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END OF SECTION 00 0110

SECTION 04 2000 - UNIT MASONRY

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Concrete block (CMU).

B. Mortar and grout.

C. Reinforcement and anchorage.

D. Flashings.

E. Lintels.

F. Accessories.

G. Installation of masonry units, including cast stone and precast concrete trim.

1.2 RELATED REQUIREMENTS

A. Section 03 3000 - Cast-in-Place Concrete: Installation of dovetail slots for masonry anchors.

B. Section 06 1000 - Rough Carpentry: Nailing strips built into masonry.

C. Section 07 2500 - Weather Barriers: Water-resistive barriers applied to exterior face of backing sheathing or unit masonry substrate.

D. Section 07 9200 - Joint Sealants: Sealing control and expansion joints.

1.3 REFERENCE STANDARDS

A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.

B. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2022.

C. ASTM A951/A951M - Standard Specification for Steel Wire for Masonry Joint Reinforcement; 2022.

D. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2022.

E. ASTM B370 - Standard Specification for Copper Sheet and Strip for Building Construction; 2022.

F. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units; 2023.

G. ASTM C91/C91M - Standard Specification for Masonry Cement; 2023.

H. ASTM C129 - Standard Specification for Nonloadbearing Concrete Masonry Units; 2023.

I. ASTM C140/C140M - Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units; 2023a.

J. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar; 2018.

K. ASTM C150/C150M - Standard Specification for Portland Cement; 2022.

L. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2018.

M. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2019a, with Editorial Revision.

N. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; 2024.

O. ASTM C476 - Standard Specification for Grout for Masonry; 2023.

P. ASTM C780 - Standard Test Methods for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry; 2023.

Q. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete; 2016.

R. BIA Technical Notes No. 7 - Water Penetration Resistance – Design and Detailing; 2017.

S. BIA Technical Notes No. 28B - Brick Veneer/Cold-Formed Steel Framed Walls; 2025.

T. BIA Technical Notes No. 46 - Maintenance of Brick Masonry; 2017.

U. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2022, with Errata (2024).

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and masonry accessories.

C. Shop Drawings: Indicate pertinent dimensions, materials, anchorage, size and type of fasteners, and accessories for brickwork support system.
   1. Stone Trim Units: Show sizes, profiles, and locations of each stone trim unit required.
   2. Reinforcing Steel: Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315.
   3. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.

D. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.

E. Material Certificates: For each type and size of the following:
   1. Masonry units.
      a. Include data on material properties.

b. For masonry units used in structural masonry, include data and calculations establishing average net-area compressive strength of units.

2. Cementitious materials. Include name of manufacturer, brand name, and type.
3. Mortar admixtures.
4. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
5. Grout mixes. Include description of type and proportions of ingredients.
6. Reinforcing bars.
7. Joint reinforcement.
8. Anchors, ties, and metal accessories.

F. 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 C109/C109M for compressive strength, ASTM C1506 for water retention, and ASTM C91/C91M for air content.
2. Include test reports, according to ASTM C1019, for grout mixes required to comply with compressive strength requirement.

G. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to TMS 602/ACI 530.1/ASCE 6.

H. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.5 QUALITY ASSURANCE

A. Comply with provisions of TMS 402/602, except where exceeded by requirements of Contract Documents.

B. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section with minimum three years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

B. Handle and store ceramic glazed masonry units in protective cartons or trays. Do not remove from protective packaging until ready for installation.

PART 2 PRODUCTS

2.1 CONCRETE MASONRY UNITS

A. Concrete Block: Comply with referenced standards and as follows:

1. Size: Standard units with nominal face dimensions of 16 by 8 inches (400 by 200 mm) and nominal depths as indicated on drawings for specific locations.

2. Special Shapes: Provide nonstandard blocks configured for corners, jambs, lintels, and other detailed conditions as indicated in drawings.
3. Load-Bearing Units: ASTM C90, normal weight.
   a. Hollow block.
   b. Exposed Faces: Manufacturer's standard color and texture.
4. Nonloadbearing Units: ASTM C129.
   a. Hollow block, as indicated.

2.2 MORTAR AND GROUT MATERIALS

A. Masonry Cement: ASTM C91/C91M, Type S.

B. Portland Cement: ASTM C150/C150M, Type I or Type II, except Type III may be used for cold-weather construction.
   1. Not more than 0.10 percent alkali according to ASTM C114.

C. Hydrated Lime: ASTM C207, Type S.

D. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.

E. Masonry Cement: ASTM C91/C91M.

F. Mortar Cement: ASTM C1329/C1329M.

G. Mortar Aggregate: ASTM C144.

H. Grout Aggregate: ASTM C404.

I. Pigments for Colored Mortar: Pure, concentrated mineral pigments specifically intended for mixing into mortar and complying with ASTM C979/C979M.
   1. Color(s): As selected by Architect from manufacturer's full range.

J. Water: Clean and potable.

K. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C494/C494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.

2.3 REINFORCEMENT AND ANCHORAGE

A. Manufacturers:
   1. 3GEN Masonry Products: www.3genmp.com.
   2. Hohmann & Barnard, Inc: www.h-b.com/#sle.
   3. WIRE-BOND: www.wirebond.com/#sle.
   4. Substitutions: See Section 01 6000 - Product Requirements.

B. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi) (420 MPa), deformed billet bars; uncoated.

C. Joint Reinforcement: Use ladder type joint reinforcement where vertical reinforcement is involved and truss type elsewhere, unless otherwise indicated.

D. Single Wythe Joint Reinforcement: ASTM A951/A951M.
   1. Type: Truss or ladder.
   2. Material: ASTM A1064/A1064M steel wire, hot dip galvanized after fabrication to ASTM A153/A153M Class B.
   3. Size: 0.1483 inch (3.8 mm) side rods with 0.1483 inch (3.8 mm) cross rods; width as required to provide not less than 5/8 inch (16 mm) of mortar coverage on each exposure.

E. Two-Piece Wall Ties: Formed steel wire, 0.1875 inch (4.8 mm) thick, adjustable, eye and pintle type, hot dip galvanized to ASTM A 153/A 153M, Class B, sized to provide not less than 5/8 inch (16 mm) of mortar coverage from masonry face and to allow vertical adjustment of up to 1-1/4 in (32 mm).

F. Metal-to-Metal Fasteners: Self-drilling, self-tapping screws; corrosion resistant finish or hot dip galvanized to ASTM A153/A153M.

2.4 FLASHINGS

A. Metal Flashing Materials:
   1. Copper Flashing: ASTM B370, 060 soft annealed; 20 oz/sq ft (0.7 mm) thick; natural finish.
   2. Prefabricated Metal Flashing: Smooth fabricated 12 oz/sq ft (3.66 kg/sq m) copper flashing for surface mounted conditions.

B. Membrane Asphaltic Flashing Materials:
   1. Rubberized Asphalt Flashing: Self-adhering polymer modified asphalt sheet; 40 mils (0.040 inch) (1.0 mm) minimum total thickness; 8 mil (0.20 mm) cross-laminated polyethylene bonded to adhesive rubberized asphalt, with a removable release liner.

C. Factory-Fabricated Flashing Corners and End Dams: Stainless steel.

D. Flashing Sealant/Adhesives: Silicone, polyurethane, or silyl-terminated polyether/polyurethane or other type required or recommended by flashing manufacturer; type capable of adhering to type of flashing used.

E. Lap Sealants and Tapes: As recommended by flashing manufacturer; compatible with membrane and adhesives.

2.5 ACCESSORIES

A. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

2.6 LINTELS

2.7 MORTAR AND GROUT MIXING

A. Mortar for Unit Masonry: ASTM C270, using the Proportion Specification.
   1. Masonry below grade and in contact with earth: Type S.

2. Exterior, loadbearing masonry: Type S.
3. Exterior, non-loadbearing masonry: Type N.
4. Interior, loadbearing masonry: Type S.
5. Interior, non-loadbearing masonry: Type O.

B. Colored Mortar: Proportion selected pigments and other ingredients to match Architect's sample, without exceeding manufacturer's recommended pigment-to-cement ratio.

C. Grout: ASTM C476; consistency required to fill completely volumes indicated for grouting; fine grout for spaces with smallest horizontal dimension of 2 inches (50 mm) or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches (50 mm).

D. Admixtures: Add to mixture at manufacturer's recommended rate and in accordance with manufacturer's instructions; mix uniformly.

E. Mixing: Use mechanical batch mixer and comply with referenced standards.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive masonry.

B. Verify that related items provided under other sections are properly sized and located.

C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.2 PREPARATION

A. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.3 COLD AND HOT WEATHER REQUIREMENTS

A. Comply with requirements of TMS 402/602 or applicable building code, whichever is more stringent.

3.4 COURSING

A. Establish lines, levels, and coursing indicated. Protect from displacement.

B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

C. Concrete Masonry Units:
1. Bond: Running.
2. Coursing: One unit and one mortar joint to equal 8 inches (200 mm).
3. Mortar Joints: Concave.

3.5 PLACING AND BONDING

A. Conform to established masonry industry standards for installation of masonry products.

B. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.

C. Lay hollow masonry units with face shell bedding on head and bed joints.

D. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.

E. Remove excess mortar and mortar smears as work progresses.

F. Interlock intersections and external corners, except for units laid in stack bond.

G. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.

H. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges. Job site cut cast stone units only as approved by unit manufacturer.

I. Isolate masonry partitions from vertical structural framing members with a control joint.

J. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler.

3.6 REINFORCEMENT AND ANCHORAGE - GENERAL, SINGLE WYTHE MASONRY, AND CAVITY WALL MASONRY

A. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches (400 mm) on center.

B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches (400 mm) each side of opening.

C. Embed longitudinal wires of joint reinforcement in mortar joint with at least 5/8 inch (16 mm) mortar cover on each side.

D. Lap joint reinforcement ends minimum 6 inches (150 mm).

E. Embed ties and anchors in mortar joint and extend into masonry unit a minimum of 1-1/2 inches (38 mm) with at least 5/8 inch (16 mm) mortar cover to the outside face of the anchor.

3.7 MASONRY FLASHINGS

A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
   1. Extend flashings full width at such interruptions and at least 6 inches (152 mm), minimum, into adjacent masonry or turn up flashing ends at least 1 inch (25.4 mm), minimum, to form watertight pan at nonmasonry construction.

B. Terminate flashing up 8 inches (203 mm) minimum on vertical surface of backing:

1. Install vertical leg of flashing behind water-resistive barrier sheet over backing.
2. Install vertical leg of flashing over fluid-applied or self-adhered air/vapor barriers over backing or per manufacturer’s directions.
3. Anchor vertical leg of flashing into backing with a termination bar and sealant.
4. Apply cap bead of sealant on top edge of self-adhered flashing.

C. Install flashing in accordance with manufacturer's instructions and BIA Technical Notes No. 7.

D. Install flashings below masonry or cast stone sills, water tables, and other horizontal projections.

E. Extend metal flashings to within 1/2 inch (12 mm) of exterior face of masonry and adhere to top of stainless steel angled drip with hemmed edge.

F. Support flexible flashings across gaps and openings.

G. Extend plastic, laminated, EPDM, and _____ flashings to within 1/2 inch (12 mm) of exterior face of masonry and adhere to top of stainless steel angled drip with hemmed edge.

H. Lap end joints of flashings at least 6 inches (152 mm), minimum, and seal watertight with flashing sealant/adhesive.

3.8 LINTELS

A. Install loose steel lintels over openings.

B. Install reinforced unit masonry lintels over openings where steel or precast concrete lintels are not scheduled and where openings are more than 12 inches for brick-size units and 24 inches for block-size units.

3.9 GROUTED COMPONENTS

A. Lap splices minimum 48 bar diameters.

B. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch (13 mm) of dimensioned position.

C. Place and consolidate grout fill without displacing reinforcing.

D. At bearing locations, fill masonry cores with grout for a minimum 8 inches (204 mm) either side of opening.

3.10 CONTROL AND EXPANSION JOINTS

A. Install masonry control and expansion joints at industry standard locations and intervals, or as indicated in Drawings. Prior to commencement of work, notify Architect if control or expansion jointing plan is not clear..

B. Do not continue horizontal joint reinforcement through control or expansion joints.

C. Size control joints as indicated on drawings; if not indicated, 3/4 inch (19 mm) wide and deep.

3.11 BUILT-IN WORK

A. As work progresses, install built-in metal door frames and glazed frames and other items to be built into the work and furnished under other sections.

B. Install built-in items plumb, level, and true to line.

C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout.
   1. Fill adjacent masonry cores with grout minimum 12 inches (300 mm) from framed openings.

D. Do not build into masonry construction organic materials that are subject to deterioration.

3.12 TOLERANCES

A. Install masonry within the site tolerances found in TMS 402/602.

B. Maximum Variation from Alignment of Columns: 1/4 inch (6 mm).

C. Maximum Variation From Unit to Adjacent Unit: 1/16 inch (1.6 mm).

D. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft (6 mm/3 m) and 1/2 inch in 20 ft (13 mm/6 m) or more.

E. Maximum Variation from Plumb: 1/4 inch (6 mm) per story non-cumulative; 1/2 inch (13 mm) in two stories or more.

F. Maximum Variation from Level Coursing: 1/8 inch in 3 ft (3 mm/m) and 1/4 inch in 10 ft (6 mm/3 m); 1/2 inch in 30 ft (13 mm/9 m).

G. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/4 inch, plus 3/8 inch (minus 6.4 mm, plus 9.5 mm).

H. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch (6 mm).

3.13 CUTTING AND FITTING

A. Neatly cut and fit masonry for pipes, conduit, sleeves, and other wall penetrations. Excessive gaps around penetrations may be deemed unacceptable. Coordinate with other sections of work to provide correct size, shape, and location.

B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.14 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - Quality Requirements.

B. Concrete Masonry Unit Tests: Test each variety of concrete unit masonry in accordance with ASTM C140/C140M for compliance with requirements of this specification.

C. Mortar Tests: Test each type of mortar in accordance with ASTM C780, testing with same frequency as masonry samples.

3.15 CLEANING

A. Remove excess mortar and mortar droppings.

B. Replace defective mortar. Match adjacent work.

C. Clean soiled surfaces with cleaning solution.

D. Clean precast concrete and cast stone elements as recommended by unit manufacturer.

END OF SECTION 04 2000

SECTION 05 5000 - METAL FABRICATIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Shop fabricated steel items.

1.2 RELATED REQUIREMENTS

A. Section 03 3000 - Cast-in-Place Concrete: Placement of metal fabrications in concrete.

B. Section 04 2000 - Unit Masonry: Placement of metal fabrications in masonry.

C. Section 09 9123 - Interior Painting: Paint finish.

1.3 REFERENCE STANDARDS

A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.

B. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2022.

C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.

D. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2021.

E. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength; 2023.

F. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2020.

G. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, with Errata (2023).

H. AWS D1.2/D1.2M - Structural Welding Code - Aluminum; 2014, with Errata (2020).

I. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel AC172; 2019.

J. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 2004.

K. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic); 2019.

L. SSPC-SP 2 - Hand Tool Cleaning; 2024.

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
   1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
   2. Design data: Submit drawings and supporting calculations, signed and sealed by a qualified professional structural engineer.

1.5 QUALITY ASSURANCE

A. Design items under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located.

B. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and AWS D1.2/D1.2M and dated no more than 12 months before start of scheduled welding work.

C. Fabricator Qualifications: A qualified steel fabricator that is accredited by IAS AC172.

PART 2 PRODUCTS

2.1 MATERIALS - STEEL

A. Steel Sections: ASTM A36/A36M.

B. Steel Tubing: ASTM A500/A500M Grade C cold-formed structural tubing.

C. Plates: ASTM A36/A36M.

D. Pipe: ASTM A53/A53M, Grade B Schedule 40, black finish.

E. Mechanical Fasteners: Same material as or compatible with materials being fastened; type consistent with design and specified quality level.

F. Bolts, Nuts, and Washers: ASTM A307, Grade A, plain.

G. Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, plain.

H. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

I. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

J. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.2 FABRICATION

A. Fit and shop assemble items in largest practical sections, for delivery to site.

B. Fabricate items with joints tightly fitted and secured.

C. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

D. Furnish components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.3 FABRICATED ITEMS

A. Ledge Angles, Shelf Angles, Channels, and Plates Not Attached to Structural Framing: For support of metal decking; prime paint finish.

B. Lintels: As detailed; prime paint finish.
   1. Galvanized at exterior applications and where indicated.

2.4 FINISHES - STEEL

A. Prime paint steel items.
   1. Exceptions: Galvanize items to be embedded in concrete and items to be embedded in masonry. Galvanized at exterior applications and where indicated.
   2. Exceptions: Do not prime surfaces in direct contact with concrete, where field welding is required, and items to be covered with sprayed fireproofing.

B. Prepare surfaces to be primed in accordance with SSPC-SP2.

C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

D. Prime Painting: One coat.

E. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A123/A123M requirements.

2.5 FABRICATION TOLERANCES

A. Squareness: 1/8 inch (3 mm) maximum difference in diagonal measurements.

B. Maximum Offset Between Faces: 1/16 inch (1.5 mm).

C. Maximum Misalignment of Adjacent Members: 1/16 inch (1.5 mm).

D. Maximum Bow: 1/8 inch (3 mm) in 48 inches (1.2 m).

E. Maximum Deviation From Plane: 1/16 inch (1.5 mm) in 48 inches (1.2 m).

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.2 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Furnish setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

3.3 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

C. Field weld components as indicated on drawings.

D. Perform field welding in accordance with AWS D1.1/D1.1M.

E. Obtain approval prior to site cutting or making adjustments not scheduled.

3.4 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch (6 mm) per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch (6 mm).

C. Maximum Out-of-Position: 1/4 inch (6 mm).

END OF SECTION 05 5000

SECTION 08 7400 – ACCESS CONTROL

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Lock cylinder and keys.

B. AD Series Integrated locks.

C. Proximity Readers with Controllers and cards.

D. Knox Box.

1.2 RELATED REQUIREMENTS

A. Section 01 3513.16 – Special Project Procedures for Detention Facilities

B. Section 08 7400 – Detention Locking Control System

C. Section 11 1910 – Detention Doors and Frames

D. Section 11 1920 – Detention Security Hardware.

E. Section 11 1960 – Detention Wall Systems

1.3 REFERENCE STANDARDS

A. NFPA 70; National Electrical Code - The standard for the safe installation of electrical wiring and equipment in the United States.

B. ANSI A156.1 - AMERICAN NATIONAL STANDARD FOR BUTTS AND HINGES.

C. COORDINATION
1. 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.
2. Electrical System Roughing-In: Coordinate layout and installation of electrically powered detention door hardware with connections to power supplies, detention monitoring and control system, fire-alarm system and detection devices, and building control system.

D. PREINSTALLATION MEETINGS
1. Preinstallation Conference: Conduct conference at Project site.

    a. Inspect and discuss power and control system roughing-in and other preparatory work performed by other trades.
    b. Review sequence of operation for each type of detention door hardware.

c. Review and finalize a construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
d. Certifying procedures.

2. Detention Keying Conference: Conduct conference at Project site.

a. Conference participants to include Installer.
b. Incorporate detention keying conference decisions into Project's final Detention Keying Schedule after reviewing detention door hardware keying system including, but not limited to, the following:

1) Preliminary key system schematic diagram.
2) Requirements for key-control system.
3) Requirements for access control.
4) Address for delivery of keys.

1.4 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.
a. Include diagrams for power, signal, and control wiring; differentiate between manufacturer-installed and field-installed wiring for detention door hardware. Include the following:

1) System schematic.
2) Point-to-point wiring diagram, including location of connections.
3) Riser diagram.
4) Elevation of each detention door type.

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

C. Samples: Submit samples to Architect only upon request.

1. Submit one sample of each hardware product requested, in finish specified.
a. Tag Sample with full product description to coordinate with Detention Door Hardware Schedule.
b. Samples will be returned to Supplier. Units that are acceptable and remain undamaged through submittal, review, and field comparison process may, after final check of operation, be incorporated into the Work, within limitations of keying requirements.

D. Detention Door Hardware Schedule: Prepared by or under the supervision of Supplier, detailing fabrication and assembly of door hardware as well as installation procedures and wiring

diagrams. Coordinate the Detention Door Hardware Schedule with detention doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of detention door hardware.

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

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Contracts:

1. Maintenance service.

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

1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:

a. Normal remote security operation.
b. Normal local security operation.
c. Emergency security operation.
d. Hardware schedules.
e. Catalog cuts for all hardware.
f. Templates.

C. Warranty Documentation:

1. Manufacturers' special warranties.

1.6 MAINTENANCE MATERIAL SUBMITTALS

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

B. Extra Stock Material: Furnish extra materials to Owner that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1.7

1.8 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with at least 3 years of documented experience.

B. Installer Qualifications: Company specializing in performing work of type specified and with at least 3 years of documented experience.

1.9 WARRANTY

A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.

B. Manufacturer Warranty for Laminated Glass: Provide 5-year manufacturer warranty coverage for delamination, including providing products to replace failed units, and commencing on Date of Substantial Completion. Complete forms in Owner's name and register with manufacturer.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. McGrory Glass, Inc: www.mcgrory.com/#sle.

B. Old Castle Corp..

C. North American Specialty Glass

D. The LTI Group

E. Substitutions: See Section 01 6000 - Product Requirements.

F. Source Limitations: Provide glazing, framing, and films from single supplier.

2.2 LAMINATED SECURITY GLAZING TYPE SG-60RW

A. Basis of Design: Global Security Glazing "SP-035G" or approved equal.

B. Clear symmetrical glass-clad polycarbonate with fire rating and translucent film ply. Laminated glass with proprietary interlayer designed to prevent body passage during physical attack in accordance with ASTM C1172.
   1. Detention Security Grade: Grade 1 (60 minute) according to ASTM F 1915 warm-temperature impact test and torch and small blunt impactor test.
   2. Applications: Locations as indicated on drawings.
   3. Tint: Clear.
   4. Inner Ply: Translucent Film.
   5. Thickness: 11/16 inch (17.46 mm).

2.3 LAMINATED SECURITY GLAZING TYPE SG-60R

A. Basis of Design: Global Security Glazing "SP-028" or approved equal.

B. Clear symmetrical glass-clad polycarbonate in accordance with ASTM C1349.
   1. Detention Security Grade: Grad 1 (60 minute) according to ASTM F 1915 warm-temperature impact test and torch and small blunt impactor
   2. Forced-Entry Resistance: Level IV according to HPW-TP-0500.02.
   3. Applications: Locations as indicated on drawings.
   4. Tint: Clear.
   5. Interlayer Color: Clear, unless otherwise indicated in construction documents.
   6. Thickness: 1 inch (25 mm).
   7. Outer Ply: 1/4" Chem-Tem or heat-strengthened float glass.
   8. Multi Core:
      a. Outer Core Ply: 1/8" polycarbonate.
      b. Single Inner Core Ply: 3/8" polycarbonate.
   9. Inner Ply: 1/4" Chem-Tem or heat-strengthened float glass.
   10. Thermal Transmittance (U-Value): 0.88.
   11. Visible Light Transmittance (VLT): 0.86.

2.4 GLAZING ASSEMBLY MATERIALS

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. Glazing Frames:
   1. Bullet-Resistant Door Frames: Comply with UL 752, with same level of bullet resistance as door; face-welded construction, ground smooth, fully prepared and reinforced for hardware installation.
      a. Frame Metal Thickness: 0.071 inch (1.8 mm).
   2. Interior Gaskets: Closed-cell neoprene, 40 to 50 Shore A durometer hardness; ASTM C509 Option I.
   3. Exterior Gaskets: Solid neoprene, 65 to 75 Shore A durometer hardness; ASTM C864 Option I.
   4. Fasteners: Stainless steel.
   5. Finish: Factory primed, and field finished.

2.5 GLAZING COMPOUNDS

A. Type GC-1 - Silicone Sealant: Single component; neutral curing; capable of water immersion without loss of properties; nonbleeding, nonstaining; ASTM C920 Type S, Grade NS, Class 25, uses M, A, and G; cured Shore A hardness range of 25 to 35; color as selected by Architect.

B. Type GC-2 - Security Sealant: Single component; nonsag; tamper-resistant; low-movement; ASTM C920 Grade NS, Class 12.5 or 25, use NT; cured Shore A hardness of at least 45.

2.6 ACCESSORIES

A. Setting Blocks: Silicone, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch per 1 sq ft (2.5 mm per 0.093 sq m) of glazing or minimum 4-inch (100 mm) width of glazing rabbet space minus 1/16-inch (1.5 mm) height to suit glazing method and pane weight and area.

B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Minimum 3 inches (75 mm) long by one-half height of glazing stop by thickness to suit application; self-adhesive on one face.

C. Glazing Tape, Back-Bedding Mastic: Preformed, butyl-based, 100-percent solids compound with integral resilient spacer rod for application indicated in construction documents; 5 to 30 cured Shore A durometer hardness; coiled on release paper; black color.
   1. Width: As required for application.
   2. Thickness: As required for application.

D. Fasteners: Stainless steel.

E. Edge banding.
   1. Color: Black.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify openings for glazing are sized, squared, offset at corners, and within tolerances in accordance with manufacturer's instructions.

B. Verify surfaces of glazing channels or recesses are clean and free of obstructions impeding moisture movement, weeps are clear, and support framing is ready to receive glazing system.

C. Verify sealing of joints between framing members.

D. Proceed with glazing system installation only after unsatisfactory conditions are corrected.

3.2 PREPARATION

A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings not tightly bonded to substrates.

B. Seal porous glazing channels or recesses with substrate-compatible primer or sealer.

C. Prime surfaces scheduled to receive sealant where required for sealant adhesion.

3.3 INSTALLATION - GENERAL

A. Install glazing in accordance with manufacturer's written instructions unless more stringent requirements are indicated in construction documents, or in glazing referenced standards.

B. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.

C. Do not exceed edge pressures around perimeter of lites as stipulated by manufacturer.

D. Set lites with uniform pattern, draw, bow, and similar characteristics.

E. Prevent glass and polycarbonate from contact with contaminating substances resulting from construction operations, including weld splatter, fire-safing, plastering, mortar droppings, and paint.

3.4 INSTALLATION - DRY GLAZING METHOD, GASKET GLAZING

A. Application: Set glazing infills from either building exterior or interior.

B. Place setting blocks at 1/4 points with edge block no more than 6 inches (152 mm) from corners.

C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.

D. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

3.5 INSTALLATION - WET/DRY GLAZING METHOD, TAPE AND SEALANT

A. Application - Interior Glazed: Set glazing infills from building interior.

B. Cut glazing tape to length and install against permanent stops, projecting 1/16 inch (1.6 mm) above sight line.

C. Place setting blocks at 1/4 points with edge block no more than 6 inches (152 mm) from corners.

D. Rest glazing on setting blocks and push against tape to ensure full contact at perimeter of pane or unit.

E. Install removable stops with spacer shims inserted between glazing and applied stops at 24-inch (610 mm) intervals, 1/4 inch (6 mm) below sight line.

F. Fill gaps between pane and applied stop with glazing sealant to depth equal to bite on glazing and to uniform and level line.

G. Trim protruding tape with knife.

3.6 CLEANING

A. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.

B. Remove nonpermanent labels immediately after glazing installation is complete.

C. Clean glazing and adjacent surfaces after sealants are fully cured.

D. Clean glazing on both exposed surfaces not more than four days before Date of Substantial Completion in accordance with manufacturer's written recommendations.

3.7 PROTECTION

A. After installation, mark pane with "X" using removable plastic tape or paste; do not mark heat-absorbing or reflective glass units.

B. Remove and replace glazing and films damaged during construction period before Date of Substantial Completion.

END OF SECTION 08 8853

SECTION 08 8853 - SECURITY GLAZING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Laminated security glazing units.

B. Glass-clad polycarbonate security glazing systems.

1.2 REFERENCE STANDARDS

A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; Current Edition.

B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test; 2015 (Reaffirmed 2020).

C. ASTM C509 - Standard Specification for Elastomeric Cellular Preformed Gasket and Sealing Material; 2006 (Reapproved 2021).

D. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005 (Reapproved 2019).

E. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.

F. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass; 2019.

G. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016 (Reapproved 2023).

H. ASTM C1349 - Standard Specification for Architectural Flat Glass Clad Polycarbonate; 2017 (Reapproved 2024).

I. ASTM F1233 - Standard Test Method for Security Glazing Materials And Systems; 2021.

J. ASTM F1915 - Standard Test Methods for Glazing for Detention Facilities; 2005 (Reapproved 2019).

K. GANA (LGRM) - Laminated Glazing Reference Manual; 2019.

L. GANA (SM) - GANA Sealant Manual; 2008.

M. HPW-TP-0500.03 - Test Procedure-Transparent Materials for Use in Forced Entry or Containment Barriers; 2003.

N. UL 752 - Standard for Bullet-Resisting Equipment; Current Edition, Including All Revisions.

1.3 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data on Insulation Glass Unit, Glazing Unit, and Polycarbonate Glazing Unit Glazing Types: Provide structural, physical, and environmental characteristics, size limitations, special handling, and installation requirements.

C. Product Data for Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, and special application requirements. Identify available colors.

D. Manufacturer's qualification statement.

E. Installer's qualification statement.

F. Testing agency's qualification statement.

G. Executed warranty.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with at least 3 years of documented experience.

B. Installer Qualifications: Company specializing in performing work of type specified and with at least 3 years of documented experience.

1.5 WARRANTY

A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.

B. Manufacturer Warranty for Laminated Glass: Provide 5-year manufacturer warranty coverage for delamination, including providing products to replace failed units, and commencing on Date of Substantial Completion. Complete forms in Owner's name and register with manufacturer.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. McGrory Glass, Inc: www.mcgrory.com/#sle.

B. Old Castle Corp..

C. North American Specialty Glass

D. The LTI Group

E. Substitutions: See Section 01 6000 - Product Requirements.

F. Source Limitations: Provide glazing, framing, and films from single supplier.

2.2 LAMINATED SECURITY GLAZING TYPE SG-60RW

A. Basis of Design: Global Security Glazing "SP-035G" or approved equal.

B. Clear symmetrical glass-clad polycarbonate with fire rating and translucent film ply. Laminated glass with proprietary interlayer designed to prevent body passage during physical attack in accordance with ASTM C1172.
   1. Detention Security Grade: Grade 1 (60 minute) according to ASTM F 1915 warm-temperature impact test and torch and small blunt impactor test.
   2. Applications: Locations as indicated on drawings.
   3. Tint: Clear.
   4. Inner Ply: Translucent Film.
   5. Thickness: 11/16 inch (17.46 mm).

2.3 LAMINATED SECURITY GLAZING TYPE SG-60R

A. Basis of Design: Global Security Glazing "SP-028" or approved equal.

B. Clear symmetrical glass-clad polycarbonate in accordance with ASTM C1349.
   1. Detention Security Grade: Grad 1 (60 minute) according to ASTM F 1915 warm-temperature impact test and torch and small blunt impactor
   2. Forced-Entry Resistance: Level IV according to HPW-TP-0500.02.
   3. Applications: Locations as indicated on drawings.
   4. Tint: Clear.
   5. Interlayer Color: Clear, unless otherwise indicated in construction documents.
   6. Thickness: 1 inch (25 mm).
   7. Outer Ply: 1/4" Chem-Tem or heat-strengthened float glass.
   8. Multi Core:
      a. Outer Core Ply: 1/8" polycarbonate.
      b. Single Inner Core Ply: 3/8" polycarbonate.
   9. Inner Ply: 1/4" Chem-Tem or heat-strengthened float glass.
   10. Thermal Transmittance (U-Value): 0.88.
   11. Visible Light Transmittance (VLT): 0.86.

2.4 GLAZING ASSEMBLY MATERIALS

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. Glazing Frames:
   1. Bullet-Resistant Door Frames: Comply with UL 752, with same level of bullet resistance as door; face-welded construction, ground smooth, fully prepared and reinforced for hardware installation.
      a. Frame Metal Thickness: 0.071 inch (1.8 mm).
   2. Interior Gaskets: Closed-cell neoprene, 40 to 50 Shore A durometer hardness; ASTM C509 Option I.

3. Exterior Gaskets: Solid neoprene, 65 to 75 Shore A durometer hardness; ASTM C864 Option I.
4. Fasteners: Stainless steel.
5. Finish: Factory primed, and field finished.

2.5 GLAZING COMPOUNDS

A. Type GC-1 - Silicone Sealant: Single component; neutral curing; capable of water immersion without loss of properties; nonbleeding, nonstaining; ASTM C920 Type S, Grade NS, Class 25, uses M, A, and G; cured Shore A hardness range of 25 to 35; color as selected by Architect.

B. Type GC-2 - Security Sealant: Single component; nonsag; tamper-resistant; low-movement; ASTM C920 Grade NS, Class 12.5 or 25, use NT; cured Shore A hardness of at least 45.

2.6 ACCESSORIES

A. Setting Blocks: Silicone, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch per 1 sq ft (2.5 mm per 0.093 sq m) of glazing or minimum 4-inch (100 mm) width of glazing rabbet space minus 1/16-inch (1.5 mm) height to suit glazing method and pane weight and area.

B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Minimum 3 inches (75 mm) long by one-half height of glazing stop by thickness to suit application; self-adhesive on one face.

C. Glazing Tape, Back-Bedding Mastic: Preformed, butyl-based, 100-percent solids compound with integral resilient spacer rod for application indicated in construction documents; 5 to 30 cured Shore A durometer hardness; coiled on release paper; black color.
1. Width: As required for application.
2. Thickness: As required for application.

D. Fasteners: Stainless steel.

E. Edge banding.
1. Color: Black.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify openings for glazing are sized, squared, offset at corners, and within tolerances in accordance with manufacturer's instructions.

B. Verify surfaces of glazing channels or recesses are clean and free of obstructions impeding moisture movement, weeps are clear, and support framing is ready to receive glazing system.

C. Verify sealing of joints between framing members.

D. Proceed with glazing system installation only after unsatisfactory conditions are corrected.

3.2 PREPARATION

A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings not tightly bonded to substrates.

B. Seal porous glazing channels or recesses with substrate-compatible primer or sealer.

C. Prime surfaces scheduled to receive sealant where required for sealant adhesion.

3.3 INSTALLATION - GENERAL

A. Install glazing in accordance with manufacturer's written instructions unless more stringent requirements are indicated in construction documents, or in glazing referenced standards.

B. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.

C. Do not exceed edge pressures around perimeter of lites as stipulated by manufacturer.

D. Set lites with uniform pattern, draw, bow, and similar characteristics.

E. Prevent glass and polycarbonate from contact with contaminating substances resulting from construction operations, including weld splatter, fire-safing, plastering, mortar droppings, and paint.

3.4 INSTALLATION - DRY GLAZING METHOD, GASKET GLAZING

A. Application: Set glazing infills from either building exterior or interior.

B. Place setting blocks at 1/4 points with edge block no more than 6 inches (152 mm) from corners.

C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.

D. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

3.5 INSTALLATION - WET/DRY GLAZING METHOD, TAPE AND SEALANT

A. Application - Interior Glazed: Set glazing infills from building interior.

B. Cut glazing tape to length and install against permanent stops, projecting 1/16 inch (1.6 mm) above sight line.

C. Place setting blocks at 1/4 points with edge block no more than 6 inches (152 mm) from corners.

D. Rest glazing on setting blocks and push against tape to ensure full contact at perimeter of pane or unit.

E. Install removable stops with spacer shims inserted between glazing and applied stops at 24-inch (610 mm) intervals, 1/4 inch (6 mm) below sight line.

F. Fill gaps between pane and applied stop with glazing sealant to depth equal to bite on glazing and to uniform and level line.

G. Trim protruding tape with knife.

3.6 CLEANING

A. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.

B. Remove nonpermanent labels immediately after glazing installation is complete.

C. Clean glazing and adjacent surfaces after sealants are fully cured.

D. Clean glazing on both exposed surfaces not more than four days before Date of Substantial Completion in accordance with manufacturer's written recommendations.

3.7 PROTECTION

A. After installation, mark pane with "X" using removable plastic tape or paste; do not mark heat-absorbing or reflective glass units.

B. Remove and replace glazing and films damaged during construction period before Date of Substantial Completion.

END OF SECTION 08 8853

SECTION 11 1920 – DETENTION DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Detention door hardware for the following:
      a. Swinging detention doors.

B. Basis of Design Manufacturer:
   1. Items of security hardware specified in the hardware sets of this division have been selected for the purpose of establishing a quality and design standard acceptable to the Architect. Products of other manufacturers of builder's hardware only may be substituted, providing they are equal in quality and design to the items specified and receive the express approval of the Architect. The Architect will permit no substitutions after final approval of the hardware schedule. All security locks and their components shall be provided by Southern Folger as the basis of design.
   2. Any products to be substituted for items of hardware other than those specified must be submitted in writing to the Architect for prior approval at least ten (10) days before bid date. Include the name of manufacturer, catalog number of series, design, and other pertinent data. No substitutions shall be permitted after the start of the ten day period prior to bid date.
   3. Security equipment items specified in the security hardware sets have been selected from the various manufacturers' catalogs. Identifying numbers of the manufacturer, where listed herein, are given for purposes of establishing a quality and design standard acceptable to the Architect. The basis of design manufacturers listed are:
      a. Hinges: Southern Folger
      b. Locks - Security: Southern Folger
      c. Closers: LCN
      d. Stops: Bronze Craft
      e. Threshold/Weatherstripping: Pemko
   4. Fastenings:
      a. All bolts, screws and other fastenings required for the application of the hardware shall be of the size and type to fit requirements and shall be of the same material and finish as the hardware to which they connect.
      b. Screws for products used in secured areas will have torx security screws. Screws for products in other areas such as offices, kitchen and maintenance shall have fasteners normally furnished from manufacturer.
      c. The hardware supplier shall furnish four (4) of each size torx driver required for installation of hardware. At completion of job, torx drivers shall be turned over to the Owner.
      d. All kick plates are to be mounted with stainless steel pop rivets.

C. Related Requirements:

1. Section 01 3513.16 – Special Project Procedures for Detention Facilities
2. Section 08 8853 – Security Glazing
3. Section 08 7400 – Detention Locking Control System
4. Section 09 9123 - Interior Painting
5. Section 11 1910 – Detention Doors and Frames
6. Section 11 1920 – Detention Security Hardware.
7. Section 11 1960 – Detention Wall Systems

1.2 COORDINATION

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

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

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

B. Inspect and discuss power and control system roughing-in and other preparatory work performed by other trades.

C. Review sequence of operation for each type of detention door hardware.

D. Review and finalize a construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

E. Certifying procedures.
1. Detention Keying Conference: Conduct conference at Project site.
2. Conference participants to include Installer.
3. Incorporate detention keying conference decisions into Project's final Detention Keying Schedule after reviewing detention door hardware keying system including, but not limited to, the following:
    a. Preliminary key system schematic diagram.
    b. Requirements for key-control system.
    c. Requirements for access control.
    d. Address for delivery of keys.

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.
    e. Detail interface between electrically powered detention door hardware and detention monitoring and control, fire-alarm, and building control system.
    f. Samples: Submit samples to Architect only upon request.
        1) Submit one sample of each hardware product requested, in finish specified.
        2) Tag Sample with full product description to coordinate with Detention Door Hardware Schedule.
        3) Samples will be returned to Supplier. Units that are acceptable and remain undamaged through submittal, review, and field comparison process may, after final check of operation, be incorporated into the Work, within limitations of keying requirements.
    g. 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.
    h. Keying Schedule: Coordinate detention keying with other door hardware in Project's final Detention Keying Schedule. Include floor plan of each floor, indicating keymarks, lock types, and key access sides required at each detention door and opening.
        1) 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.
    i. Indicate security level of each item.

1.5 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each type of detention lock and latch, security door closer, and for tests performed by a qualified testing agency.
    1. Examination reports documenting inspections of substrates, areas, and conditions.
    2. Anchor inspection reports documenting inspections of built-in and cast-in anchors.
    3. Field quality-control reports documenting inspections of installed products.
    4. Field quality-control certification signed by Contractor.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Contracts:

1. Maintenance service.
    a. Operation and Maintenance Data: For detention door hardware to include in emergency, operation, and maintenance manuals.
    b. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
        1) Normal remote security operation.
        2) Normal local security operation.
        3) Emergency security operation.
        4) Hardware schedules.
        5) Catalog cuts for all hardware.
        6) Templates.
    c. Warranty Documentation:
        1) Manufacturers' special warranties.

1.7 QUALITY ASSURANCE

A. Qualifications:
1. Installers: 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.
2. Suppliers: Detention Door Hardware Supplier with warehousing facilities in Project's vicinity who is, or employs, a qualified Architectural Hardware Consultant, available during the course of the Work to consult with Contractor, Architect, and Owner about detention door hardware and keying.
3. 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.
4. 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.
5. Scheduling Responsibility: Preparation of Detention Door Hardware and Keying schedules.
6. Architectural Hardware Consultant Qualifications: A person who is currently certified by DHI as an Architectural Hardware Consultant and who is experienced in providing consulting services for detention door hardware installations that are comparable in material, design, and extent to that indicated for this Project.

1.8 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.

1.9 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.

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

PART 2 - PRODUCTS

2.1 MANUFACTURERS
   1. Southern Steel co.
   2. Southern Folger
   3. Folger Adams
   4. Detention Device Systems
   5. R.R. Brink Locking System, Inc.
   6. Tymetal Corporation

2.2 ACCEPTABLE DETENTION EQUIPMENT CONTRACTORS
   1. Southern Folger
   2. Cell Security Ltd.
   3. Norment Ind. (Sesco)
   4. Slate Security Systems
   5. CML Security
   6. Universal Security
   7. Chief Industries
   8. I.S.I. Detention Contracting Group
   9. Pauly Jail
   10. Maximum Security Products
   11. CCC Group
   12. Cornerstone Detention

2.3 PERFORMANCE REQUIRMENTS

A. Swinging Detention Door Assemblies: Provide detention door hardware as part of a detention door assembly that complies with security grade indicated, when tested in accordance with ASTM F1450, based on testing manufacturer's standard units in assemblies similar to those indicated for this Project.

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

C. Detention Door Hardware Sets: Provide quantity, item, size, finish, or color indicated.

D. Sequence of Operation: Provide electrically powered detention door hardware function, sequence of operation, and interface with other building control systems indicated.

E. Include all accessories and fasteners required for a complete installation.

F. 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.

G. Detention Door Hardware Control and Monitoring: Provide detention door hardware with features, functions, and internal equipment required to perform control and monitoring functions indicated in Section 285211 "Detention Monitoring and Control Systems."

H. Obtain mechanical detention door hardware from same manufacturer as that of electrically powered or pneumatic detention door hardware.

I. Regulatory Requirements:
   1. Fire-Rated Detention Door Assemblies: Provide detention door hardware for assemblies complying with NFPA 80 that is listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure in accordance with NFPA 252 or UL 10C.
   2. Where indicated to comply with accessibility requirements, comply with the DOJ's "2010 ADA Standards for Accessible Design", ICC A117.1 and state regulations.

J. Swinging Detention Door Assemblies: Provide detention door hardware as part of a detention door assembly that complies with security grade indicated, when tested in accordance with ASTM F1450, based on testing manufacturer's standard units in assemblies similar to those indicated for this Project.

K. Bullet Resistance: Comply with Level 3 rating when tested in accordance with UL 752; where indicated.

L. Listed and labeled as bullet resistant by a testing agency acceptable to authorities having jurisdiction.

M. Tool-Attack Resistance: Comply with small-tool-attack-resistance rating when tested in accordance with UL 1034 and UL 437; where indicated.

2.4 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.
3. Include all accessories and fasteners required for a complete installation.

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

C. Detention Door Hardware Control and Monitoring: Provide detention door hardware with features, functions, and internal equipment required to perform control and monitoring functions indicated in Section 285211 "Detention Monitoring and Control Systems."

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

E. Regulatory Requirements:
1. Fire-Rated Detention Door Assemblies: Provide detention door hardware for assemblies complying with NFPA 80 that is listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure in accordance with NFPA 252 or UL 10C.
2. Where indicated to comply with accessibility requirements, comply with the DOJ's "2010 ADA Standards for Accessible Design" and the ABA standards of the Federal agency having jurisdiction ICC A117.1

F. DETENTION HINGES
1. Security Hardware Hinges:
   a. Standard for Electric Detention Hinges: UL 634
   b. Security Grade: 1 in accordance with ASTM F1758.
   c. Each security door shall be hung with three (3) knuckle institutional, stainless steel hinge. Hinge shall be full mortise on all doors.
   d. Hinge shall be 4-1/2" x 4-1/2" with 3/16" leaf thickness, made of investment cast 304 stainless steel with integral security stud.
   e. Each hinge shall have bearing material that is a self-lubricating, engineered thermo-plastic, flange type design to support thrust and radial loads.
   f. Entire construction shall be cross-pinned after assembly to make disassembly impossible.
   g. Furnish four hinges for single openings up to and including 7'-4" height. Furnish one additional hinge for openings over 7'-4" high and for each additional 2'-6" of opening height and for openings over 3'-8" wide.
   h. Finish: ANSI/BHMA 600.
2. Food-Pass Detention Hinges:
   a. Heavy weight, plain bearing; fabricated from cast iron or steel; 3/8-inch- (9.5-mm-) diameter, case-hardened, fully welded, steel hinge pin; with applied stop preventing door from opening more than 90 degrees and supporting door in horizontal position as a shelf; full surface.
      1) Leaves: Drilled for countersunk security fasteners.
      2) Size: Minimum 3 by 4 by 0.200 inch (75 by 102 by 5 mm).
      3) Security Grade: 1 in accordance with ASTM F1758.
      4) Finish: ANSI/BHMA 600.

G. DETENTION LOCKS AND LATCHES
1. Lock Mountings:
a. Hollow-Metal Detention Doors: Mount detention lock to back of 0.179-inch (4.56-mm) nominal-thickness steel cover plate for installation in lock pocket fabricated into detention door. Attach cover plate to hollow-metal detention door with security fasteners.
b. Steel-Plate Detention Doors: Mount detention lock to inside surface of 0.179-inch (4.56-mm) nominal-thickness steel nominal-thickness, galvanized-steel] enclosure with integrally formed mounting flanges. Attach enclosure to steel-plate detention door with security fasteners.
2. Mechanical Deadlocks, Mogul Cylinder:
a. Basis of Design: Southern Steel High Security Six-Pin Mogul Cylinder.
1) Function: Lockbolt retracted and extended by mogul cylinder; keyed two sides.
2) Security Grade: 1 in accordance with ASTM F1758.
3) Cylinder Size: 2” thread Diameter.
4) Key Size: 2-3/8”L x 1/8” TK.
5) Security Grade: 1 in accordance with ASTM F1577.
6) Mogul Keys: Mogul Blank Key EC39 ASSA Series – “Nickel Silver”
7) Finish: US26D
3. Electromechanical Detention Locks and Latches:
a. Basis of Design: Southern Steel 10120AM Motor Operated Electro-Mechanical Deadlatch.
1) Security Grade: 1 in accordance with ASTM F1758.
2) Jamb mounted.

H. KEYING
1. Locks by Southern Folger as described in the Hardware Schedule below.
2. Keying and Keys
a. Mogul type cylinder shall be keyed in sets and master keyed to level as directed. Provide five (5) keys per key alike set and five (5) keys per master level.
b. Paracentric prison locks shall be keyed in sets and provided with three (3) keys for each set. Each key to be not less than 4 1/2" in length. Blade to be 7/8" wide by 5/32" thick. Key to have overlapping Paracentric grooves to match similar grooves in cylinder. Handle to be of oval shape to properly fit hand, about 2-1/4" x 1-3/8" in size and separated from the key blade by 1/2" x 1-1/2" shank to provide clearance for officer's hand. Entire key to be made of polished silicone bronze/copper alloy having tensile strength of not less than 60,000 psi and have a hardness of B73-75 on the Rockwell scale.
c. All keys shall be stamped with number or letter combination as directed.
3. Key Control System
a. Cabinets and components shall be manufactured out of 10-guage steel (minimum) with a key lock out of steel. System shall include completely set up three way cross index system, installation of keys and tag system, and instructions to the owner on proper use of the system. Cabinet to be size to accommodate one complete set of all security building keys.

I. Door Closers

1. Door closers shall be Concealed LCN 2213 series.

J. Door Position Switches
1. Furnish 500CL Keeper Switch and 220A Door Position Switch by Southern Folger.

K. Miscellaneous Hardware:
1. Door Stops: Furnish doorstops for all doors. All stops and bumpers shall be cast bronze and shall be furnished with machine screws and expansion shields or toggle bolts to use the material it is to be fastened upon. Stops shall be equal to Northwest Specialty Hardware NW608.
2. Push Plates, Pull Plates, and Protection Plates: Furnish push and pull plates as specified in the hardware sets. Finish to be satin stainless steel, US32D. Plates to be cut for cylinder or turn pieces as required.
3. Manufacturers of Push/Pull units: Southern Folger. (basis for schedule).
4. Protection plates (kick and armor) shall be .050 thick type 304 stainless steel. Kickplates shall be 8" high. Plates shall be 2" less than door width. All protection plates are to be mounted with stainless steel pop rivets.
5. Provide silencers in metal door frames, unless not permitted for fire rating, or unless bumper-type weatherstripping is provided; three per single door frame, two per double door frame. All exterior doors to have bumper type weatherstripping.
6. Spare Parts: Provide 4 spare parts items for each hardware element scheduled below.

2.5 HARDWARE SCHEDULE

A. General: Provide hardware for each door to comply with requirements of Section Builders and Security Hardware, hardware set numbers indicated in door schedule, and in the following schedule of hardware sets.

Hardware Set 101

Each door to receive

6	EA	HINGE	204FMSS	US32D	Southern Folger
1	EA	LOCK	10120AE-1	120VAC & US32D	Southern Folger
1	EA	LATCH	10501	US32D	Southern Folger
1	EA	DOOR POSITION SWITCH	220A-4	USP	Southern Folger
1	EA	RAISED DOOR PULL	212C	--	Southern Folger
1	EA	FOOD PASS LATCH	1017A	GALV	Southern Folger
1	EA	FOOD PASS HINGE	203FP	USP	Southern Folger
1	EA	CLOSER	2213	AL	LCN
1	EA	WALL STOP	362-003-0125	US26D	Bronze Craft

Hardware Set 102

Each door to receive

6	EA	HINGE	204FMSS	US32D	Southern Folger
1	EA	LOCK	10120AE-1	120VAC & US32D	Southern Folger
1	EA	LATCH	10501	US32D	Southern Folger
1	EA	DOOR POSITION SWITCH	220A-4	USP	Southern Folger
1	EA	RAISED DOOR PULL	212C	--	Southern Folger
1	EA	CLOSER	4040SE		LCN
1	EA	WALL STOP	362-003-0125	US26D	Bronze Craft

PART 3 - EXECUTION

3.1 EXAMINATION

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

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

C. Inspect built-in and cast-in anchor installations, before installing detention door hardware, to verify that anchor installations comply with requirements. Prepare inspection reports.
   1. Remove and replace anchors where inspections indicate that they do not comply with specified requirements. Reinspect after repairs or replacements are made.
   2. Perform additional inspections to determine compliance of replaced or additional work.

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

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

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

3.2 PREPARATION

A. Steel Detention Doors and Frames: Comply with ANSI/BHMA A156.115 Series.
   1. Surface-Applied Detention Door Hardware: Drill and tap detention doors and frames in accordance with ANSI/SDI A250.6.

3.3 INSTALLATION

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

B. Install each detention door hardware item to comply with Shop Drawings and manufacturer's written instructions. Where cutting and fitting are required to install detention door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.
   1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
   2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.

C. Hinge Installation:

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

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

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. 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 in accordance with 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 MAINTENANCE SERVICE

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

3.8 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain detention door hardware and detention door hardware finishes.

END SECTION 11 1920

SECTION 26 0400 - ELECTRIC SERVICE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the furnishing and installation of materials and labor required to provide the extend the existing electrical service to the remodeled area.

B. The existing service to the building 277/480 volt, 3 phase, 4 wire.

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SECTION 26 0526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Grounding and bonding requirements.

B. Conductors for grounding and bonding.

C. Connectors for grounding and bonding.

D. Ground bars.

1.2 RELATED REQUIREMENTS

A. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables: Additional requirements for conductors for grounding and bonding, including conductor color coding.

B. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

1.3 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.

B. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

C. NFPA 99 - Health Care Facilities Code; 2024.

D. UL 467 - Grounding and Bonding Equipment; Current Edition, Including All Revisions.

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittals procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for grounding and bonding system components.

PART 2 PRODUCTS

2.1 GROUNDING AND BONDING REQUIREMENTS

A. Do not use products for applications other than as permitted by NFPA 70 and product listing.

B. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.

C. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.2 GROUNDING AND BONDING COMPONENTS

A. General Requirements:
1. Provide products listed, classified, and labeled as suitable for the purpose intended.
2. Provide products listed and labeled as complying with UL 467 where applicable.

B. Conductors for Grounding and Bonding, in Addition to Requirements of Section 26 0526:
1. Use insulated copper conductors unless otherwise indicated.
    a. Exceptions:
        1) Use bare copper conductors where installed underground in direct contact with earth.
        2) Use bare copper conductors where directly encased in concrete (not in raceway).

C. Connectors for Grounding and Bonding:
1. Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.
2. Unless otherwise indicated, use exothermic welded connections for underground, concealed and other inaccessible connections.
3. Unless otherwise indicated, use mechanical connectors, compression connectors, or exothermic welded connections for accessible connections.
4. Manufacturers - Mechanical and Compression Connectors:
    a. allG Fabrication; _____: www.allgfab.com/#sle.
    b. Burndy LLC; _____: www.burndy.com/#sle.
    c. Harger Lightning & Grounding; _____: www.harger.com/#sle.
    d. nVent ERICO; _____: www.nvent.com/#sle.
    e. Thomas & Betts Corporation; _____: www.tnb.com/#sle.
5. Manufacturers - Exothermic Welded Connections:
    a. Burndy LLC; _____: www.burndy.com/#sle.
    b. nVent ERICO; Cadweld: www.nvent.com/#sle.
    c. thermOweld, subsidiary of Continental Industries; division of Burndy LLC; _____: www.thermoweld.com/#sle.

D. Ground Bars:
1. Description: Copper rectangular ground bars with mounting brackets and insulators.
2. Size: As indicated.
3. Holes for Connections: As indicated or as required for connections to be made.
4. Manufacturers:
    a. allG Fabrication; _____: www.allgfab.com/#sle.

b. Harger Lightning & Grounding; _____: www.harger.com/#sle.
c. nVent ERICO; _____: www.nvent.com/#sle.
d. thermOweld, subsidiary of Continental Industries; division of Burndy LLC; _____: www.thermoweld.com/#sle.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that work likely to damage grounding and bonding system components has been completed.

B. Verify that field measurements are as indicated.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Perform work in accordance with NECA 1 (general workmanship).

C. Make grounding and bonding connections using specified connectors.
1. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate insertion into connector.
2. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.
3. Exothermic Welds: Make connections using molds and weld material suitable for the items to be connected in accordance with manufacturer's recommendations.
4. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
5. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.

D. Identify grounding and bonding system components in accordance with Section 26 0553.

END OF SECTION 26 0526

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SECTION 26 0553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

A. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables: Color coding for power conductors and cables 600 V and less; vinyl color coding electrical tape.

1.2 REFERENCE STANDARDS

A. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

B. NFPA 70E - Standard for Electrical Safety in the Workplace; 2024.

C. UL 969 - Marking and Labeling Systems; Current Edition, Including All Revisions.

PART 2 PRODUCTS

2.1 IDENTIFICATION REQUIREMENTS

A. Identification for Equipment:
   1. Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components.
      a. Switchgear:
         1) Identify ampere rating.
         2) Identify voltage and phase.
         3) Identify power source and circuit number. Include location when not within sight of equipment.
         4) Use identification nameplate to identify load(s) served for each branch device. Do not identify spares and spaces.
      b. Panelboards:
         1) Identify power source and circuit number. Include location when not within sight of equipment.
         2) Use typewritten circuit directory to identify load(s) served for panelboards with a door. Identify spares and spaces using pencil.
         3) For power panelboards without a door, use identification nameplate to identify load(s) served for each branch device. Do not identify spares and spaces.
   2. Available Fault Current Documentation: Use identification label to identify the available fault current and date calculations were performed at locations requiring documentation by NFPA 70 including but not limited to the following.
      a. Service equipment.
      b. Industrial control panels.

c. Motor control centers.
d. Elevator control panels.
e. Industrial machinery.
f. Panelboards

B. Identification for Conductors and Cables:
1. Color Coding for Power Conductors 600 V and Less: Comply with Section 26 0519.
2. Use identification nameplate or identification label to identify color code for ungrounded and grounded power conductors inside door or enclosure at each piece of feeder or branch-circuit distribution equipment when premises has feeders or branch circuits served by more than one nominal voltage system.

2.2 IDENTIFICATION NAMEPLATES AND LABELS

A. Identification Nameplates:
1. Materials:
a. Indoor Clean, Dry Locations: Use plastic nameplates.
2. Plastic Nameplates: Two-layer or three-layer laminated acrylic or electrically non-conductive phenolic with beveled edges; minimum thickness of 1/16 inch (1.6 mm); engraved text.
3. Mounting Holes for Mechanical Fasteners: Two, centered on sides for sizes up to 1 inch (25 mm) high; Four, located at corners for larger sizes.

B. Identification Labels:
1. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.
2. Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.

2.3 WARNING SIGNS AND LABELS

A. Comply with ANSI Z535.2 or ANSI Z535.4 as applicable.

B. Warning Signs:
1. Materials:
2. Minimum Size: 7 by 10 inches (178 by 254 mm) unless otherwise indicated.

C. Warning Labels:
1. Materials: Use factory pre-printed or machine-printed self-adhesive polyester or self-adhesive vinyl labels; UV, chemical, water, heat, and abrasion resistant; produced using materials recognized to UL 969.
2. Machine-Printed Labels: Use thermal transfer process printing machines and accessories recommended by label manufacturer.
3. Minimum Size: 2 by 4 inches (51 mm by 102 mm) unless otherwise indicated.

PART 3 EXECUTION

3.1 PREPARATION

A. Clean surfaces to receive adhesive products according to manufacturer's instructions.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install identification products to be plainly visible for examination, adjustment, servicing, and maintenance. Unless otherwise indicated, locate products as follows:
   1. Surface-Mounted Equipment: Enclosure front.
   2. Flush-Mounted Equipment: Inside of equipment door.
   3. Free-Standing Equipment: Enclosure front; also enclosure rear for equipment with rear access.
   4. Elevated Equipment: Legible from the floor or working platform.
   5. Branch Devices: Adjacent to device.
   6. Interior Components: Legible from the point of access.
   7. Conductors and Cables: Legible from the point of access.

C. Install identification products centered, level, and parallel with lines of item being identified.

D. Secure nameplates to exterior surfaces of enclosures using stainless steel screws and to interior surfaces using self-adhesive backing or epoxy cement.

E. Install self-adhesive labels and markers to achieve maximum adhesion, with no bubbles or wrinkles and edges properly sealed.

F. Mark all handwritten text, where permitted, to be neat and legible.

END OF SECTION 26 0553

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SECTION 27 1000 - STRUCTURED CABLING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Communications system design requirements.

B. Communications pathways.

C. Copper cable and terminations.

D. Communications outlets.

E. Communications grounding and bonding.

F. Communications identification.

1.2 RELATED REQUIREMENTS

A. Section 07 8400 - Firestopping.

B. Section 26 0526 - Grounding and Bonding for Electrical Systems.

C. Section 26 0533.16 - Boxes for Electrical Systems.

D. Section 26 0553 - Identification for Electrical Systems: Identification products.

E. Section 26 2726 - Wiring Devices.

F. Section 27 0529 - Hangers and Supports for Communications Systems.

G. Section 27 0533.13 - Conduit for Communications Systems.

1.3 REFERENCE STANDARDS

A. BICSI N1 - Installation Practices for Telecommunications and ICT Cabling and Related Cabling Infrastructure, 1st Edition; 2019.

B. EIA/ECA-310 - Cabinets, Racks, Panels, and Associated Equipment; 2005e.

C. FM (AG) - FM Approval Guide; Current Edition.

D. ICEA S-83-596 - Indoor Optical Fiber Cable; 2021.

E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

F. TIA-568 (SET) - Commercial Building Telecommunications Cabling Standard Set; 2020.

G. TIA-568.2 - Balanced Twisted-Pair Telecommunications Cabling and Components Standards; 2018d, with Addenda (2020).

H. TIA-569 - Telecommunications Pathways and Spaces; 2019e, with Addendum (2022).

I. TIA-606 - Administration Standard for Telecommunications Infrastructure; 2021d.

J. TIA-607 - Telecommunications Bonding and Grounding (Earthing) for Customer Premises; 2024e.

K. UL 444 - Communications Cables; Current Edition, Including All Revisions.

L. UL 514C - Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers; Current Edition, Including All Revisions.

M. UL 1863 - Communications-Circuit Accessories; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate requirements for service entrance and entrance facilities with Communications Service Provider.
   2. Coordinate the work with other trades to avoid placement of other utilities or obstructions within the spaces dedicated for communications equipment.
   3. Coordinate arrangement of communications equipment with the dimensions and clearance requirements of the actual equipment to be installed.
   4. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.5 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for each product.

C. Sustainable Design Documentation: Submit manufacturer's product data on cable and cable insulation showing compliance with specified lead content requirements.

D. Evidence of qualifications for installer.

E. Field Test Reports.

1.6 QUALITY ASSURANCE

A. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

B. Installer Qualifications: A company having at least 3 years experience in the installation and testing of the type of system specified, and:
   1. Employing a BICSI Registered Communications Distribution Designer (RCDD).
   2. Supervisors and installers factory certified by manufacturers of products to be installed.

C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Keep stored products clean and dry.

1.8 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a 2 year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.1 SYSTEM DESIGN

A. Provide a complete permanent system of cabling and pathways for voice and data communications, including cables, conduits and wireways, pull wires, support structures, enclosures and cabinets, and outlets.
   1. Provide fixed cables and pathways that comply with NFPA 70 and TIA-607 and are UL listed or third party independent testing laboratory certified.
   2. Provide connection devices that are rated for operation under conditions of 32 to 140 degrees F (0 to 60 degrees C) at relative humidity of 0 to 95 percent, noncondensing.
   3. In this project, the term plenum is defined as return air spaces above ceilings, inside ducts, under raised floors, and other air-handling spaces.

B. System Description:

C. Main Distribution Frame (MDF): Centrally located support structure for terminating horizontal cables that extend to telecommunications outlets, functioning as point of presence to external service provider.
   1. Locate main distribution frame as indicated on the drawings.

D. Cabling to Outlets: Specified horizontal cabling, wired in star topology to distribution frame located at center hub of star; also referred to as "links".

2.2 PATHWAYS

A. Conduit: See section 27 0533.13.

B. Firestop Sleeves: Listed; provide as required to preserve fire resistance rating of building elements.

2.3 COPPER CABLE AND TERMINATIONS

A. Manufacturers:
   1. CommScope: www.commscope.com/#sle.
   2. General Cable Technologies Corporation: www.generalcable.com/#sle.

B. Copper Horizontal Cable:
   1. Description: 100 ohm, balanced twisted pair cable complying with TIA-568.2 and listed and labeled as complying with UL 444.
   2. Cable Type - Voice and Data: TIA-568.2 Category 6 UTP (unshielded twisted pair); 23 AWG.
   3. Cable Capacity: 4-pair.
   4. Cable Applications: Use listed NFPA 70 Type CMP plenum cable unless otherwise indicated.
   5. Cable Jacket Color - Voice and Data Cable: Blue.
   6. Product(s):
      a. CommScope; SYSTIMAX Twisted Pair Cables; GigaSPEED XL Category 6 U/UTP Cable: www.commscope.com/#sle.
      b. CommScope; Uniprise Twisted Pair Cables; CS34 Series Category 6 U/UTP Cable: www.commscope.com/#sle.
      c. General Cable Technologies Corporation; GenSPEED Cables: www.generalcable.com/#sle.

C. Copper Cable Terminations: Insulation displacement connection (IDC) type using appropriate tool; use screw connections only where specifically indicated.

D. Jacks and Connectors: Modular RJ-45, non-keyed, terminated with 110-style insulation displacement connectors (IDC); high impact thermoplastic housing; suitable for and complying with same standard as specified horizontal cable; UL 1863 listed.
   1. Performance: 500 mating cycles.
   2. Voice and Data Jacks: 8-position modular jack, color-coded for both T568A and T568B wiring configurations.
   3. Product(s):
      a. CommScope; SYSTIMAX RJ45 Jacks; MGS400 Series Category 6 U/UTP Modular Jacks: www.commscope.com/#sle.

2.4 COMMUNICATIONS OUTLETS

A. Manufacturers:
   1. CommScope: www.commscope.com/#sle.
   2. Siemon Company: www.siemon.com/#sle.

B. Outlet Boxes: Comply with Section 26 0533.16.
   1. Provide depth as required to accommodate cable manufacturer's recommended minimum conductor bend radius.
   2. Minimum Size, Unless Otherwise Indicated:
      a. Data or Combination Voice/Data Outlets: 4 inch square by 2-1/8 inch deep (100 by 54 mm) trade size.

C. Wall Plates:

1. Comply with system design standards and UL 514C.
2. Accepts modular jacks/inserts.
3. Capacity:
   a. Data or Combination Voice/Data Outlets: 8 ports.
4. Wall Plate Material/Finish - Flush-Mounted Outlets: Match wiring device and wall plate finishes specified in Section 26 2726.

2.5 GROUNDING AND BONDING COMPONENTS

A. Comply with TIA-607.

B. Comply with Section 26 0526.

2.6 IDENTIFICATION PRODUCTS

A. Comply with TIA-606.

B. Comply with Section 26 0553.

2.7 SOURCE QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for additional requirements.

B. Factory test cables according to TIA-568 (SET).

PART 3 EXECUTION

3.1 INSTALLATION - GENERAL

A. Comply with latest editions and addenda of TIA-568 (SET) (cabling), TIA-569 (pathways), TIA-607 (grounding and bonding), BICSI N1, NFPA 70, and SYSTEM DESIGN as specified in PART 2.

B. Comply with Communication Service Provider requirements.

C. Grounding and Bonding: Perform in accordance with TIA-607 and NFPA 70.

D. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 8400.

3.2 INSTALLATION OF PATHWAYS

A. Install pathways with the following minimum clearances:
1. 48 inches (1220 mm) from motors, generators, frequency converters, transformers, x-ray equipment, and uninterruptible power systems.
2. 12 inches (300 mm) from power conduits and cables and panelboards.
3. 5 inches (125 mm) from fluorescent and high frequency lighting fixtures.
4. 6 inches (150 mm) from flues, hot water pipes, and steam pipes.

B. Outlet Boxes:
1. Coordinate locations of outlet boxes provided under Section 26 0533.16 as required for installation of telecommunications outlets provided under this section.
a. Mounting Heights: Unless otherwise indicated, as follows:
1) Telephone and Data Outlets: 18 inches (450 mm) above finished floor.
2) Telephone Outlets for Side-Reach Wall-Mounted Telephones: 54 inches (1.4 m) above finished floor to top of telephone.
3) Telephone Outlets for Forward-Reach Wall-Mounted Telephones: 48 inches (1.2 m) above finished floor to top of telephone.

3.3 INSTALLATION OF EQUIPMENT AND CABLING

A. Cabling:
1. Do not bend cable at radius less than manufacturer's recommended bend radius; for unshielded twisted pair use bend radius of not less than 4 times cable diameter.
2. Do not over-cinch or crush cables.
3. Do not exceed manufacturer's recommended cable pull tension.
4. When installing in conduit, use only lubricants approved by cable manufacturer and do not chafe or damage outer jacket.

B. Service Loops (Slack or Excess Length): Provide the following minimum extra length of cable, looped neatly:
1. At Distribution Frames: 120 inches (3000 mm).
2. At Outlets - Copper: 12 inches (305 mm).

C. Copper Cabling:
1. Category 5e and Above: Maintain cable geometry; do not untwist more than 1/2 inch (12 mm) from point of termination.
2. For 4-pair cables in conduit, do not exceed 25 pounds (110 N) pull tension.
3. Use T568B wiring configuration.

D. Identification:
1. Use wire and cable markers to identify cables at each end.
2. Use manufacturer-furnished label inserts, identification labels, or engraved wallplate to identify each jack at communications outlets with unique identifier.

3.4 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for additional requirements.

B. Comply with inspection and testing requirements of specified installation standards.

C. Visual Inspection:
1. Inspect cable jackets for certification markings.
2. Inspect cable terminations for color coded labels of proper type.
3. Inspect outlet plates and patch panels for complete labels.

D. Testing - Copper Cabling and Associated Equipment:
1. Test backbone cables after termination but before cross-connection.

2. Test backbone cables for DC loop resistance, shorts, opens, intermittent faults, and polarity between connectors and between conductors and shield, if cable has overall shield.
3. Test operation of shorting bars in connection blocks.
4. Category 5e and Above Links: Perform tests for wire map, length, attenuation, NEXT, and propagation delay.

E. Final Testing: After all work is complete, including installation of telecommunications outlets, and telephone dial tone service is active, test each voice jack for dial tone.

END OF SECTION 27 1000

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SECTION 28 3000 - SECURITY SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Work shall be included
      a. Lock/unlock detention doors
      b. Integrate with fire alarm system
      c. Necessary relay and relay panel
      d. Intercom system
      e. Coordination with various trades

B. Basis of Design
   1. The contractor shall provide an extension to and modifications of the LEC security system to include door control, integration with fire alarm and intercom system. Provide work and material requird tp provide for a workable and complete system compatible with existing system.
   2. Work shall be done by Accurate Controls. Contact Jeromy Dahlke for price and include price in bid. Jeromy Dalhke, 420 Oshkosk St, Ripon WI 54971, Phone Number 920.896.4044.

END OF SECTION 28 3000 28 3000

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SECTION 28 4600 - DIGITAL, ADDRESSABLE FIRE-ALARM SYSTEM

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Manual fire-alarm boxes.
   2. System smoke detectors.
   3. Notification appliances.
   4. Addressable interface device.
   5. Duct smoke detector

B. Provide a complete & workable extension to the existing Simplex Addressable Fire Alarm System. Verify exact model.

C. Relate Requirements:
   1. Section 26 0519 "Low-voltage Electrical Power Conductors and Cables " for cables and conductors for fire-alarm systems.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product, including furnished options and accessories.

B. Shop Drawings: For fire-alarm system.
   1. Comply with recommendations and requirements in the "Documentation" section of the "Fundamentals" chapter in NFPA 72.
   2. Include plans, elevations, sections, details, and attachments to other work.
   3. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and locations. Indicate conductor sizes, indicate termination locations and requirements, and distinguish between factory and field wiring.
   4. Detail assembly and support requirements.
   5. Include voltage drop calculations for notification-appliance circuits.
   6. Include battery-size calculations.
   7. Include input/output matrix.
   8. Include statement from manufacturer that all equipment and components have been tested as a system and meet all requirements in this Specification and in NFPA 72.
   9. Include performance parameters and installation details for each detector.
   10. Verify that each duct detector is listed for complete range of air velocity, temperature, and humidity possible when air-handling system is operating.
   11. Include plans, sections, and elevations of heating, ventilating, and air-conditioning ducts, drawn to scale; coordinate location of duct smoke detectors and access to them.
      a. Show critical dimensions that relate to placement and support of sampling tubes, detector housing, and remote status and alarm indicators.

b. Show field wiring required for HVAC unit shutdown on alarm.
c. Locate detectors according to manufacturer's written recommendations.

12. Include floor plans to indicate final outlet locations showing address of each addressable device. Show size and route of cable and conduits and point-to-point wiring diagrams.

C. General Submittal Requirements:
1. Submittals shall be approved by authorities having jurisdiction prior to submitting them to Architect.
2. Shop Drawings shall be prepared by persons with the following qualifications:
a. Trained and certified by manufacturer in fire-alarm system design.
b. NICET-certified, fire-alarm technician; minimum.
c. Licensed or certified by authorities having jurisdiction.

D. Delegated-Design Submittal: For notification appliances and smoke and heat detectors, in addition to submittals listed above, indicate compliance with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
1. Drawings showing the location of each notification appliance and smoke and heat detector, ratings of each, and installation details as needed to comply with listing conditions of the device.
2. Design Calculations: Calculate requirements for selecting the spacing and sensitivity of detection, complying with NFPA 72. Calculate spacing and intensities for strobe signals and sound-pressure levels for audible appliances.
3. Indicate audible appliances required to produce square wave signal per NFPA 72.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Seismic Qualification Certificates: For fire-alarm control unit, accessories, and components, from manufacturer.

C. Field quality-control reports.

D. Sample warranty.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For fire-alarm systems and components to include in emergency, operation, and maintenance manuals.
1. In addition to items specified in Section 01782 "Operation and Maintenance Data," include the following:
a. Comply with the "Records" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
b. Provide "Fire Alarm and Emergency Communications System Record of Completion Documents" according to the "Completion Documents" Article in the "Documentation" section of the "Fundamentals" chapter in NFPA 72.
c. Complete wiring diagrams showing connections between all devices and equipment.

d. Riser diagram.
e. Record copy of site-specific software.
f. Provide "Inspection and Testing Form" according to the "Inspection, Testing and Maintenance" chapter in NFPA 72, and include the following:
    1) Equipment tested.
    2) Frequency of testing of installed components.
    3) Frequency of inspection of installed components.
    4) Requirements and recommendations related to results of maintenance.
    5) Manufacturer's user training manuals.
g. Manufacturer's required maintenance related to system warranty requirements.
h. Abbreviated operating instructions for mounting at fire-alarm control unit and each annunciator unit.

B. Software and Firmware Operational Documentation:
1. Software operating and upgrade manuals.
2. Program Software Backup: On magnetic media or compact disk, complete with data files.
3. Device address list.
4. Printout of software application and graphic screens.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Personnel shall be trained and certified by manufacturer for installation of units required for this Project.

B. Installer Qualifications: Installation shall be by personnel certified by NICET as fire-alarm technician.

C. NFPA Certification: Obtain certification according to NFPA 72 by an NRTL (nationally recognized testing laboratory).

D. NFPA Certification: Obtain certification according to NFPA 72 by a UL-listed alarm company.

E. NFPA Certification: Obtain certification according to NFPA 72 inch (1828.8 mm) the form of a placard by an FM Global-approved alarm company.

F. NFPA Certification: Obtain certification according to NFPA 72 by .

1.6 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace fire-alarm system equipment and components that fail in materials or workmanship within specified warranty period.
1. Warranty Extent: All equipment and components not covered in the Maintenance Service Agreement.
2. Warranty Period: Five years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

A. Source Limitations for Fire-Alarm System and Components: Components shall be compatible with, and operate as an extension of, existing system. Provide system manufacturer's certification that all components provided have been tested as, and will operate as, a system.

B. Noncoded, UL-certified addressable system, with multiplexed signal transmission and horn/strobe evacuation.

C. Automatic sensitivity control of certain smoke detectors.

D. All components provided shall be listed for use with the selected system.

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

2.2 SYSTEMS OPERATIONAL DESCRIPTION

A. Fire-alarm signal initiation shall not be changed except addition devices will be added.

B. Fire-alarm signal shall initiate as previously programmed except with additional devices added.

C. Supervisory signal initiation shall be as before except with additional devices added.

D. System trouble signal initiation shall be as before except with additional devices added.

E. System Supervisory Signal Actions to remain as before except with additional devices added.

2.3 FIRE-ALARM CONTROL UNIT

A. Manufacturers: Existing Simplex 4100U.

B. Notification-Appliance Circuit:
1. Existing upgrade, if required.

C. Door Controls: Door hold-open devices that are controlled by smoke detectors at doors in smoke-barrier walls shall be connected to fire-alarm system.

D. Remote Smoke-Detector Sensitivity Adjustment: Controls shall select specific addressable smoke detectors for adjustment, display their current status and sensitivity settings, and change those settings. Allow controls to be used to program repetitive, time-scheduled, and automated changes in sensitivity of specific detector groups. Record sensitivity adjustments and sensitivity-adjustment schedule changes in system memory.

2.4 MANUAL FIRE-ALARM BOXES

A. Manufacturers: Simplex #4099-9003 (Verify).

B. General Requirements for Manual Fire-Alarm Boxes: Comply with UL 38.

1. Single-action mechanism, type; with integral addressable module arranged to communicate manual-station status (normal, alarm, or trouble) to fire-alarm control unit.
2. Station Reset: Key- or wrench-operated switch.

2.5 SYSTEM SMOKE DETECTORS

A. Smoke detector: Simplex #4098-9714/4098-9792.

2.6 NOTIFICATION APPLIANCES

A. A/V device: Simplex #4906-9133.

B. Visual only devices: Simplex #4906-9102 (Verify).

2.7 FAN SHUTDOWN RELAY

A. Simplex #4090-9008 RIAM.

2.8 IAM

A. Simplex #4090-9002.

2.9 RACEWAYS

A. Pathways above recessed ceilings and in non accessible locations may be routed exposed.
1. Exposed pathways located less than 96 inches (2438.4 mm) above the floor shall be installed in EMT.

B. Pathways shall be installed in EMT.

C. Exposed EMT shall be painted red enamel.

2.10 CONNECTIONS

A. For fire-protection systems related to doors in fire-rated walls and partitions and to doors in smoke partitions, comply with requirements in Section 08710 "Door Hardware." Connect hardware and devices to fire-alarm system.
1. Verify that hardware and devices are listed for use with installed fire-alarm system before making connections.

B. Make addressable connections with a supervised interface device to the following devices and systems. Install the interface device less than 36 inches (914.4 mm) from the device controlled. Make an addressable confirmation connection when such feedback is available at the device or system being controlled.
1. Smoke dampers in air ducts of designated HVAC duct systems.
2. Magnetically held-open doors.
3. Electronically locked doors and access gates.
4. Alarm-initiating connection to elevator recall system and components.

5. Alarm-initiating connection to activate emergency lighting control.
6. Alarm-initiating connection to activate emergency shutoffs for gas and fuel supplies.
7. Supervisory connections at valve supervisory switches.
8. Supervisory connections at low-air-pressure switch of each dry-pipe sprinkler system.
9. Supervisory connections at elevator shunt-trip breaker.
10. Supervisory connections at fire-extinguisher locations.

2.11 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 16075 "Electrical Identification."

B. Install framed instructions in a location visible from fire-alarm control unit.

2.12 GROUNDING

A. Ground fire-alarm control unit and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to fire-alarm control unit.

B. Ground shielded cables at the control panel location only. Insulate shield at device location.

2.13 FIELD QUALITY CONTROL

A. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
   1. Visual Inspection: Conduct visual inspection prior to testing.
      a. Inspection shall be based on completed record Drawings and system documentation that is required by NFPA 72 inch (1828.8 mm) its "Completion Documents, Preparation" table in the "Documentation" section of the "Fundamentals" chapter.
      b. Comply with the "Visual Inspection Frequencies" table in the "Inspection" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72; retain the "Initial/Reacceptance" column and list only the installed components.
   2. System Testing: Comply with the "Test Methods" table in the "Testing" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
   3. Test audible appliances for the public operating mode according to manufacturer's written instructions. Perform the test using a portable sound-level meter complying with Type 2 requirements in ANSI S1.4.
   4. Test audible appliances for the private operating mode according to manufacturer's written instructions.
   5. Test visible appliances for the public operating mode according to manufacturer's written instructions.
   6. Factory-authorized service representative shall prepare the "Fire Alarm System Record of Completion" in the "Documentation" section of the "Fundamentals" chapter in NFPA 72 and the "Inspection and Testing Form" in the "Records" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.

B. Reacceptance Testing: Perform reacceptance testing to verify the proper operation of added or replaced devices and appliances.

C. Fire-alarm system will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

E. Maintenance Test and Inspection: Perform tests and inspections listed for weekly, monthly, quarterly, and semiannual periods. Use forms developed for initial tests and inspections.

F. Annual Test and Inspection: One year after date of Substantial Completion, test fire-alarm system complying with visual and testing inspection requirements in NFPA 72. Use forms developed for initial tests and inspections.

2.14 SOFTWARE SERVICE AGREEMENT

A. Comply with UL 864.

B. Technical Support: Beginning at Substantial Completion, service agreement shall include software support for two years.

C. Upgrade Service: At Substantial Completion, update software to latest version. Install and program software upgrades that become available within two years from date of Substantial Completion. Upgrading software shall include operating system and new or revised licenses for using software.

1. Upgrade Notice: At least 30 days to allow Owner to schedule access to system and to upgrade computer equipment if necessary.

2.15 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain fire-alarm system.

END OF SECTION 28 4600

WILLIAMS COUNTY LAW ENFORCEMENT CENTER INFIRMARY

206 EAST BROADWAY
WILLISTON, ND

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PROJECT LOCATION

CONTACT INFORMATION

EAPC

PROJECT MANAGER
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REGISTRATION

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Registered Architect under the laws of the State of North Dakota.

Signature: Burton E. Youngs

Date: 06/09/2025 REG. NO.: 1132

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PROJECT DESCRIPTION
WILLIAMS COUNTY LAW ENFORCEMENT CENTER INFIRMARY

CITY WILLISTON
STATE ND

ISSUE DATES

MARK	DESCRIPTION	DATE
CD	CONSTRUCTION DOCUMENTS	06/09/2025

PROJECT NO: 20232310
DRAWN BY: BEY
CHECKED BY: GL/MC

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