECTION

SECTION 16149 – DETENTION RELAY LOGIC SYSTEM

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Relays.
- B. Power supplies.
- C. Control equipment and enclosures.

1.2 RELATED SECTIONS

- A. Section 16120 - Wire and Cable: Low voltage cable.
- B. Section 16195 – Electrical Identification.
- C. Section 16727 – Detention Monitoring and Control System.
- D. Section 16903 – Detention PLC Control System.

1.3 REFERENCES

- A. ANSI/NFPA 70 - National Electrical Code.
- B. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
- C. ANSI/NEMA ICS 1 - Industrial Control and Systems.
- D. ANSI/NEMA ICS 4 - Terminal Blocks for Industrial Control Equipment and Systems.
- E. ANSI/NEMA ICS 6 - Enclosures for Industrial Control Equipment and Systems

1.4 REGULATORY REQUIREMENTS

- A. All systems shall comply with applicable federal, state, and local building codes. All equipment shall be Underwriters Laboratories approved if applicable. All assemblies of approved electrical components that are subject to the adopted National Electrical Code shall be third-party certified by an approved installer, in accordance with the State of Alaska Mechanical Inspection Policy Letter (MIPL 94). This includes each assembly of relays, line and low-voltage conductors, power supplies, and other equipment in each security cabinet. The UL label shall be visible either on the outside or inside of the cabinet without removing any devices or equipment from the cabinet.

1.5 SYSTEM DESCRIPTION

- A. Provide all relay logic and interconnecting wiring for a complete and operable interface with the security control system specified in the Contract Documents. Provide all labor, equipment, materials and supervision to install, calibrate, adjust, document and test the total system as required herein and as specified in section 16727.
- B. Performance Requirements

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1. On/Off Control Functions: On/Off control of individual relays, or groups of relays, from single or multiple locations.
2. System shall provide dry momentary, maintained contact or interface with the PLC and touchscreen computers.
3. Controls:
 - a. Operating Temperature – 0 to 40° C.
 - b. Transient Immunity – 6KV spikes.

1.6 QUALIFICATIONS

- A. The entire low voltage switching system shall be supplied, assembled, installed, and commissioned by the Security Systems Integrator as specified in Section 16727.

1.7 SUBMITTALS

- A. Submit product data under provisions of Division 1 and Division 16.
- B. Submit product data showing dimensions and ratings for power supplies, relays, and switches.
- C. Show all equipment and interconnecting wiring on the security system shop drawings as specified in Section 16727.

1.8 PROJECT RECORD DOCUMENTS

- A. Submit project record documents under provisions of Division 1 and Division 16.
- B. Accurately record location of relays, power supplies, cabinets, etc. as part of the security system project record documents as specified in Section 16727. Include description of switching and circuiting arrangements for all relays.

1.9 OPERATION AND MAINTENANCE DATA

- A. Submit operation and maintenance data under provisions of Division 1 and Division 16.

1.10 EXTRA MATERIALS

- A. No additional spare parts. Install extra relays for future expansion as specified.

1.11 WARRANTY

- A. Warrant all materials and equipment to be new and free from defects in material and workmanship for a period of one year under provisions of Division 1.

PART 2 - PRODUCTS

2.1 PRODUCT SPECIFICATIONS

- A. Throughout this specification, specific manufacturers and manufacturer's catalog numbers are cited. Unless otherwise noted, these citations are for the purpose of establishing quality and performance criteria and are not intended to be proprietary.

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- B. Where no manufacturer is specified, provide products of manufacturers in compliance with requirements. Any item of equipment or material not specifically addressed on the drawings or in this document and required to provide a complete installation shall be provided in a level of quality consistent with other specified items.
- C. The Contractor shall provide the latest product model and software version available from each manufacturer at the time of installation. No "beta version" or "test software" products will be accepted. All proposed and provided equipment and products shall be from the specified and approved manufacturers only, unless previously approved by the Engineer or Owner.
- D. All products and materials are to be new and free of defects, damage and corrosion. All materials shall be in compliance to all applicable codes and designed specifically for the function intended.
- E. Quantity and location of all devices and equipment shall be as specified in Contract Documents or as required for a complete and operable system.

2.2 ACCEPTABLE MANUFACTURERS – RELAY SWITCHING SYSTEM

- A. Phoenix Contact.
- B. General Electric.
- C. IDEC.
- D. Panduit.
- E. Sola.
- F. Substitutions: Under provisions of Division 1.

2.3 RELAY SWITCHING SYSTEM COMPONENTS

- A. Relay Power Supply: Sola "SDP Series" or approved equal UL 508 listed, 24-volt DC power supply with DIN rail mount. Size power supplies to control all existing connected security system devices, including door locks, intercoms, vehicle gates CCTV cameras, etc. plus 10 percent capacity to allow future system load growth. Size power supplies to account for inrush current on solenoid locks where applicable. Provide separate power supplies for the following groups of devices:
 - 1. PLC components.
 - 2. Low-current switching relays.
 - 3. High-current switching relays.
- B. Low-Current Switching Relays: Plug-in, SPDT miniature relay with integral terminal block, damping diode, screw-type terminal connections, and operation indicator light. Relay contacts shall be rated at 6 amperes continuous current and 30 amperes inrush current at 24 volts DC. Phoenix Contact #PLC-RSC-24DC/21 or approved equal. Provide DIN mounting rails as necessary. Use for 24V door locks/strikes, cell lights, etc.
- C. High-Current Switching Relays: Plug-in, SPDT miniature relay with integral terminal block, damping diode, screw-type terminal connections, and operation indicator light. Relay contacts shall be rated at 10 amperes continuous current and 16 amperes inrush current at 120 volts AC.

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Construction Documents

KETCHIKAN CORRECTIONAL CENTER
DOOR LOCK AND SECURITY CONTROLS REPLACEMENT
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Phoenix Contact #PLC-RSC-24DC/21HC or approved equal. Provide DIN mounting rails as necessary. Use for 120V door locks, dayroom lights, rec yard lights, etc.

- D. Low Voltage Intercom Switching Relays: Plug-in, DPDT miniature relay with integral terminal block, damping diode, screw-type terminal connections, and operation indicator light. Relay contacts shall be rated at 6 amperes continuous current and 8 amperes inrush current at 24 volts DC. Phoenix Contact #PLC-RSC-24DC/21-21 or approved equal. Provide DIN mounting rails, sockets, hold-down clips, terminal blocks, and fuse holders as necessary.

- E. Power Circuit Breaker: Miniature circuit breaker for protecting 120VAC inputs for incoming circuits to the relay backplane, power supplies, transformers, solenoid door locks, and also for 24VDC output of power supplies rated over 100VA. Phoenix Contact #TCP-xxA or approved equal, where "xx" is the current rating of the breaker. Current ratings of all breakers shall be determined by the Contractor.

- F. Terminal Blocks: ANSI/NEMA ICS 4; UL listed terminal blocks with tubular pressure screw connectors, rated 300 volts. Provide DIN mounting rails and hold-down clips as necessary.

1. Door Lock Circuits: Phoenix Contact #UKK 5-TG or approved equal 2-level terminal block.
2. Intercom Circuits: Phoenix Contact #UK-5-N or approved equal.
3. Power Circuit Breakers: Mount power circuit breakers on Phoenix Contact #UK-6-FS/C or approved equal flat-type fuse terminal block.

- G. Fuse Holder For Door Locks: Fuse plug with LED light indicator for cartridge fuse inserts, designed to plug into top of Door Lock Terminal Blocks as specified above. Individually fuse all door locks. Phoenix Contact #ST-SILA250-UK-4 or approved equal.

- H. Wiring Duct: Rigid PVC slotted wall wiring duct with non-slip cover, rounded edges on all slots, and breakaway fingers. Panduit "Panduit Type G" or approved equal.

2.4 ACCEPTABLE MANUFACTURERS – SECURITY SYSTEM CABINETS AND ACCESSORIES

- A. Hoffman.
- B. B-Line.
- C. Black Box
- D. Chatsworth.
- E. American Power Systems (APC)
- F. Substitutions: Under provisions of Division 1.

2.5 SECURITY SYSTEM CABINETS AND ACCESSORIES

- A. Wall-Mounted PLC/Relay Cabinet:
1. NEMA 4 single-door gasketed steel enclosure with locking hasp, sized as required for the installed equipment, and able to fit in the intended space within each relay or equipment room. Hoffman or approved equal.

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2. Provide positive pressure ventilation using fans and filters as required to maintain all equipment within normal operating temperature ranges. If fans are installed, they shall be listed for use in the cabinet.
 3. Include appropriate barrier strips for mounting relays and separating energy-limited wiring from line voltage wiring.
 4. Future Expansion: Provide 10 percent additional lighting, intercom, and door control relays on the relay backplane for future expansion of security system. Relays shall be mounted on the DIN rail with their respective group and labeled as "Future". Provide space for one additional power supply in the cabinet.
- B. Floor-Mounted Intercom/Security Cabinet:**
1. New equipment shall be installed in the existing cabinet in Telephone 115.
 2. Provide additional mounting brackets, rack rails, shelves, or other accessories as required to mount the new intercom and security equipment.
 3. UPS Unit: As specified in Section 16727.
 4. KVM System (Security Equipment Room): Provide 1RMU, slide-out, dual-rail KVM system with 17" LCD, keyboard, and touchpad. Chatsworth #37201-111 or approved equal. KVM shall be used to interface with the intercom and security systems from the cabinet.
- C. Existing Relay Cabinets:** At the Contractor's option, existing wall-mounted relay cabinets in the Boiler Room may be used for new relays to support the Main Control Room, provided the existing cabinets have sufficient size and depth. If existing cabinets are used, provide new backplane with new components as specified. All cabinets (existing or new) shall be assembled in accordance with all applicable State and UL listing requirements as specified elsewhere in this Section.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Field verify final location of relay cabinet to allow door to be opened to 90°.
- B. Ensure that conduit sizes wire quantity, size and type are suitable for installed system. Review proper installation of each type of device per UL requirements.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install relay cabinet level and plumb.
- C. Install low-voltage wiring as specified in Section 16120.
- D. Label all wires and cables under provisions of Section 16195.
- E. Install relays to be accessible. Allow space for adequate ventilation and circulation of air.

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- F. Neatly train all wires, cables, and cable bundles within cabinet, including all wires and cables in center section between relay backplanes. Provide a service loop of slack wire and cable to remove and/or swing out relay backplane for maintenance and troubleshooting.
- G. Dress, lace or harness all wire and cable to prevent mechanical stress on electrical connections. No wire or cable shall be supported by a connection point.
- H. Security Device Identification: All doors, locks, intercoms, cameras, lights, etc. shall be identified on the shop drawings using the existing naming/numbering scheme already in use at the facility. Do not re-number or re-name any devices without prior approval from the Owner
- I. Terminate all non-coaxial connections (except microphone or line level) to screw-type terminal blocks, with a maximum of two wires per screw. Wire nuts, electrical tape, or "free" (i.e. stake-on) splices shall not be used for any connections.
- J. Extend all lighting, door control, and other circuits from the existing terminal cabinets to the new relay cabinets.
- K. Existing Door Lock Circuits: Re-use existing 120V door lock circuits for new system. Do not consolidate circuits, which can cause problems with circuit overload during group unlock functions.
- L. Provide protective pocket inside front cover of relay cabinet for 11"x17" full copy of approved security system project record drawings and flowsheets.

3.3 DEMONSTRATION

- A. Provide systems demonstration under the provisions of Division 1 and Division 16.
- B. Demonstrate proper operation of entire security system.

END OF SECTION

SECTION 16190 - SUPPORTING DEVICES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Conduit and equipment supports.
- B. Fastening hardware.

1.2 REFERENCES

- A. International Building Code (IBC), Chapter 16 – Structural Design.

1.3 SUBMITTALS

- A. Submit shop drawings under the provisions of Division 1.
- B. Provide structurally engineered shop drawings for seismic restraint of all electrical equipment required by the International Building Code (IBC), Chapters 16, 17, and the Authority Having Jurisdiction. Structural design shall be based on the Seismic Use Category and Seismic Design Category as designated in these chapters.
- C. Shop drawings shall be stamped by a professional engineer registered in the State of Alaska.

1.4 QUALITY ASSURANCE

- A. Support systems shall be adequate for weight of equipment and conduit, including wiring, which they carry.

PART 2 - PRODUCTS

2.1 CONDUIT SUPPORTS

- A. Hanger Rods: Threaded high tensile strength galvanized carbon steel with free running threads.
- B. Beam Clamps: Malleable Iron, with tapered hole in base and back to accept either bolt or hanger rod. Set screw: hardened steel.
- C. Conduit clamps for trapeze hangers: Galvanized steel, notched to fit trapeze with single bolt to tighten.
- D. Conduit clamps - general purpose: As specified in Section 16132.

2.2 FORMED STEEL CHANNEL

- A. U-Channel Strut: 12-gauge steel.
- B. Dry Interior Areas: Zinc or Cadmium-plated.

2.3 SPRING STEEL CLIPS

- A. "Caddy" spring steel electrical support systems, suitable and listed for use for intended application.
- B. Provide only where concealed in walls or above ceilings.

2.4 SEISMIC SUPPORT WIRE AND CABLE

- A. #12 gauge ceiling support wire where concealed. Aircraft stainless steel cable where exposed.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Fasten hanger rods, conduit clamps, and outlet and junction boxes to building structure using precast insert system, expansion anchors, preset inserts, beam clamps, or spring steel clips. Conduit support plates shall not be used to support conduits entering junction or outlet boxes.
- B. Use toggle bolts or hollow wall fasteners in hollow masonry partitions and walls; expansion anchors or preset inserts in solid masonry walls; self-drilling anchors or expansion anchor on concrete surfaces; sheet metal screws in sheet metal studs; and wood screws in wood construction.
- C. Do not support raceways, low voltage pathways, cables, telecommunication pathways or boxes from ceiling suspension wires or suspended ceiling systems. Provide support from building structure independently to allow ceiling removal and replacement without removal of electrical system. If dedicated support wires are used, wires and wire clips must be painted or color-coded.
- D. Do not fasten supports to piping, ductwork, mechanical equipment, conduit, or ceiling suspension system.
- E. Power-driven fasteners are prohibited for tension load applications (such as supporting luminaries or conduit racks from ceiling above). Use drilled-in expansion anchors, or drilled and screw-in anchors such as Kwik-Con II or Tapcon.
- F. Do not penetrate by drilling or screwing into metal roof decking. All penetrations into metal roof decking must be approved by the Project Manager in writing.
- G. Fabricate supports from structural steel or steel channel, rigidly welded or bolted to present a neat appearance. Use hexagon head bolts with spring lock washers under all nuts.
- H. Install surface-mounted cabinets and panelboards with minimum of four anchors.
- I. Securely fasten fixtures and equipment to building structure in accordance with manufacturer's recommendations and to provide necessary earthquake anchorage.
- J. Provide wall attached fixtures and equipment weighing less than 50 pounds with backing plates of at least 1/8" x 10" sheet steel or 2" x 10" fire retardant treated wood securely built into the structural walls. Submit attachment details of heavier equipment for approval.
- K. Earthquake Anchorages:

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SUPPORTING DEVICES

1. Equipment weighing more than 50 pounds shall be adequately anchored to the building structure to resist lateral earthquake forces.
 2. Total lateral (earthquake) forces shall be 1.5 times the equipment weight acting laterally in any direction through the equipment center of gravity. Provide adequate backing at structural attachment points to accept the forces involved.
- L. Replace or repair any fireproofing damaged by the installation of supporting equipment or devices.

END OF SECTION

SECTION 16195 - ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Nameplates and tape labels.
- B. Wire and cable markers.
- C. Low-voltage one-line diagrams and system maps.

1.2 RELATED WORK

- A. Section 16120 – Wire and Cable.
- B. Section 16132 – Raceway and Boxes.
- C. Section 16141 – Wiring Devices.
- D. Section 16149 – Detention Relay Logic System.

1.3 SUBMITTALS

- A. None required.

1.4 ENVIRONMENTAL REQUIREMENTS

- A. Install labels and nameplates only when ambient temperature and humidity conditions for adhesive are within range recommended by manufacturer.

PART 2 - PRODUCTS

2.1 NAMEPLATES

- A. Product Description: Laminated three-layer plastic with engraved white letters on black background.
- B. Letter Size:
 - 1. 1/4-inch high letters for identifying individual panel or equipment.
 - 2. 1/8-inch high letters for remaining lines with 1/8 inch spacing between lines.
- C. Minimum nameplate size: 1/8 inch thick with a consistent length and height for each type of nameplate wherever installed on the project.

2.2 TAPE LABELS

- A. Product Description: Adhesive tape labels, with 3/16 inch Bold Black letters on clear background.
- B. Embossed adhesive tape will not be permitted for any application.

2.3 WIRE MARKERS

- A. Power and Lighting Description: Cloth tape type wire markers for all neutrals and Phase conductors.
- B. Low Voltage System Description: Self-adhesive machine printed label with unique wire number that is shown on shop drawing for system.
- C. Telecommunications Cable Markers: Self-laminating vinyl with translucent band and minimum 1"W x .5"H printable area with matte white finish.

2.4 LOW-VOLTAGE SYSTEMS ONE-LINE DIAGRAMS AND MAPS

- A. Provide one-line diagrams and system maps for low-voltage and special systems, such as security, intercom, etc. Requirements are specified in individual specification sections for each system.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION

- A. Degrease and clean surfaces to receive nameplates and tape labels.
- B. Install nameplates and tape labels parallel to equipment lines.

3.2 NAMEPLATE INSTALLATION

- A. Secure nameplates to equipment fronts using machine screws tapped and threaded into panelboard, using adhesives, or using rivets. Machine screws to not protrude more than 1/16 inch on back side.
- B. Control or Low Voltage System Panels:
 - 1. Provide nameplate for each control panel with the following information:
 - a. Line 1: Unique panel name as shown on the shop drawings.
 - b. Line 2: System description such as Intercom, Door Control, etc.
 - c. Line 3: Panelboard and circuit number from which the panel is fed if applicable.

3.3 LABEL INSTALLATION

- A. Low-Voltage System Device Labels: Provide label on each device, denoting device ID or address where applicable. Affix label to device faceplate for ceiling-mounted devices or wall-mounted devices above 8'-0" AFF. Affix label inside backbox for exterior devices.

3.4 WIRE IDENTIFICATION

- A. Provide wire markers on each conductor in panelboard gutters, pull boxes, outlet and junction boxes, and at load connection. Identification shall be as follows:
1. Markers shall be located within one inch of each cable end, except at panelboards, where markers for branch circuit conductors shall be visible without removing panel deadfront.
 2. Each wire and cable shall carry the same labeled designation over its entire run, regardless of intermediate terminations.
 3. Color code phases, neutral, and ground per NEC requirements and Section 16120.
 4. Color-code all low-voltage system wires and cables in accordance with the individual sections in which they are specified.
 5. For power circuits, identify with branch circuit or feeder number.
 6. Control Circuits: Control wire number as indicated on schematic and shop drawings.
 7. Provide cable markers on each cable, indicating device designation (e.g. "Camera AN-3") for all security, intercom, door control and CCTV systems. Cables shall be labeled at each end, as well as at any intermediate junction boxes or pullboxes.
- B. Provide wire markers on each conductor on all new and existing terminal backboards and security cabinets. Identify with door number for locks and intercoms, room name for lights, camera number for CCTV cameras, or other unique identifier for other equipment as required. All identification tags on all wire markers shall match what is shown on the security system shop drawings.
- C. Security Device Identification: All doors, locks, intercoms, cameras, lights, etc. shall be identified on the shop drawings using the existing naming/numbering scheme already in use at the facility. Do not re-number or re-name any devices without prior approval from the Owner.
- D. Where a wire color code is used (i.e. white/brown) for multi-conductor control cables, individual wire markers shall not be required but the wire color-code and cable ID shall be shown on the security system shop drawings.
- E. Provide pull string markers at each end of all pull strings. Marker shall identify the location of the opposite end of the pull string.
- F. At the end of the project, all conductors entering or leaving the main terminal cabinets in the Control Rooms or Relay Rooms shall be identified as specified above. Where existing wires are not identified, the Contractor shall trace the circuits as necessary to determine where the wire is terminated at the opposite end. If a wire cannot be identified using these means, the Contractor shall notify the Project Manager for possible assistance from the facility maintenance personnel.

3.5 JUNCTION BOX IDENTIFICATION

- A. Label each power junction box with the panelboard name and circuit number.
- B. Label all junction boxes for intercom, security, and CCTV systems with the type of system cables contained in the box.
- C. For junction boxes above ceilings, mark the box cover with the circuit or system designation using permanent black marker. For junction boxes in finished areas, mark the inside of the cover with the circuit or system designation using permanent black marker.

3.6 DEVICE PLATE IDENTIFICATION

- A. Label each receptacle device plate or point of connection denoting the panelboard name and circuit number.
- B. Install adhesive label on the top of each plate.

3.7 LOW-VOLTAGE SYSTEM IDENTIFICATION

- A. Install all labeling in accordance with the requirements of this section and of each section where the individual systems are specified.

END OF SECTION

SECTION 16470 - PANELBOARDS

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Lighting and appliance branch circuit panelboards.

1.2 REFERENCES

- A. NEMA AB 1 - Molded Case Circuit Breakers.
- B. NEMA PB 1 - Panelboards.
- C. NEMA PB 1.1 - Instructions for Safe Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less.
- D. NEMA PB 1.2 - Application Guide for Ground-fault Protective Devices for Equipment.

1.3 SUBMITTALS

- A. Submit shop drawings for equipment and component devices under provisions of Division 1.
- B. Include outline and support point dimensions, voltage, main bus ampacity, integrated short circuit ampere rating, circuit breaker arrangement and sizes.

1.4 OPERATION AND MAINTENANCE DATA

- A. Submit under provisions of Division 1.

1.5 SPARE PARTS

- A. Keys: Furnish 2 each to Owner.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS - PANELBOARDS

- A. Square D.
- B. Cutler Hammer.
- C. General Electric.
- D. Siemens.
- E. Substitutions: Under provisions of Division 1.

2.2 BRANCH CIRCUIT PANELBOARDS

- A. Lighting and Appliance Branch Circuit Panelboards: NEMA PB1; circuit breaker type.
- B. Enclosure: NEMA PB 1; Type 1 or 3R. As indicated on Drawings.

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PANELBOARDS**

- C. Cabinet Size: 6 inches deep; 20 inches wide minimum.
- D. Provide flush or surface cabinet front as indicated on the Drawings with concealed trim clamps, concealed hinge and flush lock all keyed alike. Finish in manufacturer's standard gray enamel.
- E. Provide panelboards with copper bus, ratings as scheduled on Drawings. Provide copper ground bus in all panelboards.
- F. Minimum Integrated Short Circuit Rating: 10,000 amperes RMS symmetrical for 240 volt panelboards; 14,000 amperes RMS symmetrical for 480 volt panelboards. Provide higher ratings as shown on Drawings.
- G. Molded Case Circuit Breakers: NEMA AB 1; bolt-on type thermal magnetic trip circuit breakers, with common trip handle for all poles. Provide circuit breakers UL listed as Type SWD for lighting circuits. Provide UL Class A ground fault interrupter circuit breakers where scheduled on Drawings.

2.3 PANELBOARD IDENTIFICATION

- A. For each panelboard, provide typed schedule denoting each circuit load by the load type and final name and room number actually in use in the facility. Schedule shall not be typed with names shown on the Contract Drawings unless names are acceptable to the Owner.
- B. Provide panel schedule in O&M manual for every new panelboard.
- C. All panelboards shall have signage for arc hazard installed. The marking shall be located to be clearly visible to qualified personnel before examination, adjustment, servicing or maintenance of the equipment. At a minimum the signage shall state the following:

Warning

Arc Flash and Shock Hazard
Appropriate PPE Required

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install panelboards plumb and flush with wall finishes, in conformance with NEMA PB 1.1.
- B. Height: 6 feet, 6 inches to top of panelboard.
- C. Provide filler plates for unused spaces in panelboards.
- D. Panel Schedules: Revise schedules to reflect circuiting changes required to balance phase loads.

3.2 FIELD QUALITY CONTROL

- A. Measure steady state load currents at each panelboard feeder. Should the difference at any panelboard between phases exceed 20 percent, rearrange circuits in the panelboard to balance the phase loads within 20 percent. Take care to maintain proper phasing for multi-wire branch circuits.

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PANELBOARDS**

- B. Visual and Mechanical Inspection: Inspect for physical damage, proper alignment, anchorage, and grounding. Check proper installation and tightness of connections for circuit breakers.

END OF SECTION

SECTION 16727 – DETENTION MONITORING AND CONTROL SYSTEM

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Touchscreen Security Control System.

1.2 RELATED SECTIONS

- A. Section 16010 - Basic Electrical Requirements.
- B. Section 16120- Wire and Cable.
- C. Section 16132 – Raceway and Boxes.
- D. Section 16149 – Detention Relay Logic System.
- E. Section 16195 – Electrical Identification.
- F. Section 16751 – Detention Intercom System.
- G. Section 16903 – Detention PLC Control System.

1.3 SYSTEM DESCRIPTION

- A. Provide a complete and operating touchscreen control system consisting of touchscreen computers, a programmable logic controller, and relay interface.
- B. The system shall integrate the lighting control, door control, intercom, and IP Video systems. System configuration shall be such that failure of a single component shall not render the system inoperative. Provide all labor, equipment, materials and supervision to install, calibrate, adjust, document and test the total system as required herein and as indicated on the drawings.
- C. Provide associated circuitry to operate and/or monitor all existing intercoms, lights, receptacles, electrically-connected gates, door locks, and door position switches that are currently controlled/monitored by the existing control panels in the Main Control Room and the A-Dorm Control Room. Provide associate circuitry to operate and/or monitor the new intercom stations installed as part of this project. The Contractor shall field verify the power and control requirements of all devices and provide all materials and labor required to accomplish intended function.

1.4 REGULATORY REQUIREMENTS

- A. All systems shall comply with applicable federal, state, and local building codes. Conduit and wire installation shall comply with all of the provisions of Division 16. All equipment and assemblies shall be Underwriters Laboratories approved if applicable.

1.5 QUALIFICATIONS

- A. The Security Systems Integrator shall submit qualifications in accordance with Division 1. Qualifications shall include the following:

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1. The entire security system shall be assembled, programmed, and installed by a single Security Systems Integrator. The Security Systems Integrator shall have a minimum of five years documented experience assembling, programming, and installing these types of touchscreen security systems in correctional facilities. Documentation of previous experience shall include at least five (5) similar projects where a touchscreen security system of this type and complexity has been retrofitted into an existing correctional facility.
2. Where the system installer is a branch office or other division of a larger organization, the qualifications of the branch office or other division shall meet the requirements of the Contract Documents.
3. Maintenance Service and Software Support: The Security Systems Integrator shall be able to provide initial contact on warranty service and/or service contract requests from their principal location within four (4) hours of notification. During the warranty period, the Contractor may choose to attempt troubleshooting and/or repair of the system by telephone, either with the facility maintenance staff or by using the touchscreen remote access software. If the problem cannot be resolved within 24 hours, the Security Systems Integrator shall travel to the facility on the next available flight to repair the system.

1.6 SUBMITTALS

- A. Submit under provisions of Division 1 and Division 16.
- B. Product Data: Provide data for each component specified showing electrical characteristics and connection requirements.
- C. Electronic AutoCad® drawings of the building floor plans are available upon request for preparation of the shop drawings. All device locations shall be field verified by the Contractor prior to completion of the shop drawings.
- D. Provide contract-size shop drawings that include the following information:
 1. One-line diagram for each system (i.e. door control, intercom, IP VIDEO, etc.) that shows the signal relationships of all devices within the system.
 2. Indicate electrical characteristics and connection requirements, including line voltage and low voltage wiring, and logic diagrams or block diagrams where required.
 3. Show scaled, pictorial layout drawings of relay and PLC cabinets, including wire/cable designations as shown on the one-line diagrams or elsewhere in the shop drawings. The cabinet layout drawings shall include completed assemblies, interconnecting cabling, dimensions, weight, and external power requirements. Layout drawings shall be done in a scale allows the smallest text on the drawing to be legible when the drawing is reduced to 11" x 17".
 4. Show an overall riser diagram of the facility security system, including all terminal cabinets, major pull and junction boxes or gutters, and all touchscreen workstations. The riser diagram shall include conduit sizing and routing with the number and size of conductors in each conduit. Locations of all terminal cabinets, relay cabinets, major pullboxes, and workstations shall be identified on the Drawings. Include conductor labels to be used by the installer during construction.

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5. For each custom assembly, such as a relay panel, provide an assembly drawing illustrating the appearance of the assembled device including dimensions, assembly components and functional attributes (i.e. relay type, wire color-code, etc.).
6. Security Device Identification: All doors, locks, cameras, lights, etc. shall be identified on the shop drawings using the existing naming/numbering scheme already in use at the facility. Do not re-number or re-name any devices without prior approval from the Owner.

E. Touchscreen Control System Submittal

1. System Graphic Maps: Graphic maps of the facility shall be programmed into the system. The graphic maps shall have the following characteristics:
 - a. Map Layout: All background floor plans shall be imported from the scaled AutoCAD plans used to develop the shop drawings. All room names shall match the actual names being used in the facility. For the initial submittal, use the room names shown on the Contract Drawings. The screen colors for walls, background, and other elements shall be initially based on recommendations from the Contractor, but all colors are subject to change pending Owner approval.
 - b. Map Size: Maps shall be partitioned into separate screens either by section or security zones to maintain a minimum scale of 1/16"=1'-0". Additional screens may be necessary where there are multiple field devices concentrated in one area of the building. Icons shall not be crowded or overlapped on the screen and shall appear on the map at approximately the same location where they are physically installed. All graphic maps shall be viewable on the screen without requiring the use of scroll bars.
 - c. Final layout of all graphic screens shall be approved by the Owner during the submittal review process. The Contractor shall make any necessary changes to the screens at no additional cost to the Owner.
2. Initial Touchscreen Submittal: Provide the following items.
 - a. Provide 8.5" x 11" color printouts of each touchscreen graphic map, including all facility maps, control screens, popup windows, alarm popups, login screens, etc.
 - b. Graphic maps shall clearly show samples of all colors and positions of items such as intercoms or doors that change color and/or position on the screen when activated.
 - c. Submit a list of suggested system enhancements and suggested modifications to the specified system. After reviewing the list with the Owner's Representative, the Engineer will provide the Contractor with a written response to all suggestions. Any suggestions that are accepted by the Owner shall be incorporated into the touchscreen system (as a change order) prior to the Final Submittal.
3. Final Touchscreen Submittal: After making all required changes specified in the Initial Touchscreen Submittal, the Contractor shall resubmit color printouts of any screen maps that were modified. After the Engineer and Owner have completed the review, the Engineer will provide the Contractor with a list of modifications and/or adjustments deemed appropriate for the proper operation of the system. The Contractor shall make all modifications at no additional cost to the Owner.

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4. Substantial Completion: At the time of the substantial completion inspection, the Contractor shall have the system fully operational, with all previous modifications incorporated into the system and all points and events identified as specified. At that time, the Engineer and on-site Owner's Representatives will review the system operation and provide the Contractor with a list of modifications and/or adjustments deemed appropriate for the proper operation of the system. The Contractor shall make all modifications at no additional cost to the Owner.
5. After all programming changes noted during substantial completion have been made, the Contractor shall commence with Owner training. During the training period, the facility staff may request changes to the layout of the graphic screens or to any identification labels used on the maps. The Contractor shall review these changes with the designated Owner's Representative for concurrence and the resulting list shall be incorporated into the touchscreen system at no additional cost to the Owner. Any suggested changes that the Contractor feels will reduce the level of facility security or negatively affect system operation shall be brought to the attention of the Engineer and the Facility Superintendent prior to being programmed.
6. Final Completion: At the time of final completion, the Contractor shall have incorporated all previous modifications noted during the Engineer's previous reviews and during Owner training. The Engineer shall review the demonstration with the Owner's Representative and provide the Contractor with a list of modifications and/or adjustments deemed appropriate for the proper operation of the system. The Contractor shall make all modifications at no additional cost to the Owner.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site, store and protect under provisions of Division 1.
- B. Store products in clean, dry area; maintain temperature to NEMA ICS 1.
- C. Maintain area free of dirt and dust during and after installation of products. Protect other surfaces against damage and discoloration caused by work of this section.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Maintain area free of dirt and dust during and after installation of products. Protect other surfaces against damage and discoloration caused by work of this section.

1.9 SYSTEM DEMONSTRATION AND ACCEPTANCE

- A. Provide systems demonstration under provisions of Division 1 and Division 16.
- B. At the time of the Substantial Completion Inspection, the Contractor and Security System Integrator shall be on-site to demonstrate the operation of the security system to the Owner's Representatives and Engineer. All security system components shall be installed and fully operational at the time of the system demonstration.
- C. The Engineer shall review the demonstration with the Owner's Representatives and provide the Contractor with a list of modifications and/or adjustments deemed appropriate for the proper operation of the system. The Contractor shall make all modifications at no additional cost to the Owner.

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- D. After all changes have been made to the system, the contractor shall provide the Owner's authorized personnel with operation and maintenance training for the Detention Monitoring and Control system, as specified in this Section.
- E. System demonstration shall be conducted as directed by the Engineer but generally described as follows:
1. Test each door lock to verify correct operation, status and notification.
 2. Test the door interlock and interlock override functions (where applicable) of designated doors that are grouped together.
 3. Test each intercom station by initiating a call from either end and verifying proper operation on the master stations, as well as automatic camera call-up with selected doors.
 4. Test all lighting control functions.
 5. Test camera selection and automatic camera call-up on spot monitors.
 6. Test all other functions as specified herein and as required for a complete and operable system.

1.10 CLOSEOUT SUBMITTALS

A. Project Record Drawings

1. Submit documents under provisions of Division 1 and Division 16.
2. Accurately indicate actual location of all security devices, including door position switches, relays, electric door locks, cameras, intercoms, etc.
3. Show the location and routing of all conduit and cable, including locations of major pull and junction boxes.
4. Include a reduced set (11" x 17") set of the project record drawings in the operation and maintenance manual.

B. Operation & Maintenance Manuals

1. Submit documents under provisions of Division 1 and Division 16.
2. Operation and Maintenance Data: Include bound copies of operating and maintenance data.
3. Provide operation and maintenance instructions including detailed electronic schematic drawings, detailed parts list and exploded view of all equipment, detailed troubleshooting instructions and a reduced set of the project record drawings.
4. Provide detailed instructions on system start-up, including instructions on re-starting the touchscreen computer after a system failure/lock-up.
5. Provide detailed instructions on replacement of a defective touchscreen computer with a new touchscreen computer.

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C. Security System Software Documentation

1. Provide an electronic copy of the PLC Program and Touchscreen Security Program to aid in future maintenance, troubleshooting and modification of the security system.
2. The hard copy shall include a complete printout including the ladder diagram, program flow control instructions, function block instructions, etc., as required.
3. Meaningful names (i.e. "A-Dorm Dayroom", "Swing Cell", etc.) shall be assigned to each input, output and internal address used with comments explaining the purpose and function of each rung.
4. Provide point references and function descriptions in the comment fields of the program where applicable. The intent of this requirement is that the function of each rung or line of code can be clearly understood by the facility maintenance staff for troubleshooting and system maintenance.
5. Provide a global overview of the system design and operation. Include brief descriptions of all system functions including, but not limited to, intercom and door control, door interlocks and override, system enable/disable, lighting control, and standby power monitoring.

D. Security System Hardware Documentation

1. Provide a complete terminal block schedule for the entire system, including terminal block layout drawings and schedules for the main relay cabinet and all system cabinets. The terminal block schedule for each cabinet shall include the following data for each point:
 - a. Point description (i.e. "A-Dorm Dayroom Lights") and/or location.
 - b. Type of point (i.e. input, output, etc.).
 - c. Terminal block and point number.
 - d. Cross-reference to specific code section in PLC program.
2. Provide detailed schematic drawings with riser diagrams showing all relays, power supplies, PLC components, and any other equipment in the PLC/relay cabinet. The drawings shall show all wiring connections (with wire color codes) for all equipment and shall accurately reflect the actual installation.

1.11 SECURITY SYSTEM TRAINING

- A. In accordance with the requirements of Division 1 this section, and other Division 16 sections, include all costs for the following training on the security system:
 1. Train operation and maintenance personnel in use and operation of the security system provided in Division 16, including hands-on training for touchscreen, relay control, intercom, IP Video, and PLC system operation.
- B. Training sessions for the security system shall be conducted on-site by certified representatives of the Security System Integrator, including installers and programmers who are directly responsible for and familiar with this specific project.

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1. Conduct sessions for not less than four-hour periods during normal working hours, i.e., Monday through Friday, 8:00 AM to 4:30 PM.
 2. Training session schedules shall conform to the requirements of the Owner.
 3. Submit schedules to Owner for approval not less than two weeks prior to training session.
 4. Do not schedule different types of training (i.e. maintenance and operation) concurrently without Owner approval.
 5. Training sessions shall be conducted by qualified personnel, i.e., maintenance training shall be conducted by the system installer rather than the programmer (unless a single installer/programmer is qualified to do both types of training).
 6. The training period shall consist of forty (40) hours of on-site instruction to be apportioned by the Owner to assure that facility personnel are fully trained. If the Contractor is able to complete all training to the satisfaction of the Owner in less than the 40 hours, the balance of the training time may be used (at the Owner's discretion) for post-occupancy programming changes to be done either on-site at the end of the training session or from the Security Integrator's principal location at 90 days after Final Completion.
- C. Make a video recording of all training sessions, including but not limited to classroom instruction, operational and hands-on training, and maintenance/troubleshooting training. Provide two copies of the recorded material to the Owner upon completion of all training.
- D. Have approved operation and maintenance manuals and parts lists for all equipment on hand at time of instruction.

1.12 EXTRA MATERIALS

- A. All touchscreen software: Three full backup copies of the final touchscreen program on CD or flash drive. Prior to the final copies being made, provide one interim backup copy of the touchscreen program to the Owner whenever changes are made to the system during the inspection and training stage of the project

1.13 WARRANTY AND MAINTENANCE CONTRACT

- A. As specified in Section 16010.

PART 2 - PRODUCTS

2.1 PRODUCT SPECIFICATIONS

- A. Throughout this specification, specific manufacturers and manufacturer's catalog numbers are cited. Unless otherwise noted, these citations are for the purpose of establishing quality and performance criteria and are not intended to be proprietary.
- B. Where no manufacturer is specified, provide products of manufacturers in compliance with requirements. Any item of equipment or material not specifically addressed on the drawings or in this document and required to provide a complete installation shall be provided in a level of quality consistent with other specified items.
- C. The Contractor shall provide the latest product model and software version available from each manufacturer at the time of installation. No "beta version" or "test software" products will be

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accepted. All proposed and provided equipment and products shall be from the specified and approved manufacturers only, unless previously approved by the Engineer or Owner.

D. All products and materials are to be new and free of defects, damage and corrosion. All materials shall be in compliance to all applicable codes and designed specifically for the function intended.

E. Quantity and location of all devices and equipment shall be as specified in Contract Documents or as required for a complete and operable system.

2.2 ACCEPTABLE MANUFACTURERS - TOUCHSCREEN MONITOR

A. EloTouch "IntelliTouch 3000 Series" or approved equal.

B. Dell.

C. Viewsonic.

D. Substitutions: Under provisions of Division 1.

2.3 TOUCHSCREEN MONITOR

A. Control Room Monitors:

1. Monitor - 22" Active matrix, TFT, LCD color flat panel touchmonitor.

2. Useful Screen Area: 18.7" horizontal, 11.7" vertical

3. Maximum Resolution - 1680 x 1050 at 60 Hz.

4. Brightness With Touchscreen: 270 cd/m2.

5. Viewing Angle: +/- 80° horizontal and vertical.

6. Touchscreen Technology - Surface Acoustic Wave.

7. Mounting: VESA-compatible rear mount.

8. Warranty: Minimum 3 years.

2.4 ACCEPTABLE MANUFACTURERS - TOUCHSCREEN CONTROLLER

A. Dell "Optiplex XE" or approved equal.

B. Hewlett Packard (HP).

C. Compaq.

D. Substitutions: Under provisions of Division 1.

2.5 TOUCHSCREEN CONTROLLER

A. Control Room Computers:

1. Intel® Core 2 Duo (2.8GHz, 3MB L2 cache) dual-core processor.

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Construction Documents

KETCHIKAN CORRECTIONAL CENTER
DOOR LOCK AND SECURITY CONTROLS REPLACEMENT
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2. Operating System: Microsoft Windows 7 Professional.
3. 4GB DDR2 SDRAM Memory, 1.33GHz, (2 DIMM).
4. 250GB 2.5" SATA Drive, 3.0 Gb/s and 8MB DataBurst cache.
5. Integrated video, ATI Radeon, VGA/DVI.
6. Communications: Dell 1397 wireless half-mini PCIe card.
7. External Drive: ATAPI interface for DVD-ROM.

B. Intercom/Security Cabinet: Provide additional touchscreen controller as specified above in the main Intercom/Security cabinet to provide firewall protection and interface for remote connection to security system for maintenance and software uploading. Refer to Section 16149 for KVM specifications.

C. Programmable Controller and Networking Equipment - Refer to Section 16903.

2.6 ACCEPTABLE MANUFACTURERS – UNINTERRUPTABLE POWER SUPPLIES

- A. American Power Conversion (APC).
- B. Eaton.
- C. Tripp-Lite.
- D. Substitutions: Under provisions of Division 1.

2.7 UNINTERRUPTABLE POWER SUPPLIES

A. Control Rooms: Touchscreen Controllers and Monitors:

1. APC #Back-UPS series or approved equal desktop UPS with sufficient output power capacity to provide a half-load backup time of 30 minutes. UPS shall be mounted in the casework with the computer. Exact VA rating of the UPS shall be determined by the Contractor.

B. Relay/PLC Cabinets:

1. APC #Back-UPS series approved equal desktop UPS with sufficient output power capacity to provide a half-load backup time of 30 minutes. The UPS shall be mounted in the PLC cabinet and connected to the PLC and touchscreen controller. Exact VA rating of the UPS shall be determined by the Contractor.

2.8 ACCEPTABLE MANUFACTURERS - TOUCHSCREEN SOFTWARE

- A. Schneider Electric "Vijeo Citect", latest published version, or approved equal.
- B. Allen-Bradley.
- C. Siemens.
- D. GE Fanuc.

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E. Substitutions: Under provisions of Division 1.

2.9 TOUCHSCREEN SOFTWARE

A. All touchscreen software shall be a non-proprietary, off-the-shelf package that is readily available for purchase directly from multiple sources. This software shall be programmed and tailored to the specified functions and features described herein and shown on the Drawings.

B. All touchscreen software licenses shall be transferred to the Owner at completion of the project. This shall include but not be limited to all original installation disks, software manuals, software development packages, runtime licenses, etc. All project-specific application software shall be transferred at the end of the warranty period.

C. Touchscreen operations shall be configured as follows:

1. One-Touch: Touching the icon executes the function. Typical uses are movement and "Go To" icons, cell doors, lights, alarm acknowledge, etc.
2. Two-Touch: First touch generates a separate popup window with function icon. Second touch executes function. Typical uses are camera selection, interlock override, group release, group exclude, etc.
3. Three-Touch: First touch generates a separate popup window with function icon. Second touch generates separate "Are You Sure?" popup window with function icon. Third touch executes function. Typical uses are perimeter security doors, exterior gates, etc.

D. All functions of the touchscreen system shall also be able to be performed using a mouse.

E. Input/Output response and screen refresh shall be less than 250ms. No increase in reaction time for the system shall be acceptable due to number of screens, functions, or functional areas in the system.

F. All control icons used shall be of size that will facilitate a positive touch point. The minimum size shall be .5 inch square. All status indicators shall be a minimum of .1875 inch in diameter, or equivalent square or rectangle.

G. Background of display shall be black.

H. All events shall be queued according to priority.

I. Graphic Map Orientation: Coordinate map orientation to match the orientation of the control room operator sitting at the desk.

J. Touchscreen graphic displays shall be created to display accurate floor plans for all areas of the facility. These shall include, but not be limited to, the following:

1. Overall facility site plan with icons to select each functional area of the building. The site plan shall also include an enlarged functional area for controlling the vehicle/man gates and exterior intercoms.
2. Building screens shall include building floor plans with directional arrows to move between the main functional areas. Screens shall include icons to bring up enlarged views of all sallyports.

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3. Functional areas within each building, including separate screens for each housing unit. The housing unit screens shall be accessed from icons on the movement screens, as well as by using directional arrow icons to move directly between each of the housing areas and other adjacent functional areas.
4. The graphic screen for each tiered housing unit shall include the main floor plan, as well as an offset row of cells around the perimeter of this plan to show the second floor in each area.
- K. Graphic map hierarchy and access shall be both operator and event driven. The system shall allow the operator to move between functional area maps by touching the area of the map that is desired. The system shall also allow events to drive the map movement when the event is acknowledged by the operator.
- L. Video surveillance system: Automatic video call-up, video select, selection of full or quad scenes where quad displays are used, setup of sequences and quad displays.
- M. Detention Intercom System: Intercom call-up, all call, and paging functions.
- N. Lighting Control: Toggle lighting in cells, dayrooms, etc. as currently configured in the existing system.
- O. Additional functions: Monitor PLC status.
- P. System Maintenance: The most current version (at the time of substantial completion) of Symantec pcAnywhere® or approved equal remote access software shall be provided on all touchscreen computers to enable the Contractor to provide software support from a remote location.
- Q. System Database: All database management and reporting functions shall utilize Microsoft Excel or approved equal database software to organize, output, and archive all system alarms, events, and actions. The database shall be automatically backed up on CD, with the schedule of backups selectable by the Owner.

2.10 TOUCHSCREEN SYSTEM EQUIPMENT CAPACITIES

- A. The CPU in the Main Control Room shall be configured as the network server, with the computer in the A-Dorm Control Room configured as a client. Provide all necessary software and hardware required to network the computers together and communicate with the PLC.
- B. The system shall include means for setting up to nine levels of priority for each alarm and device input. The priority levels shall be as follows:
 1. Level One: Staff alarms (e.g., duress, panic).
 2. Level Two: Security alarms (e.g., exit or security barrier doors, unauthorized access, intrusion).
 3. Level Three: Door status (e.g., door prop and door unsecured alarms).
 4. Level Four: Intercoms.
 5. Level Five: System alarms (e.g., PLC low battery).
 6. Level Six: Undefined at this time but included in the software.

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- C. Priority levels may vary by time of day. Allow a minimum of three time periods per day, corresponding to shifts.
- D. Provide audio links.
- E. Provide video links.
- F. Provide control of various building functions, including lighting.
- G. Unlock doors and gates.
- H. Monitor doors and door position switches.
- I. Site graphic map.
- J. Local graphic map.
- K. Interlocking doors.

2.11 TOUCHSCREEN SYSTEM OPERATION

- A. All functions specified below shall be provided for both touchscreen workstations.
- B. General Functions
 - 1. A "Clean Screen" icon shall be provided on the main graphic screen. Touching this icon shall clear the screen (except for this icon) to allow cleaning. Touching the icon a second time shall return the system to normal operation. The cleaning function shall not affect any other functions of the system.
 - 2. A "Calibrate Screen" function shall be programmed into the system but shall be initially password-protected at the "Administrator" level. This function shall allow the user to adjust the pointing cursor to account for parallax.
 - 3. The system shall have a calendar, a clock with 24-hour time, and shall automatically account for daylight savings time and leap years. The clock and calendar shall be visible on all graphic screens.
- C. System Modification
 - 1. Modifications to the layout of the touchscreen system shall be performed either on-site or from a remote location using the remote access software.
 - 2. The remote access function shall have two levels of password protection. When this function is activated, a "Remote Communication Access Enabled" alarm shall appear on the touchscreen.
 - 3. The remote access function shall remain active until the user logs off or until the countdown timer reaches zero. When either of these actions occurs, the connection shall be disabled and access shall be made impossible.
- D. Redundant Operation
 - 1. The intent of this function is to provide a backup control location, so that the touchscreen in the Main Control Room can be used to operate A-Dorm as needed.

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2. All system events and operations shall be programmed for the touchscreen in the Main Control Room, but only the points normally controlled by the Main Control Room shall be displayed on its touchscreen. Under emergency operation, the Main Control Room touchscreen may be used to control all points normally controlled by the A-Dorm touchscreen. The graphic maps for both touchscreen workstations shall be oriented to match the direction of the touchscreen monitors.

E. Door Control

1. The system shall monitor the call-in activity of all the controlled doors and provide a point or door call-in status to the touchscreen monitor. The system shall provide for the control of all doors from the touchscreen with no mechanical switch being utilized for this control.
2. All doors controlled by the touchscreen shall be illustrated in different colors to indicate the status of the doors. Secured points shall be green and the unsecured points shall be red. All door icons shall change orientation to simulate the operation of the door. Swing doors or gates shall be represented by a green line when closed and a red line that is pivoted away from the wall when open. Sliding doors or gates shall be represented by offset parallel green bars when closed and aligned parallel red bars when open.
3. Activation of the fire alarm system in the building shall not affect the operation of the touchscreen security system or automatically release any doors controlled by the system.
4. Each door shall be capable of being assigned an adjustable period of time delay, after which an alarm will sound. Allow a minimum of three time periods per day corresponding to shifts. This "door prop" alarm shall be initially set on all shifts to zero for exterior doors or other security barriers and 30 seconds for all movement doors. Cell doors shall be configured for this feature but shall not be initially set for any maximum time delay.
5. All controlled exterior doors and other security barrier doors (as defined by the Owner) shall have an "Unauthorized Access" function, which will generate an alarm if the door position sensor senses the door has been opened (i.e., from the outside) prior to or without an "Unlock" command being issued by the touchscreen. This alarm shall generate an alarm popup window with "Acknowledge" and "Reset" icons. Acknowledging the event shall silence the audible alarm and the event shall remain in the Events Queue until it is reset. If the event has not been reset within five minutes, the popup window with the "Reset" icon shall re-appear on the screen (without audible tone) for the operator to reset the door.
6. A "Group Release" function shall be provided as a 2-touch operation. Cell doors within each tier of A-Dorm shall be included in a group, as well as cells in B-Dorm and C-Dorm. When the "Group Release Enable" icon is touched, the "Group Release" icon shall appear adjacent to the corresponding group. When this icon is touched, all doors in the group shall unlock and their indicator icons shall all change from green to red on the graphic map. All door icons and the "Group Release" icon shall remain red until all doors in the group are secured, after which the icons shall change from red to green. The release of individual doors within a group shall be staggered by 0.25 seconds, or as necessary, to prevent overload of the door control circuit.
7. A "Group Exclude" or "Double-Lock" function shall be provided as a 2-touch operation. Selected cell doors within each group may be excluded from a "Group Release" function so that they do not unlock when the "Group Release" function is activated. When the "Group Exclude" icon for a particular wing is touched, a window showing all cell doors in the wing shall appear and allow the operator to select which cells will remain locked. If a cell is selected for the "Group Exclude" function, it shall not be included in "Group Release" function until de-selected using the same process. If a cell door is included in

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the "Group Exclude" function, it shall appear on the wing screen with a dark outline or some other means to clearly indicate that the function is active for the cell.

8. For doors with positive locking latches, the latchbolt position sensor senses when the lock is activated and the door position sensor senses when the door is opened. Either of these events shall provide an unsecured door status signal to the touchscreen, and the door indicator icon shall change from green to red. After the requesting party passes through the door and the door is closed and locked, as indicated by sensors, the door indicator icon shall change from red to green. This will indicate that the door is secure.
9. An "Interlock Alert" function shall be provided on multiple sets of doors in the facility (as specified by the Owner), such as sallyport doors. When an attempt is made to open an interlocked door while another door of the interlock group is not secured, a popup window shall appear with a "Interlocked Doors" banner. A 2-touch interlock override function shall be provided to defeat the interlock. For bidding purposes, assume (10) sets of interlocked doors, with the exact quantity to be determined by the Owner.

F. Intercom Control

1. An interface with the intercom system shall be provided to include all new and existing intercom stations. A call originating from any intercom field station within the building shall generate a tone on the associated master station in the Control Room, after which the operator will acknowledge the desired station and initiate communication. Incoming calls may be answered by specifically selecting the desired station.
2. When a call is initiated by a field intercom station, any camera associated with that door shall appear on the spot monitor and the screen shall display the associated graphic map of the functional area where the call is originating. The status of all points within the functional area shall also be shown. The screen shall display icons for controlling the active point or exiting the displayed screen. The operator may change the active point by touching any other point shown on the active display.
3. The touchscreen system shall include an "Events List" screen that shows a list of all incoming calls in the queue, in the order which they are received. Any call on the list may be answered from this screen. Priority intercom stations (as designated by the Owner) shall appear in red on the list and shall precede those of a lower priority level. Selecting a specific call from the list shall display the graphic for the associated functional area. This screen shall also include a "Main" icon to return to the main map.
4. Reset of the call shall be accomplished by touching the intercom icon a second time or response to another event. If an intercom call-in associated with a door is activated, the call shall be reset automatically after the door is opened and then re-secured, regardless of whether the intercom channel was actually opened.
5. All intercom functions except "speaker volume" and "push-to-talk" shall be performed on the touchscreen. A 1-touch operation shall be used to open or close any specific channel and a 2-touch operation shall be used for "All Call" functions.
6. Outgoing calls to all cells and other stations (as determined by the Owner) shall not have a pre-announce tone. The intent is to allow the staff to monitor conversations in the rooms without the inmates being aware. The intercom system shall be capable of monitoring multiple simultaneous conversations.

G. IP Video System Control

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1. The existing IP Video system shall be interfaced with the touchscreen system and shall include all cameras and monitors connected to the workstations. Any view from any camera in the system shall be able to be called up on the spot monitor adjacent to each touchscreen. The system shall automatically call up cameras associated with activated doors, door position switches, intercoms, or other points in the system and display them on the spot monitor.
2. The system shall be programmed with up to twenty (20) camera groups for call-up on the designated monitor(s). The Owner will identify all cameras to be assigned to each group.
3. The display on the spot monitor shall be as follows:
 - a. **Default View:** Quad display of whatever camera group (as specified above) has been selected. When an event-driven camera is activated, it shall bring up the view of a camera associated with a door, intercom, or other controlled point in the upper left quadrant of the monitor. If there are two cameras associated with a specific door or intercom, they shall appear in the upper left/right quadrants. The event-driven camera(s) shall be set to dwell until the associated door lock, intercom channel, etc. is closed, after which time the system reverts back to the previously selected quad view.
 - b. **Full-size view:** Fully selectable for any camera using a 1-touch operation from any graphic map. Touching the camera icon on any map brings up the full-size view on the monitor. This view shall remain visible until either the camera icon is touched again or until event-driven camera(s) are automatically activated.
 - c. All event-driven camera call-ups and associated points shall be determined by the Owner.
4. The existing IP Video system shall be controlled by the touchscreen as follows:
 - a. The "Camera Selection" screen shall be used to bring up full-screen views of any connected camera on one of the existing monitors in the control rooms.
 - b. The "Camera Selection" screen shall be used to select any camera to be viewed in any quadrant of the existing monitors.
 - c. The "Camera Selection" screen shall be used to select groups of four cameras to be viewed on the monitors. The specific cameras in each 4-camera group shall be determined by the Owner during the submittal and programming phase of the project.

H. Lighting Control

1. An interface with the lighting system shall be provided to include the existing lighting circuits controlled by the existing lighting control panels. The graphic maps of various functional areas in the building shall show the status of all lights in the areas controlled by the touchscreen system. Touching the "Light" icon for a specific room shall toggle the light on/off. This shall be noted on the screen by a change in the color of the icon. The "Light" icons shall be incorporated into the floor plans, instead of having a dedicated Lighting Control screen.

I. Alarm Announcement System

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1. An alarm announcement system shall be incorporated into the paging intercom system to annunciate separate distinct tones for functions such as inmate count, medical call, and meal call. Separate icons for each announcement shall be provided on a "Utilities" popup screen for each housing unit. The tones shall be annunciated through all field intercoms and paging speakers in the building.

J. System Alarms:

1. The status of system alarms shall annunciate on the touchscreen as a 1-touch operation with an "Acknowledge" icon. The alarms to be monitored are as follows:
 - a. UPS Alarms: Low battery, trouble, etc.
 - b. PLC Alarms: PLC failure, processor failure, communications failure, low battery, etc.
 - c. Remote Access Alarm: Appears when the remote access function is activated. The alarm may be acknowledged on the touchscreen but acknowledgement shall not be required to enable the remote access function.
- K. Elevator Override: A one-touch control to override power to the elevator doors shall be provided.
- L. Facility Alarms: Alarms for existing facility systems, such as the Boiler Day Tank alarm, Sprinkler System alarms, Visitation Booth duress system, and Medical Exam duress system shall be programmed into the system.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install all new wiring associated with the Detention Monitoring and Control System in a dedicated conduit system separate from other systems. Low-voltage wiring shall not be intermixed with 120 Volt wiring.
- C. Label all wires and cables under provisions of Section 16195.
- D. Circuits shall be configured as "fail secure". A wire break or component failure shall prevent a security breach rather than cause one.
- E. Connect input and output devices as indicated. In some cases a single output device (camera, lock, etc.) may be controlled by two or more subsystems. Full functioning of all subsystems shall be maintained at all times. Isolation of the multiple systems involved shall be provided as necessary to achieve the results specified herein.

3.2 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Division 1 and Division 16.
- B. Perform operational testing on control systems to verify proper operation of hardware and software.

END OF SECTION

SECTION 16751 – DETENTION INTERCOM SYSTEM

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Master intercom system

1.2 RELATED WORK

- A. Section 16010 - Basic Electrical Requirements.
- B. Section 16132 – Raceway and Boxes for Electrical Systems.
- C. Section 16149 – Detention Relay Logic System
- D. Section 16195 – Electrical Identification.
- E. Section 16727 – Detention Monitoring and Control System
- F. Section 16903 – Detention PLC Control System

1.3 SYSTEM DESCRIPTION

- A. Provide complete intra-communications systems for two-way voice communication between the master stations in each control room and all field stations associated with each control room.
- B. Provide an interface with the Detention Monitoring and Control System for operational features as indicated.
- C. Systems shall be interconnected and shall be custom designed to accomplish and comply with the operation description, as noted on the drawings and described herein.
- D. All systems shall be complete with all required components, equipment and wiring to provide the communications system and perform the functions outlined.
- E. Some systems included in the work of this section are referred to as hands-free intercoms. This application is intended to mean that the person at the remote location need not use his hands to communicate with the person at the staff location. The person at the staff location must use the push-to-talk switch in order to have a two-way conversation.
- F. Provide all conduit, raceways, shelves, equipment, backboards, etc. as required for a complete and operable system.

1.4 QUALIFICATIONS

- A. The entire intercom system shall be supplied, assembled, installed, and commissioned by the Security Systems Integrator as specified in Section 16727.
- B. Manufacturer: Company specializing in detention intercom systems with a minimum three years documented experience in Correctional Facilities.

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1.5 SUBMITTALS

- A. Submit product data under provisions of Division 1 and Division 16.
- B. Product Data: Provide data for each component specified showing electrical characteristics and connection requirements.
- C. Provide intercom system shop drawings as part of the security system shop drawings as specified in Section 16727. See Section 16727 for additional requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site, store and protect under provisions of Division 1.
- B. All intercom equipment, wiring, etc. shall be stored in an enclosed area, maintained at a minimum of 55° F and shall be protected from weather.
- C. Maintain area free of dirt and dust during and after installation of products. Protect other surfaces against damage and discoloration caused by work of this section.

1.7 SYSTEM DEMONSTRATION AND ACCEPTANCE

- A. Provide systems demonstration under provisions of Division 1, Section 16010, Section 16727, and this section.
- B. System demonstration shall be conducted as directed by the Engineer but generally described as follows:
 1. Test each field intercom station by initiating a call from either end and verifying proper voice intelligibility at both the field station and new master station. Adjust volume levels to Owner satisfaction.
 2. Verify all intercom control functions related to the Detention Monitoring and Control System, as specified in Section 16727.

1.8 CLOSEOUT SUBMITTALS

- A. Project Record Drawings:
 1. Submit documents under provisions of Division 1, Section 16010, and this Section.
 2. Accurately record location of field intercoms, master station, etc. as part of the security system project record documents as specified in Section 16727.
 3. Include a reduced set (11" x 17") set of the security system project record drawings in the operation and maintenance manual.
- B. Operation and Maintenance Manuals:
 1. Submit documents under provisions of Division 01, Section 16010, and this Section.
 2. Operation and Maintenance Data: Include bound copies of operating and maintenance data with programming instructions.
 3. Include routine preventive maintenance schedule.

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4. List special tools, maintenance materials, and replacement parts.
5. Provide operation and maintenance instructions including detailed electronic schematic drawings, detailed parts list with exploded view of all equipment, and detailed troubleshooting instructions.
6. Include copies of manufacturer product warranties for all equipment.

1.9 INTERCOM SYSTEM TRAINING

- A. As specified in Section 16727.

1.10 EXTRA MATERIALS

- A. Provide (2) spare intercom field stations.

1.11 WARRANTY

- A. As specified in Section 16010.

PART 2 - PRODUCTS

2.1 PRODUCT SPECIFICATIONS

- A. Throughout this specification, specific manufacturers and manufacturer's catalog numbers are cited. Unless otherwise noted, these citations are for the purpose of establishing quality and performance criteria and are not intended to be proprietary.
- B. Where no manufacturer is specified, provide products of manufacturers in compliance with requirements. Any item of equipment or material not specifically addressed on the drawings or in this document and required to provide a complete installation shall be provided in a level of quality consistent with other specified items.
- C. The Contractor shall provide the latest product model and software version available from each manufacturer at the time of installation. No "beta version" or "test software" products will be accepted. All proposed and provided equipment and products shall be from the specified and approved manufacturers only, unless previously approved by the Engineer or Owner.
- D. All products and materials are to be new and free of defects, damage and corrosion. All materials shall be in compliance to all applicable codes and designed specifically for the function intended.
- E. Quantity and location of all devices and equipment shall be as specified in Contract Documents or as required for a complete and operable system.

2.2 MANUFACTURERS – DETENTION INTERCOM SYSTEM

- A. Basis of Design: Harding Instruments Co. "MicroComm DXL" series.
- B. Tech Works "ICA202".
- C. Zenetel "Stentofon".
- D. Substitutions: Under provisions of Division 1.

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2.3 CENTRAL SWITCHING EXCHANGE

- A. Intercom communication functionality shall be as specified in Section 16727.
- B. New intercom system shall be compatible with existing intercom field stations in the facility. The Contractor shall verify the exact make/model of field stations.
- C. The security intercom system exchange mainframe shall be modular, expandable for optimum station configuration and capable of future expansion by adding expander modules as required. Each exchange shall have the following capacities and features:
1. Master Stations: One master station for each touchscreen workstation, expandable to 16 total.
 2. Field Stations: System shall be expandable to 160 stations per exchange, 5120 stations per system. Initial capacity as required for all stations indicated on the Drawings.
 3. Chassis capacity for holding all necessary control and line cards.
- D. The Digital Communication Controller (DCC) shall have the following components:
1. Process Control Card (PCC): Contains system configuration and data, controls exchange operations and switching, and provides exchange network port. Each PCC has USB ports, Ethernet ports, fiber/copper digital audio trunk ports, serial ports, and internal modem.
 2. Master Control Card (MCC): Converts incoming audio signals to digital format and outgoing signals to analog format. Includes two line level audio inputs and outputs with status and control.
 3. Station Control Card (SCC): Provides an interface for intercom Field Stations by converting incoming audio signals to digital format and outgoing signals to analog format. Each card provides sixteen (16) half-duplex intercom station ports which can be employed in adjacent pairs for full duplex devices. Each channel includes a separate audio power amplifier for non-blocking call operation and sixteen (16) independent software-controlled volume settings.
 4. Front panel keypad display.
 5. On-board power supply.
- E. The Digital Communication Expander (DCE) shall provide intercom features similar to the DCC and shall facilitate exchange expansion. Each DCE shall have the following components:
1. Slave Process Control Card (PCC): Same as standard PCC but without exchange control or network functions.
 2. Master Control Card (MCC): Same as in DCC.
 3. Station Control Card (SCC): Same as in DCC.
 4. On-board power supply.
- F. Paging Amplifier: Solid-state amplifier with audio output wattage rating as required to drive all existing intercom speakers for an "All Call" function, as specified in Section 16727. Speaker

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load shall represent no more than 80% of the total amplifier load, at less than 3% distortion. Frequency response shall be flat from 40 to 15,000 Hz and noise level shall be at least 84 dB below rated output.

- G. Mounting Brackets: Provide mounting brackets for DCC controller and expander enclosures as required to mount in security cabinet. Refer to Section 16149.
- H. Switching Relays: Provide additional switching relays as required to provide the operation specified herein, in Section 16727, and as shown on the Drawings. All relays that are not part of the manufactured intercom system shall be as specified in Section 16149.

2.4 SYSTEM SOFTWARE

- A. Administrator Software shall function on a standard PC to support system configuration, diagnostics, maintenance, and logging but shall not be required for system operation. Software shall employ Windows features, including views of system tree structure, tables of devices, screens for system settings and adjustments, and tables of operational data.

2.5 TOUCHSCREEN INTERCOM MASTER STATION

- A. Desktop intercom master station with push-to-talk (PTT) switch, built-in speaker with volume adjustment, and 12" gooseneck electret microphone. Master station shall have a line level output jack for driving an external speaker. Harding #TMM-440 or approved equal.
- B. Switching relays shall be provided as required to provide the operation specified herein and as shown on the drawings.
- C. The master control station shall provide the following features and functions:
 - 1. Direct two-way voice communication between the master control station and any field intercom station connected to the system.
 - 2. After selection at the touchscreen, communication through the speaker is amplified via the intercom amplifier in the relay cabinet.

2.6 SPEAKERS AND ACCESSORIES

- A. New Intercom Field Stations: Harding # ICE-4X(0 or 1, to match Station Control Card) or approved equal intercom station with 11-gauge brushed stainless steel faceplate, center-pin Torx fasteners, and vandal-resistant, waterproof, gasketed call-in switch mounted on the faceplate. Speakers shall be 2.5 inch diameter, seamless cone type with a ceramic magnet. Speaker shall mount on 4" octagonal box.
- B. Connect existing intercom field stations and paging speakers to new intercom system head-end equipment.

2.7 INTERCOM CABLE

- A. Connect new intercom system head-end equipment to existing field stations using existing cable. Extend cabling as required. For new intercom field stations, provide #18 AWG minimum cable with one twisted shielded pair with a bare drain wire and one twisted unshielded pair minimum. West Penn #360 or approved equal.

2.8 INTERCOM CABINET

- A. Mount the intercom system head-end equipment in the existing cabinet located in Telephone 115.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Intercom system wiring shall not be intermixed with 120V power wiring or door control wiring and shall be run in a dedicated conduit system.
- B. Control systems wiring in conjunction with intercom master station to be identified in accordance with wiring diagrams furnished with equipment.
- C. Pre-Announce Tone: Disable the pre-announce tone for intercom stations in cells and other areas as directed by the Owner.

3.2 FIELD QUALITY CONTROL

- A. The final connections, start-up, check-out and owner instruction on the system shall be done by a manufacturer's certified and authorized technician.
- B. Under provisions of Division 1 and this Section, the manufacturer's certified technician shall make a thorough inspection of the complete installation including all components to ensure the following:
 - 1. The system is complete and functional and complies with all requirements of the specifications.
 - 2. All equipment meets Underwriter's Laboratories requirements.
 - 3. The system is installed in accordance with the manufacturer's instructions.
 - 4. Project record drawings are complete and up to date.
 - 5. Make changes necessary to conform to Items 1, 2, 3 and 4 with technical assistance from the manufacturer as required.

END OF SECTION

SECTION 16782 – VIDEO SURVEILLANCE SYSTEM

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Video Management Software.
- B. Video Storage Appliance.
- C. Fixed Video Cameras.
- D. PTZ Cameras.
- E. Network Switch.
- F. Camera Power Supply.
- G. Video Cable.
- H. UTP Components.

1.2 RELATED SECTIONS

- A. The Work under this section is subject to requirements of the Contract Documents including the General Conditions, Supplementary Conditions, and sections under Division 01 General Requirements and Section 16010 – Basic Electrical Requirements.
- B. Section 16132 – Raceway and Boxes for Electrical Systems.
- C. Section 16195 – Identification for Electrical Systems.

1.3 REFERENCE CODES AND STANDARDS

- A. The publications listed below form a part of the specification to the extent referenced. The publications are referred to in the text by basic designation only, latest edition. The reference codes and standards are minimum requirements:

- 1. ANSI/NFPA 70 National Electrical Code, latest adopted edition.
- 2. BICSI Telecommunications Distributions Methods Manual
- 3. TIA/EIA 568-B.1 Commercial Building Telecommunications Cable Standard,
Part 1: General Cabling System Requirements (including Addendums).
- 4. TIA/EIA 568-B.2 Commercial Building Telecommunications Cable Standard,
Part 2: Balanced Twisted-Pair Cabling Components (including Addendums).
- 5. TIA/EIA 569-A Commercial Building Standard for Telecommunications
Pathways and Spaces
- 6. TIA/EIA 606 Administration Standards for the Telecommunications
Infrastructure of Commercial Buildings

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1.4 SYSTEM DESCRIPTION

- A. Provide a new video surveillance (CCTV) system in the facility, which will include exterior IP color cameras, IP video storage appliance, color monitors, video workstation computers, and video management system (VMS) software. All new cameras shall be connected to the IP video storage appliance and shall use the VMS software to provide video communications between points of surveillance and the monitoring stations, as indicated on the Drawings.
- B. All new equipment and assemblies shall be Underwriters Laboratories approved if applicable.
- C. Remote Access: Although the VMS software and network switch has a feature for secure remote access, it shall be disabled. This shall be a closed system with no means for external access.

1.5 QUALIFICATIONS

- A. The video surveillance system shall be assembled and installed by a single Security Systems Integrator. The Security Systems Integrator shall have a minimum of three years documented experience assembling and installing these types of systems within the State of Alaska.
 - 1. Where the system installer is a branch office or other division of a larger organization, the qualifications of the branch office or other division shall meet the requirements of the Contract Documents.
 - 2. Contractor shall have local technician(s) who have attended training and hold relevant certificates from the manufacturer of the specified system.
 - 3. Maintenance Service and Support: The Security Systems Integrator shall be able to provide initial contact on warranty service and/or service contract requests from their principal location within four (4) hours of notification. During the warranty period, the Contractor may choose to attempt troubleshooting of the system by telephone, with the facility maintenance staff. If the problem cannot be resolved within 24 hours, the Security Systems Integrator shall travel to the facility on the next business day to repair the system.
- B. Technical Support: All new systems and components shall be provided with the availability of a toll free 24-hour technical support phone number from the manufacturer. The phone number shall allow for immediate technical assistance for either the dealer/installer or the end user at no charge.
- C. Video System Manufacturers: Companies specializing in the specified systems with a minimum of three years documented experience.
- D. Video System Suppliers: Companies specializing in supplying the products specified in this Division with minimum three years documented experience, and authorized by product manufacturers.
- E. All systems and components shall be provided with an explicit manufacturer warranty.

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1.6 SUBMITTALS

- A. Product Data: Submit data for each component specified, showing electrical characteristics and connection requirements.
- B. Computer Submittals: For the client and server computers, either mark the catalog sheet with the specific options being provided (e.g. processor, total RAM, hard drive, etc.) or provide a "build sheet" from the manufacturer that shows exactly what is being provided. Submitting an unmarked catalog sheet is not acceptable.
- C. Submit Contractor qualifications and certifications to install the specified video surveillance system software.
- D. Electronic AutoCAD® drawings of the facility are available upon request for preparation of the shop drawings.
- E. Provide contract-size shop drawings that include the following information:
 - 1. One-line diagrams for the video system that show the signal relationships of all devices within the system.
 - 2. Site plan drawing showing the locations of all cameras, along with camera name, camera type and mounting (i.e. wall or pendant), lens selection, and conduit routing.
 - 3. Floor plan drawings shall show entire cable pathway, including existing sections of pathway (i.e. conduit or J-hooks) that are used for the video system. Show sizes of all conduit sleeves along the pathway.
 - 4. Drawings shall be done in a scale that allows the smallest text on the drawing to be legible when the drawing is reduced to 11" x 17".
- F. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of Product.
- G. Camera Names: All camera names that are displayed on the video monitors and programmed into the VMS system shall be approved by the Owner prior to programming.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site, store and protect under provisions of Division 01.
- B. Store products in clean, dry area; maintain temperature to NEMA ICS 1.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Maintain area free of dirt and dust during and after installation of products. Protect other surfaces against damage and discoloration caused by work of this section.

1.9 COORDINATION

- A. The necessity to coordinate this work with the Owner is emphasized. The Contractor shall be responsible for any omissions, delays and additional cost due to lack of coordination or approval from the same.

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- B. Coordinate all work with existing lighting, power, and other systems in the areas of work to avoid interferences.
- C. IP Addresses: The Contractor shall submit a written request to the Owner for the quantity of IP addresses that will be required for the video system. The Owner will furnish a list of addresses within ten (10) business days.
- D. Continuity of Service:
 - 1. Take no action that will interfere with, or interrupt, any existing building services unless previous arrangements have been made with the Owner. If system shutdown is required arrange the work to minimize shutdown time.
 - 2. Owner's personnel will perform shutdown of operating systems. The contractor shall give three (3) days advance notice for systems shutdown.
- E. Should services be inadvertently interrupted, immediately furnish labor, including overtime, material, and equipment necessary for prompt restoration of interrupted service.
- F. Use of site:
 - 1. Use of the site shall be at the Owner's direction in matters in which the Owner deems it necessary to place restriction.
 - 2. Access to building wherein the work is performed shall be as directed by the Owner.
 - 3. The Owner will occupy all of the facilities during the entire period of construction for conducting normal business operations. Cooperate with the Owner to minimize conflict and to facilitate the Owner's operations.

1.10 QUALITY ASSURANCE

- A. Provide complete testing of the video system in accordance with this Section.
- B. After installation, and before termination, all wiring shall be checked and tested to ensure there are no grounds, opens, or shorts on any conductors or shields. The Contractor shall maintain a complete log of all such quality assurance tests and make them available for inspection by the Owner at any time during the construction phase. At the completion of the installation all test results shall become part of the maintenance documentation.
- C. Inspection:
 - 1. The Contractor shall carry out the inspection requirements of the Contract and shall provide the Owner with documentation to the effect that off-site work is being properly fabricated, and in accordance with the contract documents.
 - 2. The Contractor shall notify the Owner sufficiently in advance of the time when quality control tests are to be performed so that the Owner or their designee may witness such tests, if desired. The presence or absence of the Owner from these tests shall not relieve the Contractor from completing the tests in accordance with the contract documents. Contractors QA documentation and practices shall be subject to Engineer or Owner inspection at any time. The field-certified installer must be present during final testing and calibration.

1.11 CLOSEOUT SUBMITTALS

A. Project Record Drawings:

1. Accurately indicate actual locations of all cameras, head-end equipment, etc.
2. Show the actual installed cable pathway route, including type and size of pathway.
3. Include a reduced set (11" x 17") set of the video system project record drawings in the operation and maintenance manual.

B. Operation and Maintenance Manuals:

1. Document ratings of system and of each major component.
2. Identify operating limits, which may result in hazardous or unsafe conditions, or in equipment damage.
3. Include routine preventive maintenance schedule.
4. List special tools, maintenance materials, and replacement parts.
5. Include repair instructions for procedures to check, repair, and test equipment during typical malfunctions.
6. Include copies of manufacturer product warranties for all equipment.

1.12 SYSTEM DEMONSTRATION AND ACCEPTANCE

- A.** Provide systems demonstration under provisions of Division 1 and this Section.
- B.** At the time of the Substantial Completion Inspection, the Contractor and Security System Integrator shall be on-site to demonstrate the operation of the video system to the Owner's Representatives and Engineer. All video system components shall be installed and fully operational at the time of the system demonstration.
- C.** The Engineer shall review the demonstration with the Owner's Representatives and provide the Contractor with a list of modifications and/or adjustments deemed appropriate for the proper operation of the system. The Contractor shall make all modifications prior to final completion and at no additional cost to the Owner.
- D.** System demonstration shall be conducted as directed by the Owner and Engineer but generally described as follows:
1. Call up each camera on the dedicated Client Workstations in the Control Room and Admin Office, using the VMS software.
 2. Demonstrate search and review of video segments using the VMS software. Download a selected video segment to CD or DVD and demonstrate that the CD or DVD can be viewed on another PC.
- E.** After all changes have been made to the system, the Contractor shall provide the Owner's authorized personnel with operation and maintenance training for the video system, as specified in this section.

1.13 VIDEO SURVEILLANCE SYSTEM TRAINING

- A. In accordance with the requirements of Division 1 and this section, include all costs for the following training on the video system:
1. Maintenance Training: Train the facility maintenance personnel on troubleshooting of the cameras, network components, and the VMS software.
 2. Operator Training: Train the control room staff on camera call-up and general operation of the VMS software. Note that operator training shall be provided only for functions that are deemed accessible to the control room officers, as determined by the Facility Administrator.
 3. Administrator Training: Train the Facility Administrator and Maintenance Administrator on how to review and download video segments or images.
- B. The training session for the video system shall be held at the project site and conducted by certified representatives of the Security System Integrator, including installers who are directly responsible for and familiar with this specific project.
1. Training session shall occur during normal working hours, i.e., Monday through Friday, 8:00 AM to 4:30 PM.
 2. Training session schedule shall conform to the requirements of the Owner.
 3. Submit schedule to Owner for approval not less than two weeks prior to training session.
- C. Total class attendance for each of the classes noted above shall be a maximum of ten (10) people, with multiple classes required to cover staff from all shifts.
- D. Provide a total of (16) hours of training, to be allocated at the discretion of the Facility Administrator.
- E. The Contractor shall have approved operation and maintenance manuals, parts lists, and project record drawings for all equipment on hand at time of instruction.

1.14 EXTRA MATERIALS

- A. Provide spare parts under provisions of Division 1.
- B. Camera: Provide one spare Type 'A' camera.

1.15 WARRANTY

- A. Warrant all materials and equipment to be new and free from defects in material and workmanship for a period of one year under provisions of Division 01.
- B. Thirty days prior to the expiration of the warranty period, the Security Systems Integrator shall contact the Owner's Representative to determine if any adjustments or reprogramming are necessary to maintain proper operation of the security system. If any adjustments or reprogramming are necessary, they shall be done at no cost to the Owner.
- C. At the end of the warranty period, the Owner shall have the option of entering into a maintenance contract with the Security Systems Integrator.

PART 2 - PRODUCTS

2.1 PRODUCT SPECIFICATIONS

- A. Throughout this specification, specific manufacturers and manufacturer's catalog numbers are cited. Unless otherwise noted, these citations are for the purpose of establishing quality and performance criteria and are not intended to be proprietary.
- B. Where no manufacturer is specified, provide products of manufacturers in compliance with requirements. Any item of equipment or material not specifically addressed on the drawings or in this document and required to provide a complete installation shall be provided in a level of quality consistent with other specified items.
- C. The Contractor shall provide the latest product model and software version available from each manufacturer at the time of installation. No "beta version" or "test software" products will be accepted. All proposed and provided equipment and products shall be from the specified and approved manufacturers only, unless previously approved by the Engineer or Owner.
- D. All products and materials are to be new and free of defects, damage and corrosion. All materials shall be in compliance to all applicable codes and designed specifically for the function intended.
- E. Quantity and location of all devices and equipment shall be as specified in Contract Documents or as required for a complete and operable system.

2.2 IP DIGITAL VIDEO MANAGEMENT SYSTEM (VMS) SOFTWARE

- A. The VMS shall be an integrated IP Based Digital Video Management recording solution that provides the following features and capabilities:
 - 1. The VMS shall be computer hardware independent and must meet or exceed the manufacturer's minimum specification for the computer and related devices.
 - 2. The VMS shall incorporate a modular architecture and be able to support an unlimited number of cameras.
 - 3. The VMS shall support both event based and continuous recording and be able to simultaneously record and display live video and display recorded video.
 - 4. The VMS shall mark all events and they shall be available for playback and or archiving at any time. Video events shall be linked to security management system (SMS) events in the SMS database.
 - 5. Client Workstations: System shall initially have provision for up to 10 workstations, expandable up to an unlimited amount. Provide site licenses for 3 simultaneous workstations.
 - 6. Shall have the ability to enhance a frame of video with embedded features or off the shelf software while providing security for the original video image to preserve integrity.
 - 7. Shall be capable of independent camera setup for compression rate, brightness, contrast and other factor setups.

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8. The VMS shall support Ethernet 10BT, Ethernet 100BT and 1000BT. Network protocols shall be supported including TCP/IP, IPX, and UDP.
 9. The network interface shall allow remote access of the VMS from anywhere on the Owner's LAN/WAN.
 10. Shall support limiting of frame rate transmission to individual clients.
 11. The VMS shall support either Multicast or Unicast streaming technology.
 12. The VMS shall be have the ability to playback stored video over the LAN/WAN for remote access of video clips.
 13. Any alarm / event in the SMS shall have the ability to be associated with a digital video clip in real time. The VMS shall support user-defined pre and post roll.
 14. Each camera shall be configurable for a 32 alphanumeric character name and shall allow for the setup and adjustment of brightness, contrast, archiving, motion detection, and PTZ settings (where installed), on a per camera basis.
 15. The VMS shall support PTZ control via the SMS video interface.
 16. The VMS shall support Analog PTZ control via compatible Video Encoding Devices.
 17. The VMS shall support MJPEG, MPEG4, and H.264 formats for multiple IP Video Cameras and IP Video Encoders from approved sources.
 18. The VMS shall have the ability to enforce user authentication, to specify individuals or groups that have the ability to view live or recorded video or make modifications to the system, and the ability to change any or all of the associated IP camera passwords manually or on schedule.
 19. The VMS shall support uni-directional audio recording utilizing built-in audio recording devices on select IP cameras.
 20. The VMS shall support both internal camera video storage and external camera video storage. Internal storage shall allow the camera to store video events and then download these events to the VMS on a predetermined schedule or on demand.
- B. The VMS shall support the following PTZ features:
1. Priority Levels.
 2. Device Group Control.
 3. PTZ Override (Lockout).
 4. Proportional PTZ Control.
 5. Preset Lock via video screen.
 6. Preset Tour.
- C. Video Archiving:

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1. The Archive Server software shall be hardware independent, providing the ability to utilize commercial off-the-shelf mass storage devices, including SAN (Storage Area Network) solutions, Tape Libraries, and direct connect external storage drive arrays.
 2. The Archive Server software shall provide the ability to manage and store video information from multiple video recorders to a central location, without operational degradation.
 3. The VMS shall have the ability to set its own unique archiving properties. Video shall automatically be archived based on user defined "percentage full" settings. When the VMS reaches the designated capacity threshold, video shall be automatically copied to the archive storage media and space on the recorder is released for over-write by new video information.
 4. Regardless of the storage location (local on the recorder or in archive), the system will automatically retrieve video associated with an event on demand. The actual storage location shall be transparent to the user.
- D. Browser-Based Video Viewer: The VMS shall allow monitoring of real-time video from an optional web browser-based video viewer using N-Tier architecture and Microsoft Internet Explorer at 1024x768 resolution. The browser-based viewer shall have the ability to select multiple viewing templates. The browser-based viewer shall provide the following functionality:
1. Display live video.
 2. Digital zooming and panning.
 3. PTZ camera control and locking.
 4. Ability to access video from multiple recording sources.
 5. Priority-based camera control takeover
- E. Real-Time Video Monitoring: The VMS shall allow monitoring of real time video from any Alarm Monitoring client workstation. The video storage appliance and Camera status shall be displayed on a System Hardware Tree.
- F. Video Player: The VMS shall support an advanced matrix view of multiple on-line camera views. Up to a total of 128 fps @ CIF resolution and 72 fps @ 4CIF resolution shall be available for viewing in the Matrix View. The 128-frame rate limitation of video shall be any combination of Live or Recorded video. The number of open video windows shall be dependent on the frame rate and resolution of the cameras. The Video Player shall allow operator sizing of the video windows in the matrix view.
- G. Exporting Video: The VMS shall have to ability to save and export recorded video to a file for the purpose of sharing and reviewing video clips. The start and end times for each video segment shall be user-defined. The exported video clip shall be viewable via a standard video viewer, such as Windows Media Player.
- H. Automated Motion Video Searching: The VMS shall support advanced automated motion video searching against pre-recorded video. The automated motion video search shall analyze frames in a video segment to detect motion activity from image to image. It shall display thumbnail images of the frames with activity, complete with a histogram depicting the relative amount of activity within each frame. The search shall be defined by selecting a specific camera and a

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specific time period in which the suspected activity took place and all motion events associated with that camera and time period shall be displayed in either a trace or thumbnail format for review.

- I. **Video Authentication:** The VMS shall support imbedded authentication of video where the video is watermarked with an authentication key/signature during recording of live video to a hard drive. The video player shall have the ability to verify the authenticity during playback. This authentication shall provide the recorder name, camera name, video time and user information. The authentication shall have the ability to be password-protected.

2.3 VIDEO STORAGE APPLIANCE

- A. Dell R710 series or approved equal.
- B. Substitutions: Under the provisions of Division 1.
- C. The Video Storage Appliance shall be approved by the VMS software manufacturer and be compatible with the installed system. The Video Storage Appliance shall include the following features and capacities:
1. **Video Archive:** The system shall have sufficient hard drive space to provide a minimum of thirty (30) days of archived video for all new cameras, based on the following parameters:
 - a. **Resolution:** All cameras set to the highest resolution available.
 - b. **Compression:** Assume MPEG-4 for VGA cameras, H.264 for megapixel cameras.
 - c. **Recording Rate:** Minimum 2 frames per second (fps) continuous, increase to 10 fps upon motion detection. Assume 30% motion in a 24-hour period.
 2. **System Throughput:**
 - a. **MJPEG** at 4CIF, 30fps, 30Kbytes frame size, 1-20 IP cameras typical.
 - b. **MPEG4** at 4CIF, 2,000 bits/s bit rate, 1-32 IP cameras typical.
 - c. **H.264** at 4CIF, 1,600 Kbits/s bit rate, 1-36 IP cameras typical.
 3. **Processor:** Intel® Quad Core Xeon L5630, 12MB Cache, 2.53 GHz 1066MHz, Energy Smart.
 4. **Memory:** 8GB, DDR2 ECC SDRAM system memory, with minimum 2GB available to VMS application.
 5. **Operating System:** Preloaded with Microsoft® Windows Server 2008 SP2, standard edition, includes (5) CALs.
 6. **VMS Software:** Preloaded with VMS software.
 7. **Chassis:** Rack chassis with all accessories required to mount server in security equipment cabinet.
 8. **Hard Drive Configuration:** Integrated SAS/SATA RAID 5.

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9. RAID Controller: PERC 6/i SAS RAID controller, 2x4 connectors, internal, PCIe256MB cache, x6 Chassis.
10. Operating Hard Drives: Two redundant internal 160GB SATA-II hard drives for OS and VMS, separate from video recording drives.
11. Video Recording Hard Drives: In addition to operating hard drives, unit shall have internal SATA-II hot-swap RAID-5 hard drives dedicated to video recording only. Total hard drive capacity shall be 8 TB minimum, or higher if required to obtain the specified archive time.
12. Video Card: ATI ES1000 (32MB graphics) with 1 VGA port and maximum 1440x900 resolution.
13. Power Supply: Energy Smart redundant power supply with Y-cord.
14. Bezel: Provide with rack bezel.
15. Enclosure: Provide with rack-mount chassis and all brackets and accessories required to mount the server in the existing cabinet.
16. Network Adapter: Broadcom 5709 dual-port, copper, 1GbE NIC with TOE.
17. Optical Drive: DVD-RW, SATA, internal.
18. Keyboard: USB Keyboard.
19. Mouse: USB optical mouse.
20. Ports: Minimum of (2) USB 2.0 ports and (2) 1GbE ports.
21. Monitor: Dell "UltraSharp" #1708FP or approved equal 17-inch, TFT, LCD color flat panel active matrix display monitor with 1280 x 1024 resolution, 800:1 contract ratio, 5 ms response time, and adjustable height desktop stand. Provide with Dell #AX510 or approved equal speaker bar.
22. Documentation: Users Manual, Installation and Trouble Shooting Guide on CD.
23. Warranty: Basic 3-year manufacturer's hardware warranty, business hours (5x10), next business day on-site service.
24. Rack-Mount UPS: APC "Smart-UPS" #SUA2200RM2U or approved equal rack-mounted UPS with 2200VA, 1980W output power capacity, and a typical half-load backup time of 15.7 minutes. The UPS shall be mounted in the telecom cabinet and connected to the Video Storage Appliance.

2.4 CLIENT WORKSTATION COMPUTER

- A. Client Workstation Computer: Where indicated on the Drawings, new Client Workstation Computer shall be a Dell "OptiPlex 790 USFF Ultra Small Form Factor" or approved equal computer that is approved by the system manufacturer and is compatible with the installed system. The computer shall include:

1. Processor: Intel® Dual Core E5300, 2MB Cache, 2.6 GHz 800MHz FSB, Energy Smart.

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2. Memory: 4GB, DDR3, Non-ECC SDRAM, 1333MHz (2xDIMM).
3. Operating System: Microsoft® Windows 7 Professional with XP Professional mode.
4. Additional Software: The most recent versions (at time of Substantial Completion) of Norton Anti-Virus.
5. Chassis: Ultra small form factor chassis.
6. Boot Hard Drive: 250GB, 7,200 RPM, 2.5" SATA, 3.0 Gb/s with NCQ and 16MB cache.
7. Video Card: AMD Radeon HD 6450, 1GB.
8. Network Adapter: Intel PRO 1000FT 1GbE dual-port NIC, PCIe-4.
9. Optical Drive: 8X DVD±/RW, SATA, internal.
10. Keyboard: USB Keyboard.
11. Mouse: USB optical mouse.
12. Monitor: Dell "UltraSharp" #U2412M or approved equal 24-inch, VESA compatible, wide-screen flat panel LCD color monitor with 1920 x 1200 resolution, 300 cd/m2 image brightness, 1000:1 contrast ratio, 8 ms response time, and adjustable height desktop stand. Provide with Dell #AY511 or approved equal speaker bar.
13. CCTV Monitor Arm – Wall-Mount: VESA compatible, wall-mounted, fully articulated LCD monitor arm, suitable of supporting up to 23 lbs. Ergotron (www.ergotron.com) "100 Series" or approved equal double-pivot monitor arm with vertical wall bracket, 180° vertical and horizontal tilt, and black finish.
14. Documentation: Users Manual, Installation and Trouble Shooting Guide on CD.
15. Warranty: 3-year Basic Limited Warranty and 3-year next business day on-site service.

2.5 MANUFACTURERS – FIXED IP CCTV CAMERAS

- A. Axis.
- B. Bosch.
- C. Vicon
- D. Panasonic.
- E. Sony.
- F. Substitutions: Under provisions of Division 01.

2.6 FIXED IP CCTV CAMERAS

- A. Type 'A' – Outdoor Day/Night 1 Megapixel IP Mini-Dome: Axis #3344-VE-6mm or approved equal megapixel, day/night IP color camera with the following features:

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1. Imaging Device: 1/4 inch progressive scan CMOS.
2. Resolution: 1280 x 800 (1 megapixel), HDTV 720p.
3. Light Sensitivity: Minimum 0.4 lux at F1.6 in color mode, 0.06 lux at F1.6 in BW mode.
4. Lens: Vari-focal with remote zoom and focus, minimum 2.5-6.0 mm range, F1.6, IR-corrected, megapixel-rated, auto-iris. Automatic IR cut filter removal in low light conditions.
5. Electronic Shutter: 1/6 to 1/25,000 sec.
6. Backlight Compensation: Automatic.
7. Video Compression: H.264, Motion JPEG.
8. Frame Rate Using H.264: Up to 30 fps in all resolutions.
9. Frame Rate Using Motion JPEG: Up to 30 fps in all resolutions.
10. Video Streaming: Simultaneous H.264 and Motion JPEG, controllable frame rate and bandwidth, supporting both unicast and multicast streaming.
11. Image Settings: Compression, color, brightness, sharpness, white balance, exposure control, wide dynamic range, rotation, low-light adjustment, text and image overlay.
12. Security: Password protection, IP address filtering, HTTPS encryption, IEEE 802.1X network access control, user access log.
13. Supported Protocols: IPv4, IPv6, HTTP, TCP, ICMP, IGMP, SNMP, RARP, UDP, SMTP, FTP, DHCP, ARP.
14. Web Server: The camera shall contain a built-in web server, making video and configuration available in a standard browser environment using HTTP, without the need for additional software. The camera shall support full functionality with the Windows XP operating system and MS Explorer 6.x or higher browser. The camera shall support simultaneous viewing by up to 10 clients from the web server.
15. Software: Provide with one user license.
16. Alarm Triggers: external input.
17. Video Buffer: 48MB pre- and post-alarm.
18. Memory: 128MB RAM, 128MB Flash.
19. Connectors: Ethernet RJ-45 (PoE), DC jack, terminal block for 1 alarm input and 1 output.
20. Input Power: PoE IEEE 802.3af, Class 3.
21. Operating Temperature: Minimum operating temperature range of -20°F to +131°F.

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22. Housing: Impact-resistant IP-66 aluminum housing with tamperproof fasteners and camera shroud to conceal camera position inside the dome. Camera enclosure shall have thermostat, heater, dehumidifying membrane, and fan.
23. Mounting: Provide mounting arm for wall-mount where indicated on the Drawings. Axis #T91A or approved equal pendant wall bracket.
- B. Type 'B' – Outdoor Day/Night 3 Megapixel IP Mini-Dome: Axis #3346-VE-9mm or approved equal megapixel IP color camera with the following features:
1. Imaging Device: 1/3 inch progressive scan CMOS.
 2. Resolution: 2048 (H) x 1536 (V), 3 megapixel, high-definition.
 3. Light Sensitivity: Minimum 0.5 lux at F1.2 for color image, 0.8 lux at F1.2 for B/W image.
 4. Lens: Vari-focal with remote zoom and focus, minimum 3-9mm range, F1.2, IR-corrected, megapixel-rated, auto-iris. Automatic IR cut filter removal in low light conditions.
 5. Electronic Shutter: 1/6 to 1/25,000 sec.
 6. Backlight Compensation: Automatic.
 7. Video Compression: H.264, Motion JPEG.
 8. Frame Rate Using H.264: Up to 20 fps in all resolutions.
 9. Frame Rate Using Motion JPEG: Up to 20 fps in all resolutions.
 10. Video Streaming: Simultaneous H.264 and Motion JPEG, controllable frame rate and bandwidth, supporting both unicast and multicast streaming.
 11. Image Settings: Compression, color, brightness, sharpness, white balance, exposure control, rotation, low-light adjustment, text and image overlay, privacy mask.
 12. Security: Password protection, IP address filtering, HTTPS encryption, IEEE 802.1X network access control, user access log.
 13. Supported Protocols: IPv4, IPv6, HTTP, TCP, ICMP, IGMP, SNMP, RARP, UDP, SMTP, FTP, DHCP, ARP.
 14. Web Server: The camera shall contain a built-in web server, making video and configuration available in a standard browser environment using HTTP, without the need for additional software. The camera shall support full functionality with the Windows XP operating system and MS Explorer 6.x or higher browser. The camera shall support simultaneous viewing from the web server.
 15. Software: Provide with one user license.
 16. Intelligent Video: Video motion detection, active tampering alarm, audio detection.
 17. Alarm Triggers: Intelligent video and external input.

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18. Video Buffer: 48MB pre- and post-alarm.
 19. Memory: 128MB RAM, 128MB Flash.
 20. Connectors: Ethernet RJ-45 (PoE), DC jack, terminal block for 1 alarm input and 1 output.
 21. Input Power: PoE IEEE 802.3af.
 22. Operating Temperature: Minimum operating temperature range of -40°F to +131°F.
 23. Housing: Impact-resistant IP-66 aluminum housing with tamperproof fasteners and camera shroud to conceal camera position inside the dome. Camera enclosure shall have thermostat, heater, dehumidifying membrane, and fan.
 24. Mounting: Provide mounting arm for wall-mount where indicated on the Drawings. Axis #T91A or approved equal pendant wall bracket.
- C. Type 'P' – Outdoor Day/Night Megapixel IP PTZ Camera: Axis #Q6035-E or approved equal IP PTZ color camera with the following features:
1. Imaging Device: 1/3 inch progressive scan CCD.
 2. Resolution: 1920 x 1080, 3 megapixel, HDTV 1080p.
 3. Light Sensitivity: Minimum 0.8 lux, at 30 IRE F1.6 for color image, 0.04 lux at 30 IRE F1.6 for B/W image.
 4. Lens: Vari-focal with remote zoom and focus, minimum 4.7-84.6mm range, F1.6-2.8, IR-corrected, megapixel-rated, autofocus, auto-iris, automatic day/night. Automatic IR cut filter removal in low light conditions. 18x optical zoom, 28x digital zoom.
 5. Electronic Shutter: 1/4 to 1/30,000 sec.
 6. Presets: 100 preset positions.
 7. Video Compression: H.264, Motion JPEG.
 8. Frame Rate Using H.264: Up to 30 fps in all resolutions.
 9. Frame Rate Using Motion JPEG: Up to 25 fps in all resolutions.
 10. Video Streaming: Simultaneous H.264 and Motion JPEG, controllable frame rate and bandwidth, supporting both unicast and multicast streaming.
 11. Image Settings: Compression, color, brightness, sharpness, white balance, exposure control, rotation, backlight compensation, low-light adjustment, text and image overlay, privacy mask.
 12. Security: Password protection, IP address filtering, HTTPS encryption, IEEE 802.1X network access control, user access log.
 13. Supported Protocols: IPv4/v6, HTTP, HTTPS, TCP, ICMP, IGMP, SNMP, RARP, UDP, SMTP, FTP, DHCP, ARP.

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14. **Web Server:** The camera shall contain a built-in web server, making video and configuration available in a standard browser environment using HTTP, without the need for additional software. The camera shall support full functionality with the Windows XP operating system and MS Explorer 6.x or higher browser. The camera shall support simultaneous viewing from the web server.
15. **Software:** Provide with one user license.
16. **Intelligent Video:** Video motion detection, auto-tracking, Active Gatekeeper.
17. **Alarm Triggers:** Video motion detection, auto-tracking, Intelligent video, PTZ position, temperature, memory card full.
18. **Video Buffer:** 96MB pre- and post-alarm.
19. **Memory:** 256MB RAM, 128MB Flash.
20. **Connectors:** Ethernet RJ-45 (PoE) IP66-rated connector kit.
21. **Input Power:** PoE IEEE 802.3at, max 60W. Provided with Axis #T8124 1-port midspan injector.
22. **Operating Temperature:** Minimum operating temperature range of -40°F to +122°F.
23. **Housing:** Impact-resistant IP-66 aluminum housing with tamperproof fasteners and camera shroud to conceal camera position inside the dome. Camera enclosure shall have clear dome cover, sunshield, thermostat, heater, dehumidifying membrane, and fan.
24. **Mounting:** Provide corner-mount pendant arm. Axis #T91A64 or approved equal corner bracket with Axis #T91A61 wall bracket.

2.7 GENERAL HARDWARE AND MOUNTS

- A. Anchoring:
 1. Anchoring shall be rated for the load and mounting surface.
 2. All anchoring sets shall be installed per manufacturers' instructions and be appropriate for the surface to which they are mounted.
 3. All manufacturers' torque specifications shall be adhered to as applicable and be appropriate for the surface to which the anchoring sets are mounted.
 4. Mounts shall be rated for the weight, external weight (i.e., snow or rain), twist, and wind loading of the equipment used.
 5. All hardware shall be installed so that it cannot be removed without the use of hand tools.
 6. All exterior exposed mounting hardware including arms, poles, adapters conduit and boxes shall be painted to match the architecture of the building.

2.8 PoE NETWORK SWITCH

- A. PoE Switch: Cisco "Catalyst" series #3560G-24PS-S or approved equal 24-port 10/100/1000, Gigabit Ethernet PoE+ network switch with IEEE 802.3af PoE (15.4W of power) on all ports, 370W overall power budget, and (4) 1 Gigabit Ethernet SPF uplink ports.

2.9 UTP CABLE

- A. Camera PoE Field Cable: Berk-Tek LanMark 1000 CMP or approved equal plenum-rated CL2P, Category 6, 4-pair, 24 AWG, solid copper conductor UTP telecommunications cable with green outer jacket. Use for all "permanent link" cable runs between cameras and designated termination points, as indicated on the Drawings.
- B. Camera Field Patch Cord: Provide Ortronics #OR-MC6xx-05 or approved equal factory-terminated Category 6 patch cables with green jacket, where the "xx" in the part number is the cable length, which shall be determined by the Contractor. Use for connection from the camera to the CCTV jack.
- C. Gigabit Ethernet Uplink Patch Cord: Same as the Cross-Connect Patch Cords specified below.
- D. Cross-Connect Patch Cords: Provide #OR-MC603-05 or approved equal factory-terminated 3-foot Category 6 patch cords with green jacket for cross-connect between the video networking equipment. Provide one patch cord for each port in the network switch.
- E. New Network Horizontal Cable: Same as Camera PoE Field Cable specified above.

2.10 UTP COMPONENTS

- A. UTP Patch Panel: Provide UTP patch panel to terminate incoming "permanent link" field wiring from the cameras and to cross-connect to the CCTV network switch. Patch panel shall be high-density, Category 6, modular patch panels with RJ-45, T568A/B, 8P8C Category 6 compliant jacks in 8-port modules. The jacks shall be factory wired to a 110 type IDC connector. The complete assembly shall exceed the requirements of TIA/EIA 568-B (Category 6), and be factory tested to 1000 Mbps data rates. Install the number of patch panels in each equipment rack as shown on the drawings. Coordinate with Owner to verify the correct wiring configuration (T568A or T568B) of the patch panel prior to termination.
1. 24-Port Patch Panel: Ortronics "Clarity 6" #OR-PHD68U24 or approved equal.
- B. UTP Feed-Through Cable Management Panel: Provide feed-through cable management panel to route cables from patch panel to front of back of rack (as required). Cable management panel shall be 1 RMU and have five horizontal distribution rings and four cutouts in face of panel. Ortronics #60400129 or approved equal.
- C. UTP Jacks: Provide Ortronics "TracJack Clarity 6" #OR-TJ600 or approved equal type RJ-45, Category 6, T568A/B, 8P8C, single, white finish, telecommunications jack with flush exit to terminate "permanent link" field wiring at the CCTV outlet box. Coordinate with Owner to verify the correct wiring configuration (T568A or T568B) of the jacks prior to termination. Unless otherwise noted on the drawings, install each telecommunications jack inside the CCTV outlet box at the camera.

2.11 VIDEO EQUIPMENT RACKS

- A. Wall Cabinet: Rackman "SWMR series" #SWMR3022 or approved equal, 60-inch high, 20-inch deep, side-hinged vented wall cabinet with locking rear panel, adjustable 19" EIA rack rails, 30 rack-mount units of usable space, and black finish. The wall cabinet shall be capable of supporting 300 pounds. The wall cabinet shall have the following features:
1. One Rackman #ELXD30P or approved equal locking plexiglass door
 2. One Rackman #FAN-50 or approved equal 50 CFM fan kit.
 3. One Tripp Lite #IBAR12/20LTRA or approved equal surge-protected power strip with (2) front-mounted NEMA 5-15R outlets, (10) NEMA 5-20R rear-mounted outlets, 15' power cord, and a suppression rating of 140V RMS clamping/3840 joules/60,000 amps.
 4. Wall rack shall be mounted on $\frac{3}{4}$ " ACX plywood backboard, 36-inches wide by 96-inches high, in order to allow for attachment of other equipment and cable management rings. Field verify exact dimensions prior to installation.
- B. Floor Cabinet: Where indicated on the Drawings, mount the video equipment in the existing server cabinet.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION

- A. Prior to beginning equipment installation, examine areas to receive equipment. Verify that all conditions are acceptable.
- B. Environmental Conditions: Components mounted in locations exposed to weather shall be housed in corrosion resistant enclosures with appropriate environmental protection. Component performance shall not degrade because of improper housing design. Components in enclosures shall meet manufacturer's performance requirements when exposed to the ambient conditions beyond manufacturer's limits. If required, Contractor shall provide heaters in enclosures
- C. Install all equipment in accordance with the manufacturer's instructions.
- D. Keep up to date "As-built" record drawings at each job site detailing the layout and field modifications to the Shop Drawings.
- E. Provide boxes for mounting devices, cable pulling, and splicing cables under provisions of Section 16132.
- F. Follow cable manufacturer's specification regarding handling methods, retaining/support methods, bending radius and maximum pulling tension limitations. Where manufacturer does not provide bending radius information, minimum bending radius shall be 10 times the diameter of the cable. Use a tension-monitoring device to ensure that the maximum pulling tension that may be applied to the cable to be pulled into a conduit section is not exceeded. Provide replacement cable if cable manufacturer's maximum pulling tension is exceeded at any time during a pull.
- G. Cable shall be carefully inspected for sheath defects or other irregularities as it is paid out from the reel. When defects are detected, pulling shall stop immediately and the cable section shall

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be repaired or replaced at the discretion of the Owner. A system of communications shall be maintained between pulling and feed locations so that pulling can be stopped instantly, when required.

- H. Adequate care shall be exercised when handling and storing reels of cable to prevent damage to the cable. Cable with dents, flat spots, or other sheath distortions shall not be installed.
- I. Store a maximum of one foot of slack UTP cable for each UTP jack at each camera outlet.
- J. At the rack, a minimum of three feet of slack UTP cable shall be provided. Route the service loop down into the cabinet, across the bottom and up to the patch panel. No cables shall encroach or interfere with rack equipment space. All cables shall be protected from physical damage and should not be routed on the floor. Coiling the slack cable above or adjacent to the rack is not acceptable. The intent of this installation method is to provide slack cable for future work without causing increased inductance by coiling the cables.
- K. All cabling shall be run continuous with no splices from each camera outlet to the patch panel in the rack. Cables shall be terminated at each end. No UTP cable run shall exceed 90 meters (295 feet) in length from the camera to the head-end equipment or intermediate closet, whichever is closer.
- L. All cable shall be routed in such a way as to minimize EMI and RFI interference. Cables shall be routed to maintain the following minimum distances from noise producing devices:
 - 5 inches from power lines of 2 kVA or less.
 - 12 inches from fluorescent and HID ballasts
 - 36 inches from 5 kVA or greater power lines
 - 40 inches from transformers and motors
- M. The jacket of UTP cables shall be maintained to a point within one half inch of the jack. The twists on the individual pairs shall be maintained as close as possible to the contacts of the termination points but shall in no case exceed 1/2 inch.
- N. Unless otherwise noted, all video system cables shall be installed in raceway or J-hooks for the entire length of each cable. Provide raceway through areas that will not be accessible for future cable replacement or additions. Portions of cables installed in J-hooks shall be supported in accordance with TIA/EIA standards at intervals not exceeding four (4) feet in length. The cable shall not be supported from ducts, pipes, conduits, ceiling grid hangar wires, etc. At any point where the cable changes direction, slack shall be provided to prevent rubbing or binding on the corner supports. Extreme care shall be taken to ensure that the cable is not compressed, kinked or otherwise deformed during installation. Any cable that is stretched, compressed, kinked or otherwise deformed shall be replaced at no cost to the Owner.
- O. No wiring other than that directly associated with video system shall be permitted in video system conduits and pathways.

3.2 INTERFACE WITH OTHER WORK

- A. Coordinate all camera locations with Owner's Representative prior to rough-in and avoid conflicts with existing equipment and objects that may obstruct the field of view or, in the case of light fixtures, may affect the camera performance and quality of the video image.

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- B. Coordinate all camera, outlet box, J-hook, and conduit locations to avoid conflicts with mechanical piping and ductwork, structural members, and other materials above the accessible ceilings and along the entire cable pathway.
- C. Any camera that is located so that camera performance or field of view is adversely affected shall be relocated by the Contractor at no additional cost to the Owner.

3.3 LABELING

- A. Furnish and install labels and documentation to identify all cables, jacks, and connections in accordance with TIA/EIA standards, as shown on the Drawings, and under the provisions of Section 16195 and this Section. As a minimum, each camera jack in each outlet box shall have a unique identifier that matches the identifier at the opposite end and matches the naming scheme on the camera schedule. Identifiers shall be installed on the cable at both ends.
- B. Label all video system junction boxes. For junction boxes above ceilings, mark the box cover with "CCTV" using permanent black marker. For junction boxes in finished areas, mark the inside of the cover.

3.4 CABLE ACCEPTANCE TESTING

- A. Each UTP cable shall be tested for compliance with TIA/EIA 568B.2-1, Addendum 1 Category 6 standards after installation using a Fluke or approved equal Level 3 tester. At a minimum, the Contractor shall perform the following tests with the maximum frequency of the tester set at 350MHz:
 - 1. Signal Attenuation / Insertion Loss
 - 2. Near End Cross Talk (NEXT)
 - 3. Power Sum Near End Cross Talk (PS-NEXT)
 - 4. Equal Level Far End Cross Talk (ELFEXT)
 - 5. Power Sum Equal Level Far End Cross Talk (PS-ELFEXT)
 - 6. Attenuation to Crosstalk Ratio (ACR)
 - 7. Power Sum Attenuation to Crosstalk Ratio – Near End (PSACR-N)
 - 8. Power Sum Attenuation to Crosstalk Ratio – Far End (PSACR-F)
 - 9. Propagation Delay
 - 10. Delay Skew
 - 11. Return Loss
 - 12. Wiremap
 - 13. Overall Cable Length
- B. Test, analyze, and record compliance for the following network protocols:

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1. 10 Base-T
2. 100 Base-T
3. 1000 Base-T
4. 155 Mbps ATM

- C. The Contractor shall provide 100% testing for each "permanent link" (i.e. from the camera outlet box to the patch panel at the opposite end. Provide test results for all tests noted above in the form of printouts from the test equipment. At the front of the test report, the Contractor shall provide an index showing the pass/fail results of each cable, along with the cable length and a corresponding cable label.
- D. Where any portion of the system does not meet the Specifications, the Contractor shall correct the deviation and repeat any applicable testing at no additional cost to the Owner.
- E. Provide three working days advance notice of tests. The Owner's Representative shall reserve the right to be present during the testing of any or all cables in the system. Submit a copy of the test report for each cable prior to substantial completion of the project.
- F. Acceptance of the video surveillance system shall be based on the results of the above tests, functionality, and the receipt of documentation.

3.5 ADJUSTING, PROGRAMMING, AND CONFIGURATION

- A. Fixed Cameras: The Contractor shall coordinate with the Owner to obtain the desired field of view for each new camera. This includes, but is not limited to, adjusting camera aiming point, white balance, backlight compensation, AGC, iris control, viewing angle, and adjusting vari-focal lenses.
- B. VMS Software: The Contractor shall completely configure each video input for camera title, frame rate, resolution, compression, motion detection, alarms, pre/post event recording, macros, and all other features of the software. The software shall be initially configured with the following parameters:
1. Camera Title: Coordinate with Owner for approval of camera title.
 2. Record Rate: Set frame rate based on Owner input.
 3. Record Mode: Continuous recording or record on motion, set individually for each camera. Coordinate with Owner.
 4. Motion Detection: Coordinate with Owner for which cameras will have motion detection and which areas within each camera view will be masked.
 5. Pre/Post Event Recording: 5 seconds pre-event, 5 seconds post-event.
 6. Ethernet Settings: All settings shall be programmed at the system. Contact Owner for proper IP address, subnet mask, host, and gateway settings.
 7. Password: Unit shall utilize three levels of password protection (Installer, Operator, Administrator).

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8. Clock: Set software clock to 12-hour format, MM/DD/YY calendar. Synchronize with NSB primary and backup servers and update clock once per day. Contact Owner for server information.
9. Notification: Notify upon video loss. Contact Owner for email address to send notification.

3.6 DEMONSTRATION

- A. Provide systems demonstration under provisions of Division 1.
- B. Provide the Owner's authorized personnel with operation and maintenance training for the video system, as specified in this section.
- C. Conduct walking tour of project and briefly describe function, operation, and maintenance of each component.

END OF SECTION

SECTION 16903 - DETENTION PLC CONTROL SYSTEM

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Programmable controller central processing unit.
- B. Remote input/output modules.
- C. Programming Accessories.

1.2 RELATED SECTIONS

- A. Section 16149 – Detention Relay Logic System.
- B. Section 16195 – Identification for Electrical Systems.
- C. Section 16727 – Detention Monitoring and Control System.
- D. Section 16751 – Detention Intercom System.

1.3 REFERENCES

- A. NEMA ICS 1 - General Standards for Industrial Control and Systems.
- B. NEMA ICS 3 - Industrial Systems.
- C. NEMA ICS 6 - Enclosures for Industrial Controls and Systems.
- D. NFPA 70 - National Electrical Code.

1.4 SYSTEM DESCRIPTION – PROGRAMMABLE CONTROLLER (PLC)

- A. Provide a Programmable Controller consisting of the following:
 - 1. Central Processing Unit (CPU) capable of processing inputs and outputs from all modules in one or more chassis as required.
 - 2. Modular chassis, sized to accommodate all input and output modules.
 - 3. Power supply capable of providing power to all modules in the chassis, including the CPU. Separate power supplies shall be provided for each chassis.
 - 4. Input and Output (I/O) modules as required to perform all functions to provide a complete and operable system. The PLC shall support an open communication architecture, which enables it to be connected to other networked PLC's and to the touchscreen computers via Ethernet TCP/IP protocol with a minimum speed of 10Mbps.
 - 5. Ladder logic software with Windows interface capable of programming all required functions for a complete and operable system.
- B. The PLC shall have built-in comprehensive self-test and self-diagnostic capabilities. All controllers shall be equipped with built-in status indication of the following information:

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1. Power applied to the system.
2. DC power valid.
3. Watchdog contacts.
4. Serial port(s) active.
5. CPU battery failure.
6. EEPROM program failure.

C. All PLC equipment shall be from a single manufacturer. The PLC shall be general purpose in nature and not custom designed for specific application. The PLC shall become location and operation specific upon installation of I/O modules and programming.

D. Interface with Existing Equipment:

1. The new security system shall incorporate all functions in the existing hard control panels, as well as all other specified functions. There shall be a single touchscreen interface program to provide seamless integration between all equipment.

1.5 REGULATORY REQUIREMENTS

A. The PLC system shall comply with applicable federal, state, and local building codes. All equipment and assemblies shall be Underwriters Laboratories approved if applicable.

1.6 QUALIFICATIONS

A. The entire programmable controller system shall be supplied, assembled, installed, and commissioned by the Security Systems Integrator as specified in Section 16727.

1.7 SUBMITTALS

A. Submit product data under provisions of Division 1 and Division 16.

B. Product Data: Provide data for each component specified showing electrical characteristics and connection requirements.

C. Shop Drawings: Indicate electrical characteristics and connection requirements, including layout of completed assemblies, interconnecting cabling, dimensions, weights, and external power requirements. Show all equipment and interconnecting wiring on the security system shop drawings as specified in Section 16727.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Division 1.

B. All PLC equipment, wiring, etc. shall be stored in an enclosed area, maintained at a minimum of 55° F and shall be protected from weather.

C. Maintain area free of dirt and dust during and after installation of products. Protect other surfaces against damage and discoloration caused by work of this section.

1.9 SYSTEM DEMONSTRATION AND ACCEPTANCE

- A. Provide systems demonstration under provisions of Division 1, Section 16010, Section 16727, and this section.
- B. System demonstration shall be conducted as directed by the Engineer but generally described as follows:
 - 1. Test a random sample of input and output points to show that a specific function or action in the system generates the correct response on the touchscreen and illuminates the corresponding LED on the I/O module.
 - 2. Verify remote PLC access for troubleshooting.
 - 3. Verify all PLC-related internal alarms, including CPU battery failure, processor failure, communication failure, etc.
 - 4. Verify all PLC control functions related to the Detention Monitoring and Control System, as specified in Section 16727.

1.10 CLOSEOUT SUBMITTALS

- A. Project Record Drawings:
 - 1. Submit documents under provisions of Division 1 and Section 16010.
 - 2. Accurately record PLC equipment elevations, as-built wiring diagrams, etc. as part of the security system project record documents as specified in Section 16727.
- B. Operation and Maintenance Manuals:
 - 1. Submit documents under provisions of Division 1 and Section 16010.

1.11 PLC SYSTEM TRAINING

- A. As specified in Section 16727.

1.12 EXTRA MATERIALS

- A. All PLC software: Three full backup copies of the final PLC program on CD or flash drive. Prior to the final copies being made, provide one interim backup copy of the PLC program to the Owner whenever changes are made to the system during the inspection and training stage of the project

1.13 WARRANTY AND MAINTENANCE CONTRACT

- A. As specified in Section 16010.

PART 2 - PRODUCTS

2.1 PRODUCT SPECIFICATIONS

- A. Throughout this specification, specific manufacturers and manufacturer's catalog numbers are cited. Unless otherwise noted, these citations are for the purpose of establishing quality and performance criteria and are not intended to be proprietary.

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- B. Where no manufacturer is specified, provide products of manufacturers in compliance with requirements. Any item of equipment or material not specifically addressed on the drawings or in this document and required to provide a complete installation shall be provided in a level of quality consistent with other specified items.
- C. The Contractor shall provide the latest product model and software version available from each manufacturer at the time of installation. No "beta version" or "test software" products will be accepted. All proposed and provided equipment and products shall be from the specified and approved manufacturers only, unless previously approved by the Engineer or Owner.
- D. All products and materials are to be new and free of defects, damage and corrosion. All materials shall be in compliance to all applicable codes and designed specifically for the function intended.
- E. Quantity and location of all devices and equipment shall be as specified in Contract Documents or as required for a complete and operable system.

2.2 ACCEPTABLE MANUFACTURERS - PROGRAMMABLE CONTROLLER

- A. Schneider Electric/Modicon "M340" Series or approved equal.
- B. Allen-Bradley.
- C. Siemens.
- D. GE Fanuc.
- E. Substitutions: Under provisions of Division 1.

2.3 PROGRAMMABLE CONTROLLER

- A. Provide new PLC/relay system to control all points as shown on the Drawings.
- B. PLC Backplane: Modicon M340 #BMXXBPxx00 or approved equal backplane, where the "xx" in the part number is the quantity of slots on the backplane. Provide either 8-slot or 12-slot backplane, as required for the number of modules.
- C. Power Supply: Modicon M340 #BMXCPS2000 or approved equal 20W power supply.
- D. Processor Module: Modicon M340 #BMXPP342000 or approved equal CPU with 4096kB RAM, 8MB SD flash memory card for application backup, and on-board USB, Ethernet TCP/IP, and RS-485 ports.
- E. Ethernet TCP/IP Communications Module: Modicon M340 #BMXNOE0100 or approved equal communications adapter with 10BASE-T Ethernet port.
- F. I/O Modules: Modicon M340 #BMXDDIxx02K and #BMXDDIx02K series or approved equal discrete input and output modules, where the "xx" in the part number is the quantity of input or output points. Provide modules with point counts and quantities as required to obtain the specified sequence of operation
- G. Universal Communications Base: NR&D #MUCM or approved equal programmable serial communications module for the Momentum PLC. Module includes two selectable and individually configurable serial ports for RS-232/422/485 protocol.

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- H. Ethernet Switch: N-Tron #308TX or approved equal unmanaged industrial Ethernet switch with eight 10/100 RJ-45 ports.

2.4 PROGRAMMING ACCESSORIES

- A. Software: Modicon "Unity" or approved equal programming software, latest published version. The software shall have the following features:
1. 32-bit ladder logic programming with a Windows interface.
 2. Online editing of the PLC processor.
 3. Consolidated Project View: All information is displayed as a "project tree".
 4. Diagnostic and Troubleshooting Tools: The software shall be able to diagnose the interaction of output instructions within a section of the program by viewing them at the same time.
 5. The software shall be able to move instructions from one rung to another within a project using drag and drop editing.
- B. Communications cable:
1. Provide a Berk-Tek LanMark 1000 or approved equal Category 6 cable and jack to connect each touchscreen computer to the PLC.
 2. PLC I/O Cable: West Penn #275 or approved equal 20-conductor, 22 AWG cable with PVC outer jacket.

2.5 EQUIPMENT CABINET

- A. Mount PLC in PLC/Relay cabinet as specified in Section 16149.

2.6 INTERFACE WITH EXISTING EQUIPMENT

- A. Provide all necessary software, hardware, programming, and labor to interface with all new and existing field devices in the building, as indicated on the Contract Drawings, and as field-verified by the Contractor.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install PLC in relay cabinet where indicated on the Drawings.
- C. Connect all input and output devices as required to control systems as specified herein and elsewhere in the Contract Documents.
- D. Extend I/O cables from PLC I/O modules to new and existing field terminals and relays.

3.2 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Division 1 and Division 16.

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- B. Perform operational testing on control systems to verify proper operation and field wiring connections.

END OF SECTION