3.5 IDENTIFICATION

A. Identify and color code conductors and cables according to Division 26, Section "Identification for Electrical Systems."

B. Identify each spare conductor at each end with identity number and location of other end of conductor and identify as pare conductor.

3.6 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Division 26, Section "Common Materials and Methods for Electrical."

3.7 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Division 26, Section "Common Materials and Methods for Electrical" and Division 7.

3.8 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

B. Tests and Inspections:

1. After installing conductors and cables and before electrical circuitry has been energized, test feeder conductors, and conductors feeding the following critical equipment and services for compliance with requirements.

2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
3. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each splice in cables and conductors No. 3 AWG and larger. Remove box and equipment covers so splices are accessible to portable scanner.
   a. Record of Infrared Scanning: Prepare a certified report that identifies splices checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

C. Test Reports: Prepare a written report to record the following:

1. Test procedures used.
2. Test results that comply with requirements.
3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

D. Remove and replace malfunctioning units and retest as specified above.

SECTION 26 05 26 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes methods and materials for grounding systems and equipment, plus the following special applications:

1. Common ground bonding.
2. Panelboard bonding.
3. Patient vicinity grounding and bonding.

1.3 SUBMITTALS

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

B. Qualification Data: For testing agency and testing agency's field supervisor.

C. Field quality-control test reports.

1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to the State of California Office of Statewide Health and planning and Development (OSHPD) and other authorities having jurisdiction.

1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association to supervise on-site testing specified in Part 3.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in the CEC, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 - PRODUCTS

2.1 CONDUCTORS

A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

B. Equipment grounding conductor insulation color shall be continuous green, except for wire sizes No. 4 AWG and larger which shall be identified per CEC.

C. Bare Copper Conductors:

1. Solid Conductors: ASTM B 3.
2. Stranded Conductors: ASTM B 8.
3. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch (6 mm) in diameter.
4. Bonding and Grounding Conductor: Unless otherwise indicated on the drawings, use No. 4 or No. 6 AWG minimum, stranded conductor.
5. Bonding Jumper: Copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.

D. Grounding Bus: Rectangular bars of annealed copper, 1/4 by 2 inches in cross section, unless otherwise indicated; with insulators.

2.2 CONNECTORS

A. Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used, and for specific types, sizes, and combinations of conductors and other items connected.

B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, bolted pressure-type, with at least two bolts.

1. Pipe Connectors: Clamp type, sized for pipe.

C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

PART 3 - EXECUTION

3.1 APPLICATIONS

A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger, unless otherwise indicated.

B. Isolated Grounding Conductors: Green-colored insulation with continuous yellow stripe. On feeders with isolated ground, identify grounding conductor where visible to normal inspection,

with alternating bands of green and yellow tape, with at least three bands of green and two bands of yellow.

C. Grounding Bus: Install in electrical and telephone equipment rooms, in rooms housing service equipment, and elsewhere as indicated.

1. Install bus on insulated spacers 1 inch (25 mm), minimum, from wall 6 inches (150 mm) above finished floor, unless otherwise indicated.
2. Where indicated on both sides of doorways, connect horizontal buses with No. 4/0 AWG bare copper over doorway at right angles. Bond metal door frames to horizontal buses or No. 4/0 AWG conductor.

D. Conductor Terminations and Connections:

1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
2. Connections to Structural Steel: Welded connectors.

3.2 EQUIPMENT GROUNDING

A. Install insulated equipment grounding conductors with all feeders and branch circuits.

B. Install insulated equipment grounding conductors with the following items, in addition to those required by the CEC:

1. Feeders and branch circuits.
2. Lighting circuits.
3. Receptacle circuits.
4. Single-phase motor and appliance branch circuits.
5. Three-phase motor and appliance branch circuits.
6. Flexible raceway runs.
7. Armored and metal-clad cable runs.

C. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.

D. Panelboard Bonding: Install a separate insulated copper bonding conductor of No. 10 AWG connecting the ground buses of the normal and essential branch-circuit panelboards serving the same individual patient vicinity. Protect the bonding conductor by method of installation or enclosed in a raceway bonded to each panelboard enclosure.

E. Isolated Grounding Receptacle Circuits: Install an insulated equipment grounding conductor connected to the receptacle grounding terminal. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.

F. Isolated Equipment Enclosure Circuits: For designated equipment supplied by a branch circuit or feeder, isolate equipment enclosure from supply circuit raceway with a nonmetallic raceway fitting listed for the purpose. Install fitting where raceway enters enclosure, and install a

separate insulated equipment grounding conductor. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.

G. Signal and Communication Equipment: For telephone, alarm, voice and data, and other communication equipment, provide No. 4 AWG minimum unless indicated otherwise on the drawings insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.

1. Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on a 1/4-by-2-by-12-inch (6-by-50-by-300-mm) grounding bus.
2. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.

3.3 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

B. Common Ground Bonding with Lightning Protection System: Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system. Bond electrical power system ground directly to lightning protection system grounding conductor at closest point to electrical service grounding electrode. Use bonding conductor sized same as system grounding electrode conductor, and install in conduit.

C. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance, except where routed through short lengths of conduit.

1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install so vibration is not transmitted to rigidly mounted equipment.

D. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install bonding jumper to bond across flexible duct connections to achieve continuity.

3.4 FIELD QUALITY CONTROL

A. Perform the following tests and inspections and prepare test reports:

1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
2. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal.

a. Perform tests by fall-of-potential method according to IEEE 81.

B. Report measured ground resistances that exceed the following values:

1. Power and Lighting Equipment or System with Capacity 500 kVA and Less: 10 ohms.
2. Power and Lighting Equipment or System with Capacity 500 to 1000 kVA: 5 ohms.
3. Power Distribution Units or Panelboards Serving Electronic Equipment: 3 ohms.

C. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

END OF SECTION 26 05 26

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SECTION 26 05 29 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Hangers and supports for electrical equipment and systems.
2. Construction requirements for concrete bases.

B. Related Sections include the following:

1. Division 26 Section "Vibration And Seismic Controls For Electrical Systems" for products and installation requirements necessary for compliance with seismic criteria.

1.3 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. IMC: Intermediate metal conduit.

C. RMC: Rigid metal conduit.

1.4 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design supports for multiple raceways, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.

C. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

D. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.

1.5 SUBMITTALS

A. Product Data: For the following:

1. Steel slotted support systems.
2. Nonmetallic slotted support systems.

B. Shop Drawings: Show fabrication and installation details and include calculations for the following:

1. Trapeze hangers. Include Product Data for components.
2. Steel slotted channel systems. Include Product Data for components.
3. Nonmetallic slotted channel systems. Include Product Data for components.
4. Equipment supports.

C. Welding certificates.

1.6 QUALITY ASSURANCE

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

B. Comply with CEC, CBC, and OSHPD requirements.

C. All hangers and support shall be installed in compliance with OSHPD requirements and standards. The contractor shall be responsible for providing information and data as required by OSHPD to verify conformance of the installations.

1.7 COORDINATION

A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

B. Coordinate installation of roof curbs, equipment supports, and roof penetrations. These items are specified in Division 07 Section "Roof Accessories."

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.

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

a. Allied Tube & Conduit.
b. Cooper B-Line, Inc.; a division of Cooper Industries.

c. ERICO International Corporation.
d. GS Metals Corp.
e. Thomas & Betts Corporation.
f. Unistrut; Tyco International, Ltd.

2. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
3. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
4. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
5. Channel Dimensions: Selected for applicable load criteria.

B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.

C. Conduit and Cable Support Devices: Steel and malleable-iron hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.

E. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

F. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.

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

1) Hilti Inc.
2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
3) MKT Fastening, LLC.
4) Simpson Strong-Tie Co., Inc.; Masterset Fastening Systems Unit.

2. Mechanical-Expansion Anchors: Insert-wedge-type, stainless steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.

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

1) Cooper B-Line, Inc.; a division of Cooper Industries.
2) Hilti Inc.
3) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.

3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
6. Toggle Bolts: All-steel springhead type.
7. Hanger Rods: Threaded steel.

2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

B. Materials: Comply with requirements in Division 05 Section "Metal Fabrications" for steel shapes and plates.

PART 3 - EXECUTION

3.1 APPLICATION

A. Comply with NECA 1 and NECA 101 and OSHPD PIN, CAN and OPA numbers for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.

B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as required by the CEC and OSHPD. Minimum rod size shall be 1/4 inch (6 mm) in diameter.

C. Multiple Raceways or Cables: For horizontal pendent installation, install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits. For vertical surface installation, install steel slotted support system anchored to structural wall system for the entire length of run.

1. Secure raceways and cables to these supports with two-bolt conduit clamps.

D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch (38-mm) and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3.2 SUPPORT REQUIREMENTS

A. General

1. Provide materials, equipment, supplies and labor necessary as required to adequately support, brace and strengthen all equipment and materials furnished as part of this work.

2. Materials, equipment, apparatus supports and mounting hardware shall be approved for use in the location installed. For example, use electroplated galvanized, hot dipped galvanized, epoxy coated, PVC coated, stainless steel or aluminum in wet/outdoor locations.

3.3 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 and OSHPD PIN, CAN and OPA numbers for installation requirements except as specified in this Article.

B. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb (90 kg).

C. Mounting and Anchorage of Surface-Mounted Equipment and Components: Install steel slotted channel-racks to finish wall anchored and fastened to structural floor and ceiling, and wall were crossing structural members. Anchor and fasten electrical items to the steel slotted support system. The steel slotted channel-racks shall be anchored and fastened by the following methods unless otherwise indicated by code:

1. To Wood: Fasten with lag screws or through bolts.
2. To New Concrete: Bolt to concrete inserts.
3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
4. To Existing Concrete: Expansion anchor fasteners.
5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches (100 mm) thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches (100 mm) thick.
6. To Structural Steel: Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69.
7. To Light Steel: Sheet metal screws.

D. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.4 INSTALLATION OF FABRICATED METAL SUPPORTS

A. Comply with installation requirements in Division 05 Section "Metal Fabrications" for site-fabricated metal supports.

B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

C. Field Welding: Comply with AWS D1.1/D1.1M.

3.5 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils (0.05 mm).

B. Touchup: Comply with requirements in Division 09 for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.

C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 26 05 29

SECTION 26 05 33 - RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

1.3 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. ENT: Electrical nonmetallic tubing.

C. EPDM: Ethylene-propylene-diene terpolymer rubber.

D. FMC: Flexible metal conduit.

E. IMC: Intermediate metal conduit.

F. LFMC: Liquidtight flexible metal conduit.

G. LFNC: Liquidtight flexible nonmetallic conduit.

H. NBR: Acrylonitrile-butadiene rubber.

I. RNC: Rigid nonmetallic conduit.

1.4 SUBMITTALS

A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.

B. Manufacturer Seismic Qualification Certification: Submit certification that enclosures and cabinets and their mounting provisions, including those for internal components, will withstand seismic forces defined in Division 26 Section "Vibration and Seismic Controls for Electrical Systems." Include the following:

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

a. The term "withstand" means "the cabinet or enclosure will remain in place without separation of any parts when subjected to the seismic forces specified.

C. Qualification Data: For professional engineer and testing agency.

D. Source quality-control test reports.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with the CEC.

PART 2 - PRODUCTS

2.1 METAL CONDUIT AND TUBING

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

1. AFC Cable Systems, Inc.
2. Alflex Inc.
3. Allied Tube & Conduit; a Tyco International Ltd. Co.
4. O-Z Gedney; a unit of General Signal.
5. Wheatland Tube Company.

B. Rigid Steel Conduit: ANSI C80.1.

C. IMC: ANSI C80.6.

D. PVC-Coated Steel Conduit: PVC-coated rigid steel conduit.

1. Comply with NEMA RN 1.
2. Coating Thickness: 0.040 inch (1 mm), minimum.

E. EMT: ANSI C80.3.

F. LFMC: Flexible steel conduit with PVC jacket.

G. Fittings for Conduit (Including all Types and Flexible and Liquidtight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.

1. Fittings for EMT: Steel, set-screw type.
2. Coating for Fittings for PVC-Coated Conduit: Minimum thickness, 0.040 inch (1 mm), with overlapping sleeves protecting threaded joints.

H. Joint Compound for Rigid Steel Conduit or IMC: Listed for use in cable connector assemblies, and compounded for use to lubricate and protect threaded raceway joints from corrosion and enhance their conductivity.

2.2 NONMETALLIC CONDUIT AND TUBING

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

1. AFC Cable Systems, Inc.
2. CANTEX Inc.
3. CertainTeed Corp.; Pipe & Plastics Group.
4. Electri-Flex Co.
5. Lamson & Sessions; Carlon Electrical Products.
6. RACO; a Hubbell Company.
7. Thomas & Betts Corporation.

2.3 METAL WIREWAYS

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

1. Cooper B-Line, Inc.
2. Hoffman.
3. Square D; Schneider Electric.

B. Description: Sheet metal sized and shaped as indicated, NEMA 250, Type 1, unless otherwise indicated.

C. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

D. Wireway Covers: Screw-cover type.

E. Finish: Manufacturer's standard enamel finish.

2.4 SURFACE RACEWAYS

A. Surface Metal Raceways: Galvanized steel with snap-on covers. Manufacturer's standard enamel finish in color selected by Architect.

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

a. Thomas & Betts Corporation.
b. Walker Systems, Inc.; Wiremold Company (The).
c. Wiremold Company (The); Electrical Sales Division.

2.5 BOXES, ENCLOSURES, AND CABINETS

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

1. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
2. EGS/Appleton Electric.
3. Erickson Electrical Equipment Company.
4. Hoffman.
5. Hubbell Incorporated; Killark Electric Manufacturing Co. Division.
6. O-Z/Gedney; a unit of General Signal.
7. RACO; a Hubbell Company.
8. Spring City Electrical Manufacturing Company.
9. Thomas & Betts Corporation.
10. Walker Systems, Inc.; Wiremold Company (The).

B. Interior Sheet Metal Outlet and Device Boxes: NEMA OS 1.

1. General: Provide pressed galvanized sheet steel boxes with knockouts to suit raceway system to be used. Supports shall also be galvanized steel.
2. Ceiling: Provide flush, 4 inch, octagonal boxes not less than 1-1/2 inches deep with 4 knockouts. Provide 3/8 inch luminaire studs where required. Surface, 4 inch, square boxes not less than 1-1/2 inches deep.
3. Walls: Provide flush 4 inch square boxes not less than 2 inches deep with matching plaster ring for single or 2 gang outlets. Coordinate with low voltage contractor for ring size.
4. Do not use sectional or handy boxes unless specifically noted.

C. Communication Outlet and Device Boxes:

1. Unless noted otherwise, all communication outlet and devices boxes shall comply with paragraph titled "Sheet Metal Outlet and Device Boxes" above.

D. Cast-Metal Outlet and Device Boxes: NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.

E. Nonmetallic Outlet and Device Boxes: Not allowed.

F. Metal Floor Boxes: Cast metal, fully adjustable, rectangular.

G. Sheet Metal Outlet and Device Boxes: NEMA OS 1.

H. Cast-Metal Outlet and Device Boxes: NEMA FB 1, Type FD, with gasketed cover.

I. Metal Floor Boxes: Cast metal, fully adjustable, rectangular.

J. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

K. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous-hinge cover with flush latch, unless otherwise indicated.

1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.

L. Cabinets:

1. NEMA 250, Type 1, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
2. Hinged door in front cover with flush latch and concealed hinge.
3. Key latch to match panelboards.
4. Metal barriers to separate wiring of different systems and voltage.
5. Accessory feet where required for freestanding equipment.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

A. Comply with the following indoor applications, unless otherwise indicated:

1. Exposed, Not Subject to Physical Damage: EMT.
2. Exposed and Subject to Physical Damage: Rigid steel conduit. Includes raceways in the following locations:

   a. Mechanical rooms.

3. Concealed in Ceilings and Interior Walls and Partitions: EMT.
4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
5. Damp or Wet Locations: Rigid steel conduit.
6. Raceways for Optical Fiber or Communications Cable in Spaces Used for Environmental Air: optical fiber/communications cable raceway.
7. Raceways for Concealed General Purpose Distribution of Optical Fiber or Communications Cable
8. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4, in damp or wet locations.

B. Minimum Raceway Size: 3/4-inch (21-mm) trade size.

C. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.
2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with that material. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer.

3.2 RACEWAY INSTALLATION

A. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.

B. Keep raceways at least 6 inches (150 mm) away from parallel runs of cable trays (side, top and bottom) or top of light fixtures (unless otherwise noted) and 12 inches (300mm) from heat sources such as flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

C. Complete raceway installation before starting conductor installation.

D. Support raceways as specified in Division 26 Section "Hangers and Supports for Electrical Systems."

E. Arrange stub-ups so curved portions of bends are not visible above the finished slab.

F. Install no more than the equivalent of three 90-degree bends in any conduit run except for communications conduits, for which fewer bends are allowed.

G. Conceal conduit and EMT within finished walls, ceilings, and floors, including walls of unfinished spaces, unless otherwise indicated.

H. Do not install conduits in concrete floor slabs.

I. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.

J. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.

K. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull wire.

L. Raceways for Optical Fiber and Communications Cable: Install raceways, metallic and nonmetallic, rigid and flexible, as follows:

1. 3/4-Inch (19-mm) Trade Size and Smaller: Install raceways in maximum lengths of 50 feet (15 m).
2. 1-Inch (25-mm) Trade Size and Larger: Install raceways in maximum lengths of 75 feet (23 m).
3. Install with a maximum of two 90-degree bends or equivalent for each length of raceway unless Drawings show stricter requirements. Separate lengths with pull or junction boxes or terminations at distribution frames or cabinets where necessary to comply with these requirements.

M. Install 3/4-Inch (19-mm) EMT stub-up from each data/comm. or low voltage device box up to accessible ceiling space above (min. of 6 inches above ceiling line). Include conduit bushing.

N. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:

1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
2. Where otherwise required by the CEC.

O. Expansion-Joint Fittings for RNC: Install in each run of aboveground conduit that is located where environmental temperature change may exceed 30 deg F (17 deg C), and that has straight-run length that exceeds 25 feet (7.6 m).

1. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F (0.06 mm per meter of length of straight run per deg C) of temperature change.
2. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at the time of installation.

P. Flexible Conduit Connections: Use maximum of 72 inches (1830 mm) of flexible conduit for recessed and semirecessed lighting fixtures, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.

1. Use LFMC in damp or wet locations subject to severe physical damage.
2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.

Q. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall.

R. Set metal floor boxes level and flush with finished floor surface.

S. Include conduit bushings for all conduit stubs.

3.3 BOX INSTALLATION

A. Mount outlet boxes flush in areas other than mechanical rooms, electrical rooms, and above removable ceilings. Secure firmly in place and set true and square with finished surfaces. Provide raised covers for boxes as required to suit the wall or ceiling, construction, and finish.

B. Do not fasten boxes to ceiling support wires or other piping systems.

C. Install pull and junction boxes above accessible ceilings and in unfinished areas only.

D. In Accessible Ceiling Areas: Install outlet and junction boxes no more than 6 inches from ceiling access panel or from removable recessed luminaire. Note: Removable luminaires can only be considered an access point for pull and splice boxes (housing no active components nor devices requiring routine maintenance or repair).

E. Locate flush mounted boxes in masonry walls so that only a corner need be cut from masonry units. Coordinate masonry cutting to achieve neat opening.

F. Do not install flush mounted boxes back to back within the same wall; Install with minimum 6 inch separation. Install with minimum 12 inch separation in acoustic rated walls.

G. Do not use two-gang and multi-gang boxes in such a manner that one section contains a switch or receptacle circuit or combination of such circuits operating at more than 277V.

H. For boxes mounted in exterior walls install insulation behind outlet boxes to prevent condensation in boxes and air movement. Install boxes without damaging wall insulation or reducing its effectiveness.

I. All boxes shall be provided with a far side support bracket to prevent movement.

J. Remove only knockouts as required and plug unused openings. Use threaded plugs for cast metal boxes and snap in metal covers for sheet metal boxes.

K. Support boxes independently of conduit.

L. Install stamped steel bridges to fasten flush mounted outlet boxes between studs.

M. Install adjustable steel channel fasteners for hung ceiling outlet boxes.

N. Fire-resistance-rated walls and ceilings; Device outlet boxes shall only penetrate one face of a fire-resistance-rated assembly. Steel electrical boxes shall not exceed 16 square inches (i.e. a typical 4" x 4" outlet box), and the sum of such penetrations shall not exceed 100 square inches within 100 square feet of wall or ceiling space. Additionally, electrical boxes on opposite sides of the walls must either be separated by a distance of 24 inches, by a distance not less than the depth of a wall cavity when filled with insulation, by solid fireblocking, by listed putty pads, or by other approved listed materials and methods. Contractor can utilize a shallow (4" x 4" x 1 ½") depth box to meet the above criteria if; volume of the box meets the minimum conductor fill requirements of the CEC and box is of sufficient depth to accommodate the device and terminations.

O. Install a box extension rings to any switch, receptacle, or device requiring extra depth due to a veneer or veneer-type surface.

3.4 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07 Section "Penetration Firestopping."

3.5 PROTECTION

A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 26 05 33

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SECTION 26 05 48 - VIBRATION AND SEISMIC RESTRAINTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Isolation pads.
2. Spring isolators.
3. Restrained spring isolators.
4. Channel support systems.
5. Restraint cables.
6. Hanger rod stiffeners.
7. Anchorage bushings and washers.
8. Vibration control devices, accessories, materials and related items for new equipment and raceways as may be required to prevent the transmission of vibration to the building structure.
9. Seismic control devices, accessories, materials and related items for new equipment and raceways as may be required to keep all components in place during a seismic event and operational where this specification so requires.
10. Certification of seismic analysis, design and installation.

B. Related Sections include the following:

1. Division 26 Section "Hangers And Supports For Electrical Systems" for commonly used electrical supports and installation requirements.

C. It is the intent of this specification to provide the basis of seismic design for providing seismic restraints for every system within the building, including equipment and raceways as specified herein.

D. Provide the following:

1. Seismic restraints for unisolated equipment raceways and cable tray.

1.3 DEFINITIONS

A. The IBC: International Building Code.

B. ICC-ES: ICC-Evaluation Service.

C. OSHPD: Office of Statewide Health Planning and Development for the State of California.

D. CBC: California Building Code

E. Raceway or raceways as referred to in this section of the specifications and by other sections in Division 16 to this section, shall mean any one and all of the following types as applicable to project: rigid metal conduit, rigid nonmetallic conduit, intermediate metal conduit, liquidtight flexible conduit, flexible metallic tubing, flexible metal conduit, electrical metallic tubing, surface metal raceways, wireways, busways and cable trays.

F. Failure: For the purpose of this project, is defined as the discontinuance of any attachment point between equipment or structure, vertical permanent deformation greater than 0.125 inch and/or horizontal permanent deformation greater than 0.250 inch.

G. Isolation Manufacturer: For the purpose of this project, manufacturer of vibration isolation and seismic restraint equipment.

H. Longitudinal Bracing: Restraint(s) applied to limit motion parallel to the centerline of the raceway.

I. Positive Attachment: A cast-in anchor, a drill-in wedge anchor, a double sided beam clamp loaded perpendicular to a beam, or a welded or bolted connection to structure. Single sided "C" type beam clamps and power shots for support rods of piping, ductwork, or any other equipment are not acceptable on this project as positive attachment.

J. Restraint: Device(s) intended to keep component in place during a seismic event.

K. Transverse Bracing: Restraint(s) applied to limit motion perpendicular to the centerline of the raceway.

L. High Hazard Systems

1. Systems conveying material that is either toxic or potentially explosive and in significant quantity could pose a threat to the general public.
2. Fuel oil, natural gas, propane, compressed air, high pressure steam or any piping containing flammable, combustible, toxic or corrosive material.

M. Life Safety Systems:

1. Emergency power systems as defined by the National Electric Code, NFPA 70, section 700.
2. Emergency power systems as defined by OSHPD.

N. Refer to ASCE 7, Section 9 for additional definitions of items related to seismic restraints.

1.4 REFERENCES

A. SMACNA (Los Angeles) Guidelines for Seismic Restraints of Mechanical Systems and Plumbing Piping Systems, latest issue.

B. ASCE 7 American Society of Civil Engineers, latest edition.

C. OSHPD pre-approval and ISAT details.

1.5 PERFORMANCE REQUIREMENTS

A. Refer to the Structural drawings and specifications for all seismic performance criteria.

1.6 SUBMITTALS

A. Product Data: For the following:

1. Include rated load, rated deflection, and overload capacity for each vibration isolation device.
2. Illustrate and indicate style, material, strength, fastening provision, and finish for each type and size of seismic-restraint component used.

    a. Tabulate types and sizes of seismic restraints, complete with report numbers and rated strength in tension and shear as evaluated by OSHPD.
    b. Annotate to indicate application of each product submitted and compliance with requirements.

3. Restrained-Isolation Devices: Include ratings for horizontal, vertical, and combined loads.

B. Coordination Drawings: Show coordination of seismic bracing for electrical components with other systems and equipment in the vicinity, including other supports and seismic restraints.

C. Welding certificates.

D. Field quality-control test reports.

1.7 QUALITY ASSURANCE

A. It is the objective of this specification to provide the design for seismic restraint for the electrical systems. All seismic restraints shall be designed and furnished by a single manufacturer or his authorized representative, who shall be responsible for coordination of all phases of the work

B. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

C. Comply with seismic-restraint requirements in the CBC unless requirements in this Section are more stringent.

D. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

E. Seismic-restraint devices shall have horizontal and vertical load testing and analysis and shall bear anchorage preapproval OPA number from OSHPD, preapproval by ICC-ES, or preapproval by another agency acceptable to authorities having jurisdiction, showing maximum seismic-restraint ratings. Ratings based on independent testing are preferred to ratings based on calculations. If preapproved ratings are not available, submittals based on independent testing are preferred. Calculations (including combining shear and tensile loads) to support seismic-restraint designs must be signed and sealed by a qualified professional engineer.

F. Comply with the CEC.

G. Vibration isolators of appropriate sizes and proper loading are provided with the appropriate isolated equipment such as vibration isolators for emergency generator set. Coordinate seismic restraints with each isolated equipment so as not to affect performance of the vibration isolation.

H. Make certain that seismic restraints do not short circuit the isolation system and that the isolation system is unrestrained.

I. Quality assurance shall comply with the CBC.

1.8 DESIGN REQUIREMENTS

A. Refer to Section 260500 for seismic design requirements.

B. Design of seismic restraints shall be in compliance with Section 9.6 of ASCE 7 as modified by the CBC.

C. Design seismic components according to the CBC as described below. All electrical components and elements permanently attached to structures including supporting structures and attachments (hereinafter referred to as "components") shall be designed and constructed to resist the equivalent static forces and displacements determined in accordance with the CBC. The design and evaluation of support structures and equipment shall consider their flexibility as well as their strength. For the purpose of this section, components shall be considered to have the same Seismic Design Category as that of the structure that they occupy or to which they are attached unless otherwise noted in the CBC. The following components are exempt from the requirements of the CBC:

1. Electrical components in Seismic Design Categories D, E and F where Ip = 1.0 and flexible connections between the components and associated conduit are provided and that are mounted at four feet or less above a floor level and weigh 400 lbs.
2. Electrical components in Seismic Design Categories D, E and F weighing 20 lbs. or less where Ip = 1.0 and flexible connections between the components and associated conduit are provided or for distribution system weighing 5 lbs./ft. or less.

3. The functional and physical interrelations of components and their effect on each other shall be designed so that the failure of an essential or nonessential architectural, mechanical, or electrical component shall not cause the failure of a nearly essential architectural, mechanical or electrical component.

1.9 MANUFACTURER'S RESPONSIBILITIES

A. Manufacturer of seismic control equipment shall have the following responsibilities:

1. Determine seismic restraint sizes and locations.
2. Furnish seismic restraints as scheduled or specified.
3. Provide installation instructions, drawings and field supervision to assure proper installation and performance.
4. Provide certification of seismic restraints and attachments capability to safely accept loads resulting from seismic forces determined by methods defined above. Certification must be substantiated by calculations or test reports verified by a licensed engineer.
5. Advise Contractor of special size and anchor bolt requirements for foundations and housekeeping pads to develop strength equal to that for which the seismic restraints are designed to resist.
6. The licensed engineer employed by the contractor to perform seismic calculations shall be responsible to check the structural members of the building for localized stress at points of attachment for seismic restraint. The engineer shall submit to the Architect, the magnitude of seismic restraint force and include direction on shop drawings, together with computation of stress conditions at localized attachments only in the event that an overstressed condition is determined by the engineer. The Architect will review only such identified locations for additional bracing or reinforcing at these localized conditions.

B. Manufacturers of electrical equipment and systems shall be responsible for design and manufacture of their equipment to safely resist and accept earthquake generated external forces as mentioned herein. Seismic supports and anchorage locations shall be provided and indicated in equipment installation manuals just as are lifting and weight supporting elements.

1.10 SEISMIC ENGINEER'S RESPONSIBILIES

A. Seismic Engineer retained by Electrical Contractor(s) shall have the following responsibilities:

1. Seismic calculations, seismic analysis and design certification.
2. Development of a seismic restraint quality assurance plan when required by the applicable building code.
3. Identification of any overstressed conditions and notification to Architect of overstressed conditions.
4. Review of seismic restraint manufacturer's component certifications.
5. Development of special inspection requirements for this project as required by applicable codes and standards.
6. Shop drawing review and certification of compliance with seismic analysis and design.
7. Provide calculations to determine restraint loads resulting from seismic forces presented in governing codes and project seismic requirements; with a minimum seismic

acceleration applied at the equipment center of mass as specified in the DESIGN REQUIREMENTS Article in Part 1 of this section. Seismic calculations shall be certified by a licensed engineer, experienced in the design of seismic restraints. Submit calculations with professional engineer's stamp and signature to Owner for record purposes.

8. Check the structural members of the building for localized stress at points of attachment for seismic restraint. The engineer shall provide to the architect the magnitude of seismic restraint force and include direction on shop drawings, together with computation of stress conditions at localized attachments only in the event that an overstressed condition is determined by the engineer. The engineer shall certify that the architect has been advised of all overstressed condition information. The architect will review only such identified locations for additional bracing or reinforcing at these localized conditions.

1.11 COORDINATION

A. Coordinate work with other trades to avoid having isolated systems coming in contact with the building. Inform other trades following this work to avoid causing any contact which would reduce the vibration isolation.

B. Coordinate size, location and special requirements of vibration isolation equipment and systems with other trades. Coordinate plan dimensions with size of housekeeping pad.

C. Bring to the Architect's attention prior to installation any conflicts with other trades which will result in unavoidable contact to the equipment, piping, etc., described herein, due to inadequate space, etc. Corrective work necessitated by conflicts after installation shall be at the Contractor's expense.

D. Bring to the Architect's attention any discrepancies between the specifications and field conditions, changes required due to specific equipment selection, etc., prior to installation. Corrective work necessitated by discrepancies after installation shall be at the Contractor's expense.

1.12 INSPECTION AND INSTRUCTION

A. Notify the isolation manufacturer's representative prior to the general installation of vibration isolation devices and seismic restraints so that the isolation manufacturer's representative can instruct and demonstrate the proper installation procedures with the Contractor's foremen.

B. Obtain written and/or oral instructions from the isolation manufacturer's representative as to the proper installation and adjustment of vibration isolation devices and seismic restraints.

C. Obtain inspection and approval from the isolation manufacturer's representative of the completed installation. Perform all work and make all adjustments as directed by the isolation manufacturer's representative as a result of the inspection.

D. Obtain inspection and approval from the isolation manufacturer's representative, and perform all directed work and adjustments, of any installation to be covered or enclosed prior to such closure.

E. Where special inspection and periodic special inspection of seismic restraints is required by the referenced building code, Contractor must submit a written statement of responsibility as part of the Quality Assurance Program including identification of components, control procedures for all inspection and testing including frequency and method of reporting, and list of qualified personnel responsible for certifying seismic restraints.

PART 2 - PRODUCTS

2.1 SEISMIC-RESTRAINT DEVICES

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

1. Amber/Booth Company, Inc.
2. California Dynamics Corporation.
3. Cooper B-Line, Inc.; a division of Cooper Industries.
4. Hilti Inc.
5. Mason Industries.
6. Unistrut; Tyco International, Ltd.

B. General Requirements for Restraint Components: Rated strengths, features, and application requirements shall be as defined in reports by OSHPD.

1. Restraints shall be capable of safely accepting external forces specified without failure, shall maintain electrical systems and accessories in a captive position, and shall not short circuit vibration isolation systems or transmit objectionable vibration or noise.

2. Structural Safety Factor: Allowable strength in tension, shear, and pullout force of components shall be at least four times the maximum seismic forces to which they will be subjected.

3. Systems that incorporate vibration isolation support within seismic restraint housing are not permitted. Seismic restraints must be separate from isolation mounts.

C. Type I Restraint

1. All directional, double acting seismic snubber consisting of interlocking steel members restrained by shock absorbent elastomeric material compounded to bridge bearing specifications as required.
2. Elastomeric bushing shall be replaceable and a minimum of 3/4 inch thick. Snubbers shall be manufactured with an air gap between hard and resilient material of not less than 1/8 inch or more than 1/4 inch.
3. The snubber shall be constructed to allow easy inspection of snubber internal clearances.
4. The elastomeric bushing shall be capable of rotation to verify that no short circuiting of the vibration isolator exists.

D. Type II Restraint

1. Cable type system consisting of steel cable and end fastening devices.
2. The cable size and attachment to the suspended item and structure shall be designed by a licensed engineer.
3. Submittal drawing shall indicate method of vertical restraint.

E. Channel Support System: MFMA-3, shop- or field-fabricated support assembly made of slotted steel channels with accessories for attachment to braced component at one end and to building structure at the other end and other matching components and with corrosion-resistant coating; and rated in tension, compression, and torsion forces.

F. Restraint Cables: ASTM A 603 galvanized-steel cables with end connections made of steel assemblies with thimbles, brackets, swivels, and bolts designed for restraining cable service; and with a minimum of two clamping bolts for cable engagement.

G. Hanger Rod Stiffener: Steel tube or steel slotted-support-system sleeve with internally bolted connections to hanger rod. Do not weld stiffeners to rods.

H. Bushing Assemblies for Wall-Mounted Equipment Anchorage: Assemblies of neoprene elements and steel sleeves designed for rigid equipment mountings, and matched to type and size of attachment devices.

I. Mechanical Anchor: Drilled-in and stud-wedge or female-wedge type in zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchors with strength required for anchor and as tested according to ASTM E 488. Minimum length of eight times diameter.

J. Adhesive Anchor: Drilled-in and capsule anchor system containing polyvinyl or urethane methacrylate-based resin and accelerator, or injected polymer or hybrid mortar adhesive. Provide anchor bolts and hardware with zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and equipment to receive seismic-control devices for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Examine roughing-in of reinforcement and cast-in-place anchors to verify actual locations before installation.

C. Bring to the Architect's attention any discrepancies between the specifications and field conditions, changes required due to specific equipment selection, etc., prior to installation. Corrective work necessitated by discrepancies after installation shall be at the Contractor's expense.

D. Coordinate work with electrical equipment and systems furnished under other sections of Division 26, Related Work, and with other trades to avoid inadequate space, etc., for mounting and supporting seismic restraints. Corrective work necessitated by conflicts after equipment installation shall be at the Contractor's expense.

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

3.2 APPLICATIONS

A. Multiple Raceways or Cables: Secure raceways and cables to trapeze member with clamps approved for application by OSHPD.

B. Indicate on Drawings, by details, schedules, or a combination of both, the locations where hanger rods for individual raceways, bus duct, cable trays, and hanger rods for trapeze hangers require hanger rod stiffeners.

C. Hanger Rod Stiffeners: Install hanger rod stiffeners where indicated or scheduled on Drawings to receive them and where required to prevent buckling of hanger rods due to seismic forces.

D. Strength of Support and Seismic-Restraint Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static and seismic loads within specified loading limits.

E. Seismically restrain in all directions the complete new and altered electrical equipment and raceways and all existing electrical systems in altered areas as required in this section, the CBC. Seismic restraints for ceiling mounted lighting luminaires are specified in Division 26, Lighting.

F. Rigidly Mounted Equipment: Restrain by properly sized anchor bolts or hanger rods and bracing and, if required, by additional Type I and Type II seismic restraints. The need for additional restraints shall be determined by the seismic restraint manufacturer.

G. Rigidly Mounted Raceways: Provide Type II restraints at locations as determined by the seismic restraint manufacturer including, but not limited to the following locations:

1. On runs of conduit not to exceed a spacing of 20 feet on life safety, emergency and essential electrical system and 40 feet on other conduit and at all changes in direction of conduit. Provide a minimum of one support for runs less than 20 feet. Conduits less than 2-1/2 inches nominal diameter are exempt.
2. On runs of cable tray not to exceed a spacing as determined by cable tray manufacturer.

3.3 SEISMIC-RESTRAINT DEVICE INSTALLATION

A. Install restraints in accordance with the manufacturer's written instructions and the verbal instructions of his authorized representative.

B. Shim snubbers as required to achieve and maintain clearance.

C. Overstress of the building structure must not occur. Do not support overhead supported equipment from slab diaphragms between beams unless specifically approved. Support can occur from:

1. Flanges of structural beams
2. Cast-in-place inserts or drilled in adhesive type anchor, Hilti or equal, in concrete. Shot pins are not allowed.
3. At the panel points of truss chords of bar joists.

D. Install Type II restraints with slack as required, 1/2 inch maximum, to prevent excessive seismic motion for vibration isolated systems and equipment and to allow for thermal movement where applicable.

E. Restraints shall not interfere with the performance of the vibration isolation system and shall not restrict normal vibratory movement of equipment during normal operation, startup or stopping. Install carefully and adjust carefully after system startup and with equipment in operation to insure that proper clearances are maintained.

F. Equipment and Hanger Restraints:

1. Install restrained isolators on electrical equipment. Securely anchor restraints to the supporting structure and securely fasten to the equipment and raceways in accordance with the reviewed submitted data.
2. Install resilient, bolt-isolation washers on equipment anchor bolts where clearance between anchor and adjacent surface exceeds 0.125 inch (3.2 mm).
3. Install seismic-restraint devices using methods approved by OSHPD providing required submittals for component.

G. Install bushing assemblies for mounting bolts for wall-mounted equipment, arranged to provide resilient media where equipment or equipment-mounting channels are attached to wall.

H. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.

I. Drilled-in Anchors: Coordinate where drilled in anchors any acceptable and what type, with the structural engineer and drawings before installing any anchors.

1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcing or embedded items during coring or drilling. Notify the structural engineer if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.
2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
3. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
4. Adhesive Anchors: Clean holes to remove loose material and drilling dust prior to installation of adhesive. Place adhesive in holes proceeding from the bottom of the hole

and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive.

5. Set anchors to manufacturer's recommended torque, using a torque wrench.
6. Install zinc-coated steel anchors for interior and stainless-steel anchors for exterior applications.

3.4 ACCOMMODATION OF DIFFERENTIAL SEISMIC MOTION

A. Install flexible connections in runs of raceways, cables, wireways, cable trays, and busways where they cross seismic joints, where adjacent sections or branches are supported by different structural elements, and where they terminate with connection to equipment that is anchored to a different structural element from the one supporting them as they approach equipment.

3.5 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Tests and Inspections:

1. Provide evidence of recent calibration of test equipment by a testing agency acceptable to authorities having jurisdiction.
2. Schedule test with Owner, through Architect, before connecting anchorage device to restrained component (unless postconnection testing has been approved), and with at least seven days' advance notice.
3. Obtain Architect's approval before transmitting test loads to structure. Provide temporary load-spreading members.
4. Test at least four of each type and size of installed anchors and fasteners selected by Architect.
5. Test to 90 percent of rated proof load of device.
6. Measure isolator restraint clearance.
7. Measure isolator deflection.
8. Verify snubber minimum clearances.
9. If a device fails test, modify all installations of same type and retest until satisfactory results are achieved.

C. Remove and replace malfunctioning units and retest as specified above.

D. Prepare test and inspection reports.

3.6 ADJUSTING

A. Adjust restraints to permit free movement of equipment within normal mode of operation.

END OF SECTION 26 05 48

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SECTION 26 05 53 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Identification for raceway.
2. Identification for conductors and communication and control cable.
3. Warning labels and signs.
4. Instruction signs.
5. Equipment identification labels.
6. Miscellaneous identification products.

1.3 SUBMITTALS

A. Product Data: For each electrical identification product indicated.

B. Identification Schedule: An index of nomenclature of electrical equipment and system components used in identification signs and labels.

C. Samples: For each type of label and sign to illustrate size, colors, lettering style, mounting provisions, and graphic features of identification products.

1.4 QUALITY ASSURANCE

A. Comply with ANSI A13.1 and ANSI C2.

B. Comply with the CEC.

C. Comply with 29 CFR 1910.145.

1.5 COORDINATION

A. Coordinate identification names, abbreviations, colors, and other features with requirements in the Contract Documents, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual, and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.

B. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

C. Coordinate installation of identifying devices with location of access panels and doors.

D. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 RACEWAY IDENTIFICATION MATERIALS

A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.

B. Color for Printed Legend: Match the facility standard if one exists, otherwise use the following:

1. Power Circuits: Black letters on an orange field.
2. Legend: Indicate system or service and voltage, if applicable.

C. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

2.2 CONDUCTOR AND COMMUNICATION- AND CONTROL-CABLE IDENTIFICATION MATERIALS

A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils (0.08 mm) thick by 1 to 2 inches (25 to 50 mm) wide.

B. Write-On Tags: Polyester tag, 0.015 inch (0.38 mm) thick, with corrosion-resistant grommet and polyester or nylon tie for attachment to conductor or cable.

1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.

2.3 WARNING LABELS AND SIGNS

A. Comply with the CEC and 29 CFR 1910.145.

B. Baked-Enamel Warning Signs: Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application. 1/4-inch (6.4-mm) grommets in corners for mounting. Nominal size, 7 by 10 inches (180 by 250 mm).

C. Metal-Backed, Butyrate Warning Signs: Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch (1-mm) galvanized-steel backing; and with colors, legend, and size required for application. 1/4-inch (6.4-mm) grommets in corners for mounting. Nominal size, 10 by 14 inches (250 by 360 mm).

D. Warning label and sign shall include, but are not limited to, the following legends:

1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES (915 MM)."

2.4 EQUIPMENT IDENTIFICATION LABELS

A. Match the existing facility standard if one exists, otherwise use the following:

1. Engraved, Laminated Acrylic or Melamine Label: Adhesive backed, with white letters on a black background (white letters on red background for emergency equipment). Minimum letter height shall be 3/8 inch (10 mm).

2.5 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Cable Ties: Fungus-inert, self-extinguishing, 1-piece, self-locking, Type 6/6 nylon cable ties.

1. Minimum Width: 3/16 inch (5 mm).
2. Tensile Strength: 50 lb (22.6 kg), minimum.
3. Temperature Range: Minus 40 to plus 185 deg F (Minus 40 to plus 85 deg C).
4. Color: Black, except where used for color-coding.

B. Paint: Paint materials and application requirements are specified in Division 09 painting Sections.

C. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 APPLICATION

A. Accessible Raceways, 600 V or Less, for Service, Feeder, and Branch Circuits More Than 30 A: Identify with orange self-adhesive vinyl label.

B. Accessible Raceways and Cables of Auxiliary Systems: Identify the following systems with color-coded, self-adhesive vinyl tape applied in bands; or match existing facility standard if one exists:

1. Fire Alarm System: Red.
2. Security System: Blue and yellow.

C. Emergency Systems: Each junction and pull box shall be painted orange. Use black indelible liquid marker to label "EMERG" in 3/8 inch letters minimum.

D. Fire Alarm System: Each junction and pull box shall be painted Red. Use Black indelible liquid marker to label "FA" in 3/8 inch letters minimum.

E. Feeders Shown on Single Line Diagram: Each junction and pull box shall be marked with black indelible liquid marker with the assigned feeder number (example: "FDR #3B) in 3/8 inch letters minimum.

F. Power-Circuit Conductor Identification: For primary and secondary conductors No. 1/0 AWG and larger in vaults, pull and junction boxes, manholes, and handholes use color-coding conductor tape. Identify source and circuit number of each set of conductors. For single conductor cables, identify phase in addition to the above.

G. Branch-Circuit Conductor Identification: Where there are conductors for more than three branch circuits in same junction or pull box, use color-coding conductor tape wraparound. Identify each ungrounded conductor according to source and circuit number.

H. Conductors to Be Extended in the Future: Attach write-on tags or marker tape to conductors and list source and circuit number.

I. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, signal, sound, intercommunications, voice, and data connections.

1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and Operation and Maintenance Manual.

J. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Comply with 29 CFR 1910.145 and apply self-adhesive warning labels. Identify system voltage with black letters on an orange background. Apply to exterior of door, cover, or other access.

1. Equipment with Multiple Power or Control Sources: Apply to door or cover of equipment including, but not limited to, the following:

   a. Power transfer switches.
   b. Controls with external control power connections.

2. Equipment Requiring Workspace Clearance According to NFPA 70: Unless otherwise indicated, apply to door or cover of equipment but not on flush panelboards and similar equipment in finished spaces.

K. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.

All switchboards, distribution panels and panelboards shall also indicate the name of the device or equipment where the power supply originates.

Example: Panel AP-1
Fed from Substation SS-1
Voltage: 480Y/277V
Phase A: Brown
Phase B: Orange
Phase C: Yellow
Neutral: Grey

1. Labeling Instructions:

   a. Indoor Equipment: Engraved, laminated acrylic or melamine label. Unless otherwise indicated, provide a single line of text with 1/2-inch- (13-mm-) high letters on 1-1/2-inch- (38-mm-) high label; where 2 lines of text are required, use labels 2 inches (50 mm) high.
   b. Outdoor Equipment: Engraved, laminated acrylic or melamine label.
   c. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.
   d. All labels shall be screwed-in. Adhesive labels will not be allowed.

2. Equipment to Be Labeled:

   a. Panelboards, electrical cabinets, and enclosures.
   b. Access doors and panels for concealed electrical items.
   c. Transformers.
   d. Emergency system boxes and enclosures.
   e. Disconnect switches.
   f. Master clock and program equipment, and call system master and staff stations.
   g. Monitoring and control equipment.

3. Devices to be Engraved:

   a. Receptacles
      1) Cover plates shall be engraved and color-etched with "circuit no. and panel source" at bottom of plate. Example: "LP -1" for panel LP, circuit #1.
      2) Review nomenclature and color-etching with the Owner.

4. Panel Schedule: For all new and altered panelboards, provide neatly typed Excel format panel schedules for each panel. Provide Owner with an electronic CD of Excel files for all panel schedule and post copy of each printed schedule on inside of panelboard door. Additionally, if existing circuit designations are not accurate or ambiguous, the circuit(s) shall be traced in order to correctly identify the load and the correct designation shall be listed on the updated panel schedule.

3.2 INSTALLATION

A. Verify identity of each item before installing identification products.

B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.

C. Apply identification devices to surfaces that require finish after completing finish work.

D. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.

E. Attach nonadhesive signs and plastic labels with screws and auxiliary hardware appropriate to the location and substrate.

F. System Identification Color Banding for Raceways and Cables: Each color band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot (15-m) maximum intervals in straight runs, and at 25-foot (7.6-m) maximum intervals in congested areas.

G. Color-Coding for Phase and Voltage Level Identification, 600 V and Less: Use the colors listed below for ungrounded feeder, and branch-circuit conductors.

1. Color shall be factory applied or, for sizes larger than No. 10 AWG if authorities having jurisdiction permit, field applied.

2. Colors for 208/120-V Circuits:

   a. Phase A: Black.
   b. Phase B: Red.
   c. Phase C: Blue.
   d. Neutral: White

3. Colors for 480/277-V Circuits:

   a. Phase A: Brown.
   b. Phase B: Orange.
   c. Phase C: Yellow.
   d. Neutral: Gray

4. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches (150 mm) from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.

H. Aluminum Wraparound Marker Labels and Metal Tags: Secure tight to surface of conductor or cable at a location with high visibility and accessibility.

I. Painted Identification: Prepare surface and apply paint according to Division 09 painting Sections.

END OF SECTION 26 05 53

SECTION 26 09 43 – NETWORK LIGHTING CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following lighting control devices:

1. Occupancy sensors.
2. Daylight sensors.
3. Dimming sensors.
4. Relay Packs.

B. Related Sections include the following:

1. Division 26 Section "Wiring Devices" for manual light switches.

1.3 DEFINITIONS

A. LED: Light-emitting diode.

B. PIR: Passive infrared.

1.4 SUBMITTALS

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

B. Shop Drawings: Show installation details for occupancy and light-level sensors.

1. Interconnection diagrams showing field-installed wiring.

C. Field quality-control test reports.

D. Operation and Maintenance Data: For each type of product to include in emergency, operation, and maintenance manuals.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in the CEC, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.6 COORDINATION

A. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, smoke detectors, fire-suppression system, and partition assemblies.

B. Coordinate lighting control components to form an integrated interconnection of compatible components.

C. Coordinate lighting controls with BAS (if necessary) either through IP based intercommunication of system or hardwired auxiliary relay outputs.

D. The installing contractor shall be responsible for a complete and functional system in accordance with all applicable local and national codes.

1.7 WARRANTY

A. All devices in lighting control system shall have a 5-year warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Watt Stopper
2. Sensor Switch; Acuity Brands

2.2 SYSTEM REQUIREMENTS

A. Performance Requirements: Manual switch operation sends a signal to programmable-system control module that processes the signal according to its programming and route an open or close command to one or more relays in the power-supply circuits to groups of lighting fixtures or other loads.

B. Intelligent lighting control devices shall consist of one or more basic lighting control components; occupancy sensors, photocell sensors, relays, dimming outputs, manual switch stations, and manual dimming stations. Combining one or more of these components into a single device enclosure should be permissible so as to minimize overall device count of system.

2.2 INDIVIDUAL DEVICE SPECIFICATIONS

A. Occupancy Sensors

1. Occupancy sensors system shall sense the presence of human activity within the desired space and fully control the on/off function of the lights.
2. Sensors shall be dual-technology and utilize passive infrared (PIR) and ultrasonic technology.
3. Sensors shall be available with zero, one, or two integrated Class 1 switching relays, and up to one 0-10 VDC dimming output. Sensors shall be capable of switching 120 / 277 / 347 VAC. Load ratings shall be 800 W @ 120 VAC, 1200 W @ 277 VAC, 1500 W @ 347 VAC, and ¼ HP motor. Relays shall be dry contacts.
4. Sensors shall be available with one or two occupancy "poles", each of which provides a programmable time delay.
5. Wall switch sensors shall recess into single-gang switch box and fit a standard GFI opening.
6. Wall switch sensors must meet CEC grounding requirements by providing a dedicated ground connection and grounding to mounting strap. Line and load wire connections shall be interchangeable. Sensor shall not allow current to pass to the load when sensor is in the unoccupied (Off) condition.
7. Wall switch sensors shall have optional features for photocell/daylight override.
8. Wall switch sensors and plates shall be white in color (red for switches controlling emergency lights).
9. Wall switch sensors shall be available with optional raise/lower dimming adjustment controls.

B. Power (Relay) Packs

1. Power Pack shall incorporate one or more Class 1 relays and contribute low voltage power to the rest of the system. Secondary Packs shall incorporate the relay(s), shall have an optional 2nd relay, 0-10 VDC dimming output, or line voltage dimming output, but shall not be required to contribute system power. Power Supplies shall provide system power only, but are not required to switch line voltage circuit. Auxiliary Relay Packs shall switch low voltage circuits only.
2. Power Packs shall accept 120 or 277 VAC (or optionally 347 VAC), be plenum rated, and provide Class 2 power to the system.
3. Every Power Pack parameter shall be available and configurable remotely from the software and locally via the device push-button.
4. Power Pack shall securely mount to junction location through a threaded ½ inch chase nipple or be capable of being secured within a luminaire ballast channel. Plastic clips into junction box shall not be accepted. All Class 1 wiring shall pass through chase nipple into adjacent junction box without any exposure of wire leads. Note: UL Listing under Energy Management or Industrial Control Equipment automatically meets this requirement, whereas Appliance Control Listing does not meet this safety requirement.
5. When required by local code, Power Pack must install inside standard electrical enclosure and provide UL recognized support to junction box. All Class 1 wiring is to pass through chase nipple into adjacent junction box without any exposure of wire leads.

C. Wall Switches & Dimmers

1. Devices shall recess into single-gang switch box and fit a standard GFI opening.
2. All devices shall be push-button.
3. Wall switch sensors and plates shall be white in color (red for switches controlling emergency lights).

2.8 EMERGENCY SHUNT RELAY

A. Description: Normally closed, electrically held relay, arranged for wiring in parallel with manual or automatic switching contacts; complying with UL 924.

1. Coil Rating: 277 V.

2.9 CONDUCTORS AND CABLES FOR NON-CAT 5 APPLICATIONS

A. Power Wiring to Supply Side of Remote-Control Power Sources: Not smaller than No. 12 AWG. Comply with requirements in Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

B. Classes 2 and 3 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 18 AWG. Comply with requirements in Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

C. Class 1 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 14 AWG. Comply with requirements in Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

PART 3 - EXECUTION

3.1 SENSOR INSTALLATION

A. Install and aim sensors in locations to achieve not less than 90 percent coverage of areas indicated. Do not exceed coverage limits specified in manufacturer's written instructions.

B. All sensor locations are approximate, refer to manufacturer's installation instructions prior to installation.

C. Ceiling mount sensors should be located a minimum of six feet from HVAC supply/return vents.

D. Contractor is responsible for: proper sensitivity and time delay settings (for nonadaptive products) recommended placement, and field verification within respect to power placement.

E. Sensors mounted over the door must be placed one foot inside the threshold.

F. Contractor is responsible for installing equipment in compliance with local code.

G. Every light fixture shall be supplied by an emergency shunt relay and turn on in the event of a power failure.

3.2 CONTACTOR INSTALLATION

A. Mount electrically held lighting contactors with elastomeric isolator pads, to eliminate structure-borne vibration, unless contactors are installed in an enclosure with factory-installed vibration isolators.

3.3 WIRING INSTALLATION

A. Raceway and Boxes for Cat. 5 Cabling in Walls: Install backbox with 3/4 inch conduit up to accessible ceiling space. Include conduit bushings.

B. Wiring Method: Comply with Division 26 Section "Low-Voltage Electrical Power Conductors and Cables." Minimum conduit size shall be 3/4 inch.

C. Wiring within Enclosures: Comply with NECA 1. Separate power-limited and nonpower-limited conductors according to conductor manufacturer's written instructions.

D. Size conductors according to lighting control device manufacturer's written instructions, unless otherwise indicated.

E. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

3.4 IDENTIFICATION

A. Identify components and power and control wiring according to Division 26 Section "Identification for Electrical Systems."

1. Identify controlled circuits in lighting contactors.
2. Identify circuits or luminaries controlled by photoelectric and occupancy sensors at each sensor.

B. Label time switches and contactors with a unique designation.

3.5 FIELD QUALITY CONTROL

A. Perform the following field tests and inspections and prepare test reports:

1. After installing time switches and sensors, and after electrical circuitry has been energized, adjust and test for compliance with requirements.
2. Operational Test: Verify operation of each lighting control device, and adjust time delays.

B. Lighting control devices that fail tests and inspections are defective work.

3.6 ADJUSTING

A. The contractor shall be responsible for making all proper adjustments to assure owner's satisfaction with the occupancy sensor system. A manufacturer's representative shall provide on-site adjustments and train owner's personnel to ensure owner's satisfaction with the occupancy system.

B. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting sensors to suit occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

3.7 DEMONSTRATION

A. Coordinate demonstration of products specified in this Section with demonstration requirements for low-voltage, programmable lighting control system specified in Division 26 Section "Network Lighting Controls."

B. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain lighting control devices. Refer to Division 01 Section "Demonstration and Training."

END OF SECTION 26 09 23

SECTION 26 27 26 - WIRING DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Receptacles, receptacles with integral GFCI, and associated device plates.
2. Twist-locking receptacles.
3. Wall-box motion sensors.
4. Hospital-grade receptacles.
5. Snap switches and wall-box dimmers.
6. Floor service outlets, poke-through assemblies, service poles, and multioutlet assemblies.

1.3 DEFINITIONS

A. EMI: Electromagnetic interference.

B. GFCI: Ground-fault circuit interrupter.

C. Pigtail: Short lead used to connect a device to a branch-circuit conductor.

D. RFI: Radio-frequency interference.

E. TVSS: Transient voltage surge suppressor.

F. UTP: Unshielded twisted pair.

1.4 SUBMITTALS

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

B. Shop Drawings: List of legends and description of materials and process used for premarking wall plates.

C. Samples: One for each type of device and wall plate specified, in each color specified.

D. Field quality-control test reports.

E. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing label warnings and instruction manuals that include labeling conditions.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of wiring device and associated wall plate through one source from a single manufacturer. Insofar as they are available, obtain all wiring devices and associated wall plates from a single manufacturer and one source.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in the CEC, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with the CEC.

1.6 COORDINATION

A. Receptacles for Owner-Furnished Equipment: Match plug configurations.

1. Cord and Plug Sets: Match equipment requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in other Part 2 articles:

1. Cooper Wiring Devices; a division of Cooper Industries, Inc. (Cooper).
2. Hubbell Incorporated; Wiring Device-Kellems (Hubbell).
3. Leviton Mfg. Company Inc. (Leviton).
4. Pass & Seymour/Legrand; Wiring Devices & Accessories (Pass & Seymour).

2.2 STRAIGHT BLADE RECEPTACLES

A. Hospital-Grade, Duplex Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, and UL 498 Supplement SD.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Cooper; 8300 (duplex).
b. Hubbell; HBL8310 (single), HBL8300H (duplex).
c. Leviton; 8310 (single), 8300 (duplex).
d. Pass & Seymour; 9301-HG (single), 9300-HG (duplex).

B. Tamper-Resistant Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, and UL 498.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. Cooper; TR8300.
   b. Hubbell; HBL8300SG.
   c. Leviton; 8300-SGG.
   d. Pass & Seymour; 63H.

2. Description: Labeled to comply with the CEC, "Health Care Facilities" Article, "Pediatric Locations" Section.

C. Receptacles located in damp or wet locations shall be listed weather-resistant (WR) type.

2.3 GFCI RECEPTACLES

A. General Description: Straight blade, non-feed-through type. Comply with NEMA WD 1, NEMA WD 6, UL 498, and UL 943, Class A, and include indicator light that is lighted when device is tripped.

B. Hospital-Grade, Duplex GFCI Convenience Receptacles, 125 V, 20 A: Comply with UL 498 Supplement SD.

1. Products: Subject to compliance with requirements, provide one of the following:

   a. Cooper; HGF20.
   b. Hubbell; HGF8300.
   c. Leviton; 6898-HG.
   d. Pass & Seymour; 2091-SHG.

2.4 TWIST-LOCKING RECEPTACLES

A. Single Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 configuration L5-20R, and UL 498.

1. Products: Subject to compliance with requirements, provide one of the following:

   a. Cooper; L520R.
   b. Hubbell; HBL2310.
   c. Leviton; 2310.
   d. Pass & Seymour; L520-R.

2.5 SNAP SWITCHES

A. Comply with NEMA WD 1 and UL 20.

B. Switches, 120/277 V, 20 A:

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

   a. Cooper; 2221 (single pole), 2222 (two pole), 2223 (three way), 2224 (four way).
   b. Hubbell; CS1221 (single pole), CS1222 (two pole), CS1223 (three way), CS1224 (four way).
   c. Leviton; 1221-2 (single pole), 1222-2 (two pole), 1223-2 (three way), 1224-2 (four way).
   d. Pass & Seymour; 20AC1 (single pole), 20AC2 (two pole), 20AC3 (three way), 20AC4 (four way).

2.6 WALL PLATES

A. Single and combination types to match corresponding wiring devices.

1. Plate-Securing Screws: Metal with head color to match plate finish.
2. Material for Finished Spaces: Smooth, high-impact thermosplastic.

2.7 FINISHES

A. Color: Wiring device catalog numbers in Section Text do not designate device color.

1. Wiring Devices Connected to Normal Power System: White, unless otherwise indicated or required by the CEC, device listing or architect.
2. Wiring Devices Connected to Emergency Power System: Red.
3. Wall Plate colors shall match devices unless otherwise directed by the owner or the architect.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with NECA 1, including the mounting heights listed in that standard, unless otherwise noted.

B. Coordination with Other Trades:

1. Take steps to insure that devices and their boxes are protected. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of the boxes.
2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.

4. Install wiring devices after all wall preparation, including painting, is complete.

C. Conductors:

1. Do not strip insulation from conductors until just before they are spliced or terminated on devices.
2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
3. The length of free conductors at outlets for devices shall meet provisions of the CEC, Article 300, without pigtails.
4. Existing Conductors:

    a. Cut back and pigtail, or replace all damaged conductors.
    b. Straighten conductors that remain and remove corrosion and foreign matter.
    c. Pigtailing existing conductors is permitted provided the outlet box is large enough.

D. Device Installation:

1. Replace all devices that have been in temporary use during construction or that show signs that they were installed before building finishing operations were complete.
2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
4. Connect devices to branch circuits using pigtails that are not less than 6 inches (152 mm) in length.
5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, 2/3 to 3/4 of the way around terminal screw.
6. Use a torque screwdriver when a torque is recommended or required by the manufacturer.
7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
8. Tighten unused terminal screws on the device.
9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device mounting screws in yokes, allowing metal-to-metal contact.

E. Receptacle Orientation:

1. Install ground pin of vertically mounted receptacles up, and on horizontally mounted receptacles to the right.

F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.

G. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.

H. Adjust locations of floor service outlets and service poles to suit arrangement of partitions and furnishings.

3.2 IDENTIFICATION

A. Comply with Division 26 Section "Identification for Electrical Systems."

1. Receptacles: Identify panelboard and circuit number from which served. Use hot, stamped or engraved machine printing with black-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

END OF SECTION 26 27 26

SECTION 26 28 16 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following individually mounted, enclosed switches and circuit breakers:

1. Fusible switches.
2. Nonfusible switches.
3. Molded-case circuit breakers.
4. Molded-case switches.
5. Enclosures.

1.3 DEFINITIONS

A. GD: General duty.

B. GFCI: Ground-fault circuit interrupter.

C. HD: Heavy duty.

D. RMS: Root mean square.

E. SPDT: Single pole, double throw.

F. GFEP: Ground-fault equipment protection.

G. HACR: Heating, air conditioning, refrigeration rated circuit breaker.

H. AFCI: Arc-fault circuit interrupter.

I. SWD: Switch rated circuit breaker.

J. HID: High-intensity discharge switch rated circuit breaker

1.4 SUBMITTALS

A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.

1. Enclosure types and details for types other than NEMA 250, Type 1.
2. Current and voltage ratings.
3. Short-circuit current rating.
4. Features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.

B. Manufacturer Seismic Qualification Certification: Submit certification that enclosed switches and circuit breakers, accessories, and components will withstand seismic forces defined in Division 26 Section "Vibration and Seismic Controls for Electrical Systems" Include the following:

1. Basis of Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in the CEC, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with the CEC.

C. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with indicated maximum dimensions.

1.6 COORDINATION

A. Coordinate layout and installation of switches, circuit breakers, and components with other construction, including conduit, piping, equipment, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

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

2.2 FUSIBLE AND NONFUSIBLE SWITCHES

A. Manufacturers:

1. Eaton Corporation; Cutler-Hammer Products.
2. General Electric Co.; Electrical Distribution & Control Division.
3. Siemens Energy & Automation, Inc.
4. Square D/Group Schneider.

B. Nonfusible Switch: NEMA KS 1, Type HD, lockable handle with capability to accept two padlocks, and interlocked with cover in closed position.

C. Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
2. Neutral Kit: Internally mounted; insulated, capable of being grounded, and bonded; and labeled for copper and aluminum neutral conductors.

2.3 MOLDED-CASE CIRCUIT BREAKERS AND SWITCHES

A. Manufacturers:

1. Eaton Corporation; Cutler-Hammer Products.
2. General Electric Co.; Electrical Distribution & Control Division.
3. Siemens Energy & Automation, Inc.
4. Square D/Group Schneider.

B. Molded-Case Circuit Breaker: NEMA AB 1, with interrupting capacity to meet available fault currents.

1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.

C. Molded-Case Circuit-Breaker Features and Accessories:

1. Standard frame sizes, trip ratings, and number of poles.
2. Lugs: Mechanical style suitable for number, size, trip ratings, and conductor material.

D. Molded-Case Switches: Molded-case circuit breaker with fixed, high-set instantaneous trip only, and short-circuit withstand rating equal to equivalent breaker frame size interrupting rating.

2.4 ENCLOSURES

A. NEMA AB 1 and NEMA KS 1 to meet environmental conditions of installed location.

1. Outdoor Locations: NEMA 250, Type 3R.
2. Other Wet or Damp Indoor Locations: NEMA 250, Type 4.
3. Hazardous Areas Indicated on Drawings: NEMA 250, Type 7C.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance.

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

3.2 INSTALLATION

A. Comply with applicable portions of NECA 1, NEMA PB 1.1, and NEMA PB 2.1 for installation of enclosed switches and circuit breakers.

B. Mount individual wall-mounting switches and circuit breakers with tops at uniform height, unless otherwise indicated. Anchor floor-mounting switches to concrete base.

C. Comply with mounting and anchoring requirements specified in Division 26 Section "Vibration and Seismic Controls for Electrical Systems."

D. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.

3.3 IDENTIFICATION

A. Enclosure Nameplates: Label each enclosure with engraved metal or laminated-plastic nameplate as specified in Division 26 Section "Identification for Electrical Systems."

3.4 CLEANING

A. On completion of installation, vacuum dirt and debris from interiors; do not use compressed air to assist in cleaning.

B. Inspect exposed surfaces and repair damaged finishes.

END OF SECTION 26 28 16

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SECTION 26 51 00 - INTERIOR LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Interior lighting fixtures, lamps, and driver/ballasts.
2. Emergency lighting units.
3. Exit signs.
4. Lighting fixture supports.

B. Related Sections include the following:

1. Division 26 Section "Lighting Control Devices" for automatic control of lighting, including time switches, photoelectric relays, occupancy sensors, and multipole lighting relays and contactors.
2. Division 26 Section "Network Lighting Controls" for manual or programmable control systems with low-voltage control wiring or data communication circuits.
3. Division 26 Section "Wiring Devices" for manual wall-box dimmers for incandescent lamps.

1.3 DEFINITIONS

A. BF: Driver/ballast factor.

B. CRI: Color-rendering index.

C. LER: Luminaire efficacy rating.

D. Luminaire: Complete lighting fixture, including driver/ballast housing if provided.

1.4 SUBMITTALS

A. Product Data: For each type of lighting fixture, arranged in order of fixture designation. Include data on features, accessories, finishes, and the following:

1. Physical description of lighting fixture including dimensions.
2. Emergency lighting units including battery and charger.

3. Driver/ballast, including manufacturer.
4. Energy-efficiency data, including lamp type, manufacturer.
5. Lamp and driver/ballast warranty information.
6. Life, output, and energy-efficiency data for lamps.
7. Photometric data, in IESNA format, based on laboratory tests of each lighting fixture type, outfitted with lamps, driver/ballasts, and accessories identical to those indicated for the lighting fixture as applied in this Project.

    a. For indicated fixtures, photometric data shall be certified by a qualified independent testing agency. Photometric data for remaining fixtures shall be certified by the manufacturer.
    b. Photometric data shall be certified by a manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program (NVLAP) for Energy Efficient Lighting Products.

B. Luminaire submittals not including lamp and driver/ballast types and manufacturer's name will be returned marked not reviewed. Lamp and driver/ballast types and manufacturer's name must be submitted with the luminaire submittals in order to review.

C. Product Certificates: For each type of driver/ballast for bi-level and dimmer-controlled fixtures, signed by product manufacturer.

D. Qualification Data: For agencies providing photometric data for lighting fixtures.

E. Field quality-control test reports.

F. Operation and Maintenance Data: For lighting equipment and fixtures to include in emergency, operation, and maintenance manuals.

G. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

A. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by manufacturers' laboratories that are accredited under the National Volunteer Laboratory Accreditation Program for Energy Efficient Lighting Products.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in the CEC, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with the CEC.

D. Comply with the recommended standards of the Illuminating Engineering Society of North America.

E. Comply with the requirements of California Code of Regulations, Title 24, Part 6; Energy Code.

F. FMG Compliance: Lighting fixtures for hazardous locations shall be listed and labeled for indicated class and division of hazard by FMG.

G. Comply with the requirements for seismic installation with the California Building Code.

1.6 COORDINATION

A. Coordinate layout and installation of lighting fixtures and suspension system with other construction that penetrates ceilings or is supported by them, including HVAC equipment, fire-suppression system, and partition assemblies.

1.7 WARRANTY

A. Special Warranty for Driver/ballasts: Manufacturer's standard form in which driver/ballast manufacturer agrees to repair or replace driver/ballasts that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.
2. Should a driver/ballast fail during the warranty period: a new driver/ballast shall be supplied to the Owner at no charge, and a labor allowance of $15.00 for each defective driver/ballast shall be supplied to the Owner. The replacement driver/ballast shall be identical to, or an improvement upon, the original design of the malfunctioning driver/ballast.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers

1. Luminaires

a. Refer to "Luminaire Schedule", herein or on the Drawings.

2.2 LIGHTING FIXTURES AND COMPONENTS, GENERAL REQUIREMENTS

A. Recessed Fixtures: Comply with NEMA LE 4 for ceiling compatibility for recessed fixtures.

B. Luminaires shall bear UL inspection label, suitable to application and installed environment.

C. Furnish on request I.T.L. and/or E.T.L. test reports for luminaires furnished.

D. Metal Parts: Free of burrs and sharp corners and edges.

E. Sheet Metal Components: Steel, unless otherwise indicated. Form and support to prevent warping and sagging.

F. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

G. Reflecting surfaces shall have minimum reflectance as follows, unless otherwise indicated:

1. White Surfaces: 85 percent.
2. Specular Surfaces: 83 percent.
3. Diffusing Specular Surfaces: 75 percent.
4. Laminated Silver Metallized Film: 90 percent.

H. Plastic Diffusers, Covers, and Globes:

1. Acrylic Lighting Diffusers: 100 percent virgin acrylic plastic. High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.

   a. Lens Thickness: At least 0.125 inch minimum unless different thickness is indicated. Clean room fixtures shall include lens of thickness sufficient to withstand the environmental conditions and cleaning regime and products.
   b. UV stabilized.

2. Glass: Annealed crystal glass, unless otherwise indicated.

I. Luminaire housing and door frame shall be fully sealed against light leakage. Light leaks between ceiling trims of recessed luminaires and ceiling will not be acceptable.

J. Alzak parabolic cones shall be guaranteed against fading for a minimum of 2 years. In the event of premature fading, luminaire manufacturer shall replace cones and pay for both labor and material costs.

K. Adjustable luminaires shall be capable of being locked into position. Aim and adjust all adjustable luminaires to the satisfaction of the Owner and the Architect.

L. Recessed luminaires shall be removable from below to provide access to outlet or prewired luminaire box.

M. A snap type local disconnect shall be provided for all luminaires. The disconnect shall disconnect all supply conductors simultaneously, including the grounded conductor. The line side terminals of the disconnecting means shall be guarded. The disconnecting means shall be located inside or outside the luminaire housing, but must be accessible to qualified persons before servicing or maintaining the driver/ballast or lamps.

2.3 EXIT SIGNS

A. Description: Comply with UL 924; for sign colors, visibility, luminance, and lettering size, comply with authorities having jurisdiction.

B. Internally Lighted Signs:

1. Lamps for AC Operation: LEDs, 70,000 hours minimum rated lamp life.
2. Self-Powered Exit Signs (Battery Type): Integral automatic charger in a self-contained power pack.

    a. Battery: Sealed, maintenance-free, nickel-cadmium type.
    b. Charger: Fully automatic, solid-state type with sealed transfer relay.
    c. Operation: Relay automatically energizes lamp from battery when circuit voltage drops to 80 percent of nominal voltage or below. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.
    d. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
    e. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.
    f. Integral Self-Test: Factory-installed electronic device automatically initiates code-required test of unit emergency operation at required intervals. Test failure is annunciated by an integral audible alarm and flashing red LED.

3. Master/Remote Sign Configurations:

    a. Master Unit: Comply with requirements above for self-powered exit signs, and provide additional capacity in LED power supply for power connection to remote unit.
    b. Remote Unit: Comply with requirements above for self-powered exit signs, except omit power supply, battery and test features. Arrange to receive full power requirements from master unit. Connect for testing concurrently with master unit as a unified system.

4. Type "X" Directional Exit Signs shall have directional indicating chevrons pointing in direction of travel.

2.4 LIGHTING FIXTURE SUPPORT COMPONENTS

A. Comply with Division 26 Section "Hangers and Supports for Electrical Systems" for channel- and angle-iron supports and nonmetallic channel and angle supports.

B. Single-Stem Hangers: 1/2-inch steel tubing with swivel ball fittings and ceiling canopy. Finish same as fixture. Fitting shall allow movement in all directions during seismic event.

C. Twin-Stem Hangers: Two, 1/2-inch steel tubes with single canopy designed to mount a single fixture. Finish same as fixture.

D. Wires: ASTM A 641/A 641M, Class 3, soft temper, zinc-coated steel, 12 gage minimum gage as required per the CBC.

E. Wires for Humid Spaces: ASTM A 580/A 580M, Composition 302 or 304, annealed stainless steel, 12 gage.

F. Rod Hangers: 3/16-inch minimum diameter, cadmium-plated, threaded steel rod.

G. Hook Hangers: Integrated assembly matched to fixture and line voltage and equipped with threaded attachment, cord, and locking-type plug.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Lighting fixtures: Set level, plumb, and square with ceilings and walls. Install lamps in each fixture.

B. Support for Lighting Fixtures in or on Grid-Type Suspended Ceilings: Use grid as a support element.

1. Support Clips: Fasten to lighting fixtures and to ceiling grid members at or near each fixture corner with clips that are UL listed for the application at a minimum of two locations at opposing corners.
2. Fixtures of Sizes Less Than Ceiling Grid: Install as indicated on reflected ceiling plans or center in acoustical panel, and support fixtures independently with at least two 3/4-inch (20-mm) metal channels spanning and secured to ceiling tees.
3. Install independent support rod or wire from structure to a tab on lighting fixture as required below. Wire or rod shall have breaking strength of the weight of fixture at a safety factor of 3.
   a. Light fixtures less than 10 lbs. shall have a minimum of one support to structure.
   b. Light fixtures 10 lbs. or over but less than 56 lbs. shall have a minimum of two supports to structure from opposing corners.
   c. Light fixtures weighing 56 lbs. or more shall be supported solely from the structure, independent of the ceiling system.
4. All emergency light fixtures shall include a minimum of two (2) supports direct to the structure above.

C. Suspended Lighting Fixture Support:

1. Pendants and Rods: Where longer than 48 inches, brace to limit swinging.
2. Stem-Mounted, Single-Unit Fixtures: Suspend with twin-stem hangers.
3. Continuous Rows: Use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of fixture chassis, including one at each end.

D. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

E. Do not install reflector cones and visible trim of luminaires until completion of plastering, ceiling tile work, painting, and general cleanup. Installation of reflector cones and visible trim of luminaires shall be carefully coordinated with ceiling openings to prevent light leaks at the ceiling plane. Handle cones and trim carefully to avoid scratching or finger printing. Luminaires shall be completely clean at time of acceptance by Owner.

F. Drywall suspension ceiling systems will be provided with supplemental steel stud channels at luminaire locations for supporting luminaires to ceiling system under Section 09260, Gypsum

Wallboard Systems. Securely fasten recessed and/or surface mounted luminaires to steel channels with approved earthquake clips or clamping devices. Where required by the CBC or where the weight of the luminaire may cause deformation of the suspended ceiling, provide independent seismic restraint supports for luminaires connected to the structure above. The amount of deformation allowed is specified in Division 09.

G. Where MC or AC cable is not used or allowed, connect luminaires to outlet boxes with six foot lengths of flexible conduit and luminaire wire. Locate box so that luminaires can be readily moved into adjacent ceiling modules and to provide access to space above ceiling. Support flexible conduit from structure; do not lay on ceiling tiles or attach to any other support systems.

H. Properly align all surface type luminaires. Bolt together so that alignment will be permanent.

I. Clean room fixtures are to be caulked to the ceiling or wall to provide a sealed, air tight installation.

3.2 FIELD QUALITY CONTROL

A. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery and retransfer to normal.

B. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.

END OF SECTION 26 51 00

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MEMORANDUM

RIVERSIDE COUNTY COUNSEL

CONFIDENTIAL
ATTORNEY-CLIENT PRIVILEGE

DATE: May 9, 2017

TO: Cecilia Gil
Clerk of the Board

FROM: Marsha L. Victor
Principal Deputy

RE: Bids for RUHS Emergency Bi-Plane Cardiac Catheterization Laboratory

---

The two bids submitted for the above referenced project have been received for review by this office. The bids are as shown in your summary of bids.

The bid documents will be reviewed for compliance with the bid requirements and a memo sent to the managing department, EDA.

All documents submitted are returned herewith.

MLV
Attachment

cc: Charles Waltman, EDA/PMO
By Email only

RECEIVED RIVERSIDE COUNTY
CLERK OF THE BOARD OF SUPERVISORS
2017 MAY -9 PM 1:29

3960 Orange Street, Suite 500•Riverside CA•92501•(951)955-6300•FAX (951)955-6322 & (951)955-6363

BID FORM

TO THE GOVERNING BOARD OF THE COUNTY OF RIVERSIDE:

Date: 5-5-17

Bidder: Stronghold Engineering, Inc.

The undersigned Bidder, having carefully examined the Bidding Documents for the following Project:

Riverside University Hospital System Bi-Plane Cardiac Catheterization Lab (Cath Lab) Project

including, without limitation, the Plans and Specifications made part thereof, and taking into consideration all matters disclosed thereby, all matters of which Bidder is charged with knowledge by the terms thereof and all matters that are reasonably ascertainable by Bidder in the exercise of its duties of inquiry or investigation created by the terms set forth in the Bidding Documents (including, without limitation, the terms of Section 3.2 of the General Conditions, proposes, agrees to furnish in strict accordance with the Contract Documents all of the following:

- labor, materials, equipment, services, transportation;
- permits, licenses and taxes,
- **Builder's Risk (Course of Construction) Insurance coverage in accordance with the terms of Subparagraph 11.1.1.5 of the General Conditions;** and
- all other work, services and other things necessary for the undersigned to perform its obligations under the Contract Documents, excepting only those that are expressly stated in the Bidding Documents to be the responsibility of County,

for the total Base Bid price of (state in figures) $ 1,856,777.00 (state in words) One Million Eight Hundred Fifty Six Thousand Seven Hundred Seventy Seven dollars and no cents.

The foregoing Base Bid is submitted based upon and taking into consideration all of modifications and additions to the Bid Documents and other information set forth in each Addendum listed below, receipt and review of which is hereby acknowledged by Bidder (state below each and every Addendum number and date):

Addendum No.	1	Date:	03/31/2017
Addendum No.	2	Date:	04/12/2017
Addendum No.	3	Date:	04/25/2017
Addendum No.	4	Date:	04/26/2017
Addendum No.		Date:	
Addendum No.		Date:	
Addendum No.		Date:	

Subject to County's acceptance of such Alternate(s) in the manner set forth in the Instructions to Bidders,

the foregoing Base Bid shall be adjusted as hereinafter stated for the following Alternates set forth in the Bidding Documents and/or the above-listed Addenda:

State Amount (in words and figures)	State if Amount is an "Add" or "Deduct" to Base Bid or, if Base Bid is Not Affected, Enter "No Change"
Alternate 1: Course of Construction Insurance Figures: $ 15 000- Words: FIFTEEN THOUSAND DOLLARS Dollars Ø Cents	☐ Add ☒ Deduct ☐ No Change
Alternate 2: insert description here Figures: $ Words: Dollars Cents	☐ Add ☐ Deduct ☐ No Change
Alternate 3: insert description here Figures: $ Words: Dollars Cents	☐ Add ☐ Deduct ☐ No Change
Alternate 4: insert description here Figures: $ Words: Dollars Cents	☐ Add ☐ Deduct ☐ No Change
Alternate 5: insert description here Figures: $ Words: Dollars Cents	☐ Add ☐ Deduct ☐ No Change

THE UNDERSIGNED BIDDER HEREBY MAKES THE FOLLOWING REPRESENTATIONS AND COVENANTS:

1. Except as otherwise permitted by the Instructions to Bidders, this Bid shall remain open for a period of sixty (60) Days after the Bid Closing Deadline (as defined in the Bidding Documents) and during that period of time shall not, without the written consent of County, be modified, withdrawn or canceled by the Bidder.

2. Bidder adopts and incorporates into this Bid all of the representations set forth in the Instructions to Bidders and hereby warrants that all such representations are true and correct.

3. The Bid Security submitted by Bidder is given as a guarantee that if Award of the Construction Contract that is the subject of this Bid is made to Bidder that Bidder will execute the Construction Contract and furnish the Performance Bond, Payment Bonds, evidence of insurance and other documents that Bidder is required to submit under the terms of the Bidding Documents, and in the event that the Bidder fails or refuses to execute and deliver same, such Bid Security shall be charged with the all losses and damages suffered by County as a result thereof and permitted by Applicable Law, including, without limitation, the difference between the amount of the Bid and amount for which the County may legally contract with another party to perform the Project (if such latter amount be greater than the Bid), costs of publication, and all other Losses suffered by County (including, without limitation, those associated with Delay to the Project).

4. Capitalized terms used in this Bid Form shall have the meanings assigned to them in the Bidding Documents.

Individual Bidder

Name of Bidder: N/A

By: _____
(Signature)

Print Name: _____

Title: _____

Date: _____

Business Address: _____

Business Telephone: _____

Business Fax: _____

Business E-mail: _____

Contractor's License: _____
Dept. of Industrial Relations
Registration No: _____

Corporation Bidder

Corporate Name of Bidder: Stronghold Engineering, Inc.

State of Incorporation: California

By: B. Bailey
(Signature)

Print Name: Beverly A. Bailey

Title: President/CEO

Date: April 27, 2017

Business Address: 2000 Market Street
Riverside, CA 92501

Business Telephone: 951-684-9303

Business Fax: 951-684-9329

Business E-mail: bb@teamsei.com

Contractor's License: 787490
Dept. of Industrial Relations
Registration No: 1000001105

Space for Corporate Seal and Attestation

Partnership Bidder

Name of Bidder: N/A

By: _____
(Signature)

Print Name: _____

Title: _____

Date: _____

Business Address: _____

_____

_____

_____

Business Telephone: _____

Business Fax: _____

Business E-mail: _____

Contractor's License: _____
Dept. of Industrial Relations
Registration No: _____

If additional partners are signing, attach additional sheets setting forth the above signature information for each signing partner.

If the partner or partners signing on behalf of the Bidder is/are a corporation, then for each such corporate partner complete the following (attach additional sheets, if necessary):

Corporate Name of Partner: N/A

State of Incorporation: _____

By: _____
(Signature)

Print Name: _____

Title: _____

Date: _____

Business Address:

_____

_____

_____

Business Telephone: _____

Business Fax: _____

Business E-mail: _____

Contractor's License: _____
Dept. of Industrial Relations
Registration No: _____

Space for Corporate Seal and Attestation

Joint Venture Bidder

Name of Bidder: N/A

By: _____
(Signature)

Print Name: _____

Title: _____

Date: _____

Business Address:

_____

_____

_____

Business Telephone: _____

Business Fax: _____

Business E-mail: _____

Contractor's License: _____
Dept. of Industrial Relations
Registration No: _____

If additional joint venture partners are signing, attach additional sheets setting forth the above signature information for each signing joint venture partner.

If the joint venture partner or partners signing on behalf of the Bidder is/are a corporation, then for each such corporate joint venture partner complete the following (attach additional sheets, if necessary):

Corporate Name of Partner: N/A

State of Incorporation: _____

By: _____
(Signature)

Print Name: _____

Title: _____

Date: _____

Business Address:

_____

_____

_____

Business Telephone: _____

Business Fax: _____

Business E-mail: _____

Contractor's License: _____
Dept. of Industrial Relations
Registration No: _____

Space for Corporate Seal and Attestation

Project No. FM08430007374

Bond No. N/A

BID BOND

(Public Work – Public Contract Code Section 20129 (a))

KNOW ALL MEN BY THESE PRESENTS THAT:

WHEREAS, The undersigned Stronghold Engineering Incorporated ("Principal") is herewith submitting to the County of Riverside ("County") a Bid dated 5-5 20 17, in the amount of TEN PERCENT (10%) OF THE TOTAL BID ($) [Enter amount of Principal's Bid Amount, as defined in the Instructions to Bidders] ("Bid Amount") for the award by County to Principal of a contract ("Contract") for the following: Name of Project ("Project");

Riverside University Hospital System Bi-Plane Cardiac Catheterization Lab (Cath Lab) Project

AND, WHEREAS, Principal is obligated as a condition of said Bid to submit security pursuant to Public Contract Code Section 20129 (a) in the amount of ten percent (10%) of the Bid Amount, which security may be in the form of a Bid Bond issued by an admitted surety insurer pursuant to Code of Civil Procedure Section 995.120 ("Admitted Surety");

NOW THEREFORE, the Principal and Liberty Mutual Insurance Company ("Surety"), an Admitted Surety, are held and firmly bound unto the County in the penal sum of Ten Percent of the Total Amount Bid ($ 10% of the Total Amount Bid) for the payment of which sum in lawful money of the United States, well and truly to be made, we, Principal and Surety, bind ourselves, our executors, administrators, successors, heirs and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH, that if Principal is awarded the Contract upon such Bid and thereafter within the period of time specified in County's bidding documents governing the bidding process applicable to such Bid ("Bidding Documents") enters into the Contract with County on the terms and conditions required by the Bidding Documents and furnishes the performance and payment bonds, evidence of insurance and other documents that Principal is required to submit under the terms of the Bidding Documents, then this obligation shall be null and void; otherwise, it shall remain in full force and effect and the sum guaranteed by this bond shall, at the option of County, be forfeited to County to pay all losses and damages suffered by County as a result thereof and permitted by applicable law, including, without limitation, the difference between the Bid Amount and amount for which the County may legally contract with another party to perform the Work (if such latter amount be greater than the Bid Amount), costs of publication, and all other losses and damages suffered by County (including, without limitation, those associated with delay to the Project); provided, however, that Surety's liability shall not exceed the penal amount of this bond.

Surety, for value received, hereby agrees that no change, extension of time, alteration or addition to the terms of the Contract or the Bidding Documents, or to the work to be performed thereunder, nor any withdrawal of the Bid in a manner not permitted by the requirements of the Bidding Documents shall in any way

impair or affect Surety's obligation under this bond, and Surety does hereby waive notice of any such changes, extensions of time, alterations or additions.

IN WITNESS WHEREOF the undersigned parties have executed this instrument under their several seals this day of April 21, 20 17, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Affix Seal if Corporation

Stronghold Engineering Incorporated
(Firm Name – Principal)

2000 Market Street
Riverside, CA 92501
(Business Address)

By B. Barley
(Original Signature)
Pres/CEO
(Title)

Liberty Mutual Insurance Company
(Corporation Name – Surety)

Affix Corporate Seal

175 Berkeley Street
Boston, MA 02116
(Business Address)

By Julie Brennan
(Original Signature)
ATTORNEY-IN-FACT
Julie Brennan

Note: Notary acknowledgment for Surety's signature and Surety's Power of Attorney must be included or attached

THIS POWER OF ATTORNEY IS NOT VALID UNLESS IT IS PRINTED ON RED BACKGROUND.
This Power of Attorney limits the acts of those named herein, and they have no authority to bind the Company except in the manner and to the extent herein stated.

Certificate No. 7698535

Liberty Mutual Insurance Company
The Ohio Casualty Insurance Company West American Insurance Company

POWER OF ATTORNEY

KNOWN ALL PERSONS BY THESE PRESENTS: That The Ohio Casualty Insurance Company is a corporation duly organized under the laws of the State of New Hampshire, that Liberty Mutual Insurance Company is a corporation duly organized under the laws of the State of Massachusetts, and West American Insurance Company is a corporation duly organized under the laws of the State of Indiana (herein collectively called the "Companies"), pursuant to and by authority herein set forth, does hereby name, constitute and appoint,
Erin A. Greene; James P. Schabarum II; Jase Hamilton; Jeffrey W. Cavignac; Julie Brennan

all of the city of San Diego, state of CA each individually if there be more than one named, its true and lawful attorney-in-fact to make, execute, seal, acknowledge and deliver, for and on its behalf as surety and as its act and deed, any and all undertakings, bonds, recognizances and other surety obligations, in pursuance of these presents and shall be as binding upon the Companies as if they have been duly signed by the president and attested by the secretary of the Companies in their own proper persons.

IN WITNESS WHEREOF, this Power of Attorney has been subscribed by an authorized officer or official of the Companies and the corporate seals of the Companies have been affixed thereto this 28th day of March, 2017.

The Ohio Casualty Insurance Company
Liberty Mutual Insurance Company
West American Insurance Company

By: _____
David M. Carey, Assistant Secretary

STATE OF PENNSYLVANIA ss
COUNTY OF MONTGOMERY

On this 28th day of March, 2017, before me personally appeared David M. Carey, who acknowledged himself to be the Assistant Secretary of Liberty Mutual Insurance Company, The Ohio Casualty Company, and West American Insurance Company, and that he, as such, being authorized so to do, execute the foregoing instrument for the purposes therein contained by signing on behalf of the corporations by himself as a duly authorized officer.

IN WITNESS WHEREOF, I have hereunto subscribed my name and affixed my notarial seal at King of Prussia, Pennsylvania, on the day and year first above written.

COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
Teresa Pastella, Notary Public
Upper Merion Twp., Montgomery County
My Commission Expires March 28, 2021
Member, Pennsylvania Association of Notaries

By: _____
Teresa Pastella, Notary Public

This Power of Attorney is made and executed pursuant to and by authority of the following By-laws and Authorizations of The Ohio Casualty Insurance Company, Liberty Mutual Insurance Company, and West American Insurance Company which resolutions are now in full force and effect reading as follows:

ARTICLE IV – OFFICERS – Section 12. Power of Attorney. Any officer or other official of the Corporation authorized for that purpose in writing by the Chairman or the President, and subject to such limitation as the Chairman or the President may prescribe, shall appoint such attorneys-in-fact, as may be necessary to act in behalf of the Corporation to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations. Such attorneys-in-fact, subject to the limitations set forth in their respective powers of attorney, shall have full power to bind the Corporation by their signature and execution of any such instruments and to attach thereto the seal of the Corporation. When so executed, such instruments shall be as binding as if signed by the President and attested to by the Secretary. Any power or authority granted to any representative or attorney-in-fact under the provisions of this article may be revoked at any time by the Board, the Chairman, the President or by the officer or officers granting such power or authority.

ARTICLE XIII – Execution of Contracts – SECTION 5. Surety Bonds and Undertakings. Any officer of the Company authorized for that purpose in writing by the chairman or the president, and subject to such limitations as the chairman or the president may prescribe, shall appoint such attorneys-in-fact, as may be necessary to act in behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations. Such attorneys-in-fact subject to the limitations set forth in their respective powers of attorney, shall have full power to bind the Company by their signature and execution of any such instruments and to attach thereto the seal of the Company. When so executed such instruments shall be as binding as if signed by the president and attested by the secretary.

Certificate of Designation – The President of the Company, acting pursuant to the Bylaws of the Company, authorizes David M. Carey, Assistant Secretary to appoint such attorneys-in-fact as may be necessary to act on behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations.

Authorization – By unanimous consent of the Company's Board of Directors, the Company consents that facsimile or mechanically reproduced signature of any assistant secretary of the Company, wherever appearing upon a certified copy of any power of attorney issued by the Company in connection with surety bonds, shall be valid and binding upon the Company with the same force and effect as though manually affixed.

I, Renee C. Llewellyn, the undersigned, Assistant Secretary, The Ohio Casualty Insurance Company, Liberty Mutual Insurance Company, and West American Insurance Company do hereby certify that the original power of attorney of which the foregoing is a full, true and correct copy of the Power of Attorney executed by said Companies, is in full force and effect and has not been revoked.

APR 21 2017

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the seals of said Companies this _____ day of _____, 20_____.

By: _____
Renee C. Llewellyn, Assistant Secretary

Not valid for mortgage, note, loan, letter of credit, currency rate, interest rate or residual value guarantees.

To confirm the validity of this Power of Attorney call 1-610-832-8240 between 9:00 am and 4:30 pm EST on any business day.

LMS_12873_022017

CALIFORNIA ALL- PURPOSE CERTIFICATE OF ACKNOWLEDGMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California }

County of San Diego }

On APR 2 1 2017 before me, Erin Ashley Greene, Notary Public,
(Here insert name and title of the officer)

personally appeared Julie Brennan,
who proved to me on the basis of satisfactory evidence to be the person(~~s~~) whose name(~~s~~) is/are subscribed to the within instrument and acknowledged to me that he/~~she~~/they executed the same in his/~~her~~/their authorized capacity(~~ies~~), and that by his/~~her~~/their signature(~~s~~) on the instrument the person(~~s~~), or the entity upon behalf of which the person(~~s~~) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Notary Public Signature (Notary Public Seal)

ERIN ASHLEY GREENE
Notary Public - California
San Diego County
Commission # 2158050
My Comm. Expires Jun 25, 2020

ADDITIONAL OPTIONAL INFORMATION

DESCRIPTION OF THE ATTACHED DOCUMENT

(Title or description of attached document)

(Title or description of attached document continued)

Number of Pages _____ Document Date_____

CAPACITY CLAIMED BY THE SIGNER

- ☐ Individual (s)
- ☐ Corporate Officer

(Title)

- ☐ Partner(s)
- ☐ Attorney-in-Fact
- ☐ Trustee(s)
- ☐ Other _____

2015 Version www.NotaryClasses.com 800-873-9865

INSTRUCTIONS FOR COMPLETING THIS FORM

This form complies with current California statutes regarding notary wording and, if needed, should be completed and attached to the document. Acknowledgments from other states may be completed for documents being sent to that state so long as the wording does not require the California notary to violate California notary law.

- State and County information must be the State and County where the document signer(s) personally appeared before the notary public for acknowledgment.
- Date of notarization must be the date that the signer(s) personally appeared which must also be the same date the acknowledgment is completed.
- The notary public must print his or her name as it appears within his or her commission followed by a comma and then your title (notary public).
- Print the name(s) of document signer(s) who personally appear at the time of notarization.
- Indicate the correct singular or plural forms by crossing off incorrect forms (i.e. ~~he~~/she/~~they,~~ is /~~are~~) or circling the correct forms. Failure to correctly indicate this information may lead to rejection of document recording.
- The notary seal impression must be clear and photographically reproducible. Impression must not cover text or lines. If seal impression smudges, re-seal if a sufficient area permits, otherwise complete a different acknowledgment form.
- Signature of the notary public must match the signature on file with the office of the county clerk.
  - ❖ Additional information is not required but could help to ensure this acknowledgment is not misused or attached to a different document.
  - ❖ Indicate title or type of attached document, number of pages and date.
  - ❖ Indicate the capacity claimed by the signer. If the claimed capacity is a corporate officer, indicate the title (i.e. CEO, CFO, Secretary).
- Securely attach this document to the signed document with a staple.

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT **CIVIL CODE § 1189**

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California)
County of RIVERSIDE)

On MAY 3, 2017 before me, ELIZABETH A. ROMO, NOTARY PUBLIC,
Date *Here Insert Name and Title of the Officer*

personally appeared BEVERLY BAILEY
Name(s) of Signer(s)

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

ELIZABETH A. ROMO
Commission # 2067231
Notary Public - California
San Bernardino County
My Comm. Expires May 5, 2018

Signature Elizabeth A. Romo
Signature of Notary Public

Place Notary Seal Above

OPTIONAL

Though this section is optional, completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.

Description of Attached Document

Title or Type of Document: _____ Document Date: _____

Number of Pages: _____ Signer(s) Other Than Named Above: _____

Capacity(ies) Claimed by Signer(s)

Signer's Name: _____
☐ Corporate Officer — Title(s): _____
☐ Partner — ☐ Limited ☐ General
☐ Individual ☐ Attorney in Fact
☐ Trustee ☐ Guardian or Conservator
☐ Other: _____
Signer Is Representing: _____

Signer's Name: _____
☐ Corporate Officer — Title(s): _____
☐ Partner — ☐ Limited ☐ General
☐ Individual ☐ Attorney in Fact
☐ Trustee ☐ Guardian or Conservator
☐ Other: _____
Signer Is Representing: _____

BID SECURITY RECEIPT

The undersigned Bidder has submitted as Bid Security for its Bid in the form of (check appropriate box):

- [X] Bid Bond executed by an Admitted Surety, made payable to the County of Riverside,
- [ ] cash,
- [ ] cashier's check payable to the order of the County of Riverside, or
- [ ] certified check payable to the order of the County of Riverside,

in the amount of Ten Percent (10%) of the Total Bid dollars/_____ cents ($_____), which amount is equal to ten percent (10%) of the Bidder's Bid Amount, as defined in the Instructions to Bidders.

B. Bailey

Signature

Stronghold Engineering, Inc.

Print Name of Bidder

Beverly A. Bailey, President/CEO

Print Name of Signer

DESIGNATION OF SUBCONTRACTORS

In compliance with the Subletting and Subcontracting Fair Practices Act (Chapter 4, commencing at Section 4100, Division 2, Part 1 of the Public Contract Code of the State of California) and any amendments thereto ("Act"), Bidder sets forth below the information required by the Act for those Subcontractors who are required to be listed by Bidder pursuant to the provisions of the Act [Insert information requested. Attach additional sheets, if needed.]:

Portion of Work	Subcontractor Name	Subcontractor License	Location
CASE WORK + COUNTER TOPS	BROOKERS WOOD WORKS	672108	PERRIS, CA 92571
DEMO	JANUS CORP.	572682	NORCO, CA 92860
PLUMBING	CONTINENTAL PLUMBING INC.	399073	MIRA LOMA, CA 91752
GLASS + GLAZING	ADVANCED MISSION GLASS CORP.	743108	FONTANA, CA 92335

Date: 5-5-17

Beverly A. Bailey
(Name of Bidder)

By: B. Bailey
(Signature of Bidder)

Address: Stronghold Engineering, Inc.
2000 Market Street
Riverside, CA 92501

Phone: 951-684-9303

DESIGNATION OF SUBCONTRACTORS

In compliance with the Subletting and Subcontracting Fair Practices Act (Chapter 4, commencing at Section 4100, Division 2, Part 1 of the Public Contract Code of the State of California) and any amendments thereto ("Act"), Bidder sets forth below the information required by the Act for those Subcontractors who are required to be listed by Bidder pursuant to the provisions of the Act [Insert information requested. Attach additional sheets, if needed.]:

Portion of Work	Subcontractor Name	Subcontractor License	Location
DOORS & FRAMES	CFO DOORS & HARDWARE	859157	ANAHEIM, CA 92806
PAINTING	CITYWIDE PAINTING	799584	MORENO VALLEY, CA 92557
METAL STUDS & DRYWALL	INFINITY DRYWALL CONTRACTING, INC.	886097	ANAHEIM, CA 92802

Date: 5-5-17

Beverly A. Bailey
(Name of Bidder)

By: B. Bailey
(Signature of Bidder)

Address: Stronghold Engineering, Inc.
2000 Market Street
Riverside, CA 92501

Phone: 951-684-9303

DESIGNATION OF SUBCONTRACTORS

In compliance with the Subletting and Subcontracting Fair Practices Act (Chapter 4, commencing at Section 4100, Division 2, Part 1 of the Public Contract Code of the State of California) and any amendments thereto ("Act"), Bidder sets forth below the information required by the Act for those Subcontractors who are required to be listed by Bidder pursuant to the provisions of the Act [Insert information requested. Attach additional sheets, if needed.]:

Portion of Work	Subcontractor Name	Subcontractor License	Location
STRUCTURAL STEEL	EVANS INDUSTRIAL INC.	917373	TORRANCE, CA 90501
FLOORING	MIKES CUSTOM FLOORING	426696	REDLANDS, CA 92373
HVAC	ACCO	120696	COSTA MESA, CA 92626

Date: 5/5/17

Beverly A. Bailey
(Name of Bidder)

By: B. Bailey
(Signature of Bidder)

Address: Stronghold Engineering, Inc.
2000 Market Street
Riverside, CA 92501

Phone: 951-684-9303

NON-COLLUSION DECLARATION TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID

(Public Contract Code Section 7106)

The undersigned declares:

I am the President/CEO of Stronghold Engineering, Inc., the party making the foregoing bid.

The bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation. The bid is genuine and not collusive or sham. The bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid. The bidder has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding. The bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder.

All statements contained in the bid are true. The bidder has not, directly or indirectly, submitted his or her bid price of any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid, and has not paid, and will not pay, any person or entity for such purpose.

Any person executing this declaration on behalf of a bidder that is a corporation, partnership, joint venture, limited liability company, limited liability partnership, or any other entity, hereby represents that he or she has full power to execute, and does execute, this declaration on behalf of the bidder.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that this declaration is executed on 5-5-17 [date], at Riverside [city], California [state].

B. Bailey

[Signature of Declarant]

Beverly A. Bailey

[Printed Name of Person Signing]

Stronghold Engineering, Inc.

[Name of Bidder]

President/CEO

[Office or Title]

Iran Contracting Act

(Public Contract Code sections 2200-2208)

In accordance with Public Contract Code Section 2204(a), prior to bidding on, submitting a proposal or executing a contract or renewal for a County of Riverside contract for goods or services of $1,000,000 or more, a Contractor must either:

a) Certify it is not on the current list of persons engaged in investment activities in Iran created by the California Department of General Services ("DGS") pursuant to Public Contract Code section 2203(b) and is not a financial institution extending twenty million dollars ($20,000,000) or more in credit to another person, for 45 days or more, if that other person will use the credit to provide goods or services in the energy sector in Iran and is identified on the current list of persons engaged in investment activities in Iran created by DGS; or

b) Demonstrate it has been exempted from the certification requirement for that solicitation or contract pursuant to Public Contract Code section 2203(c) or (d).

To comply with this requirement, please insert your Contractor or financial institution name and Federal ID Number (if available) and complete one of the options below. Please note: California law establishes penalties for providing false certifications, including civil penalties equal to the greater of $250,000 or twice the amount of the contract for which the false certification was made; contract termination; and three-year ineligibility to bid on contracts. (Public Contract Code section 2205.)

Option #1 – Certification

I, the official named below, certify I am duly authorized to execute this certification on behalf of the Contractor/financial institution identified below, and the Contractor/financial institution identified below is **not** on the current list of persons engaged in investment activities in Iran created by DGS and is not a financial institution extending twenty million dollars ($20,000,000) or more in credit to another person/vendor, for 45 days or more, if that other person/vendor will use the credit to provide goods or services in the energy sector in Iran and is identified on the current list of persons engaged in investment activities in Iran created by DGS.

Contractor Name/Financial Institution (Printed) Stronghold Engineering, Inc.	*Federal ID Number (or n/a)* 33-0886845
By (Authorized Signature) B. Bailey	
Printed Name and Title of Person Signing Beverly A. Bailey, President/CEO	
Date Executed 5-5-17	*Executed in* Riverside, California

Option #2 – Exemption

Pursuant to Public Contract Code sections 2203(c) and (d), a public entity may permit a Contractor/financial institution engaged in investment activities in Iran, on a case-by-case basis, to be eligible for, or to bid on, submit a proposal for, or enters into or renews, a contract for goods and services.
If you have obtained an exemption from the certification requirement under the Iran Contracting Act, please fill out the information below, and attach documentation demonstrating the exemption approval.

Contractor Name/Financial Institution (Printed)	*Federal ID Number (or n/a)*
By (Authorized Signature)	
Printed Name and Title of Person Signing	
Date Executed	*Executed in*

STRONGHOLD ENGINEERING, INC.
Corporate Office:
2000 Market Street, Riverside, CA 92501 • Tel (951) 684-9303 • Fax (951) 684-9329 • Contracts Fax (951) 367-4625
Established 1991

BID DOCUMENTS

Project Name: RIVERSIDE UNIVERSITY HOSPITAL SYSTEM
BI-PLANE CARDIAC CATHETERIZATION LABORATORY PROJECT

Project Number: FM08430007374

Project Contact: CLERK OF THE BOARD
COUNTY ADMINISTRATIVE CENTER
4080 LEMON STREET, 1ST FLOOR
RIVERSIDE, CA 92501

DELIVER BY MAY 5, 2017 2:00 PM

BID FORM

TO THE GOVERNING BOARD OF THE COUNTY OF RIVERSIDE:

Date: May 5, 2017

Bidder: ProWest PCM, Inc., dba ProWest Constructors

The undersigned Bidder, having carefully examined the Bidding Documents for the following Project:

Riverside University Hospital System Bi-Plane Cardiac Catheterization Lab (Cath Lab) Project

including, without limitation, the Plans and Specifications made part thereof, and taking into consideration all matters disclosed thereby, all matters of which Bidder is charged with knowledge by the terms thereof and all matters that are reasonably ascertainable by Bidder in the exercise of its duties of inquiry or investigation created by the terms set forth in the Bidding Documents (including, without limitation, the terms of Section 3.2 of the General Conditions, proposes, agrees to furnish in strict accordance with the Contract Documents all of the following:

- labor, materials, equipment, services, transportation;
- permits, licenses and taxes,
- **Builder's Risk (Course of Construction) Insurance coverage in accordance with the terms of Subparagraph 11.1.1.5 of the General Conditions;** and
- all other work, services and other things necessary for the undersigned to perform its obligations under the Contract Documents, excepting only those that are expressly stated in the Bidding Documents to be the responsibility of County,

for the total Base Bid price of (state in figures) $ 1,899,000. (state in words) one million eight hundred ninety-nine thousand dollars. and NO cents.

The foregoing Base Bid is submitted based upon and taking into consideration all of modifications and additions to the Bid Documents and other information set forth in each Addendum listed below, receipt and review of which is hereby acknowledged by Bidder (state below each and every Addendum number and date):

Addendum No.	1	Date:	03/31/2017
Addendum No.	2	Date:	04/12/2017
Addendum No.	3	Date:	04/25/2017
Addendum No.	4	Date:	04/26/2017
Addendum No.		Date:	
Addendum No.		Date:	
Addendum No.		Date:	

Subject to County's acceptance of such Alternate(s) in the manner set forth in the Instructions to Bidders,

the foregoing Base Bid shall be adjusted as hereinafter stated for the following Alternates set forth in the Bidding Documents and/or the above-listed Addenda:

State Amount (in words and figures)	State if Amount is an "Add" or "Deduct" to Base Bid or, if Base Bid is Not Affected, Enter "No Change"
Alternate 1: Course of Construction Insurance	
Figures: $ 29,000. Words: Twenty-nine thousand dollars Dollars NO Cents	☐ Add ☒ Deduct ☐ No Change
Alternate 2: insert description here	
Figures: $ Words: Dollars Cents	☐ Add ☐ Deduct ☐ No Change
Alternate 3: insert description here	
Figures: $ Words: Dollars Cents	☐ Add ☐ Deduct ☐ No Change
Alternate 4: insert description here	
Figures: $ Words: Dollars Cents	☐ Add ☐ Deduct ☐ No Change
Alternate 5: insert description here	
Figures: $ Words: Dollars Cents	☐ Add ☐ Deduct ☐ No Change

THE UNDERSIGNED BIDDER HEREBY MAKES THE FOLLOWING REPRESENTATIONS AND COVENANTS:

1. Except as otherwise permitted by the Instructions to Bidders, this Bid shall remain open for a period of sixty (60) Days after the Bid Closing Deadline (as defined in the Bidding Documents) and during that period of time shall not, without the written consent of County, be modified, withdrawn or canceled by the Bidder.

2. Bidder adopts and incorporates into this Bid all of the representations set forth in the Instructions to Bidders and hereby warrants that all such representations are true and correct.

3. The Bid Security submitted by Bidder is given as a guarantee that if Award of the Construction Contract that is the subject of this Bid is made to Bidder that Bidder will execute the Construction Contract and furnish the Performance Bond, Payment Bonds, evidence of insurance and other documents that Bidder is required to submit under the terms of the Bidding Documents, and in the event that the Bidder fails or refuses to execute and deliver same, such Bid Security shall be charged with the all losses and damages suffered by County as a result thereof and permitted by Applicable Law, including, without limitation, the difference between the amount of the Bid and amount for which the County may legally contract with another party to perform the Project (if such latter amount be greater than the Bid), costs of publication, and all other Losses suffered by County (including, without limitation, those associated with Delay to the Project).

4. Capitalized terms used in this Bid Form shall have the meanings assigned to them in the Bidding Documents.

Individual Bidder

Name of Bidder: _____

By: _____
(Signature)

Print Name: _____

Title: _____

Date: _____

Business Address:

_____

_____

_____

Business Telephone: _____

Business Fax: _____

Business E-mail: _____

Contractor's License: _____
Dept. of Industrial Relations
Registration No: _____

Corporation Bidder

Corporate Name
of Bidder: ProWest PCM, Inc., dba ProWest Constructors

State of Incorporation: California

By: _____
(Signature)

Print Name: Randy Craig

Title: President

Date: May 5, 2017

Business Address:

22710 Palomar Street
Wildomar, CA 92595

Business Telephone: (951) 678-1038

Business Fax: (951) 678-1083

Business E-mail: reifsteck@prowestpcm.com

Contractor's License: 706619
Dept. of Industrial Relations
Registration No: 1000000382

Space for Corporate Seal and Attestation

Partnership Bidder

Name of Bidder: _____

By: _____
(Signature)

Print Name: _____

Title: _____

Date: _____

Business Address: _____

_____

_____

_____

Business Telephone: _____

Business Fax: _____

Business E-mail: _____

Contractor's License: _____
Dept. of Industrial Relations
Registration No: _____

If additional partners are signing, attach additional sheets setting forth the above signature information for each signing partner.

If the partner or partners signing on behalf of the Bidder is/are a corporation, then for each such corporate partner complete the following (attach additional sheets, if necessary):

Corporate Name
of Partner: _____

State of Incorporation: _____

By: _____
(Signature)

Print Name: _____

Title: _____

Date: _____

Business Address:

_____

_____

_____

Business Telephone: _____

Business Fax: _____

Business E-mail: _____

Contractor's License: _____
Dept. of Industrial Relations
Registration No: _____

Space for Corporate Seal and Attestation

Joint Venture Bidder

Name of Bidder: _____

By: _____
(Signature)

Print Name: _____

Title: _____

Date: _____

Business Address:

_____

_____

_____

Business Telephone: _____

Business Fax: _____

Business E-mail: _____

Contractor's License: _____
Dept. of Industrial Relations
Registration No: _____

If additional joint venture partners are signing, attach additional sheets setting forth the above signature information for each signing joint venture partner.

If the joint venture partner or partners signing on behalf of the Bidder is/are a corporation, then for each such corporate joint venture partner complete the following (attach additional sheets, if necessary):

Corporate Name
of Partner: _____

State of Incorporation: _____

By: _____
(Signature)

Print Name: _____

Title: _____

Date: _____

Business Address:

_____

_____

_____

Business Telephone: _____

Business Fax: _____

Business E-mail: _____

Contractor's License: _____
Dept. of Industrial Relations
Registration No: _____

Space for Corporate Seal and Attestation

Project No. FM08430007374

Bond No. Bid Bond

BID BOND

(Public Work – Public Contract Code Section 20129 (a))

KNOW ALL MEN BY THESE PRESENTS THAT:

WHEREAS, The undersigned ProWest PCM, Inc. dba ProWest Constructors ("Principal") is herewith submitting to the County of Riverside ("County") a Bid dated May 5 2017, in the amount of Ten Percent of Amount Bid ($ 10%) [Enter amount of Principal's Bid Amount, as defined in the Instructions to Bidders] ("Bid Amount") for the award by County to Principal of a contract ("Contract") for the following: Name of Project ("Project");

Riverside University Hospital System Bi-Plane Cardiac Catheterization Lab (Cath Lab) Project

AND, WHEREAS, Principal is obligated as a condition of said Bid to submit security pursuant to Public Contract Code Section 20129 (a) in the amount of ten percent (10%) of the Bid Amount, which security may be in the form of a Bid Bond issued by an admitted surety insurer pursuant to Code of Civil Procedure Section 995.120 ("Admitted Surety");

NOW THEREFORE, the Principal and Hartford Fire Insurance Company ("Surety"), an Admitted Surety, are held and firmly bound unto the County in the penal sum of Ten Percent of Amount Bid ($ 10%) for the payment of which sum in lawful money of the United States, well and truly to be made, we, Principal and Surety, bind ourselves, our executors, administrators, successors, heirs and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH, that if Principal is awarded the Contract upon such Bid and thereafter within the period of time specified in County's bidding documents governing the bidding process applicable to such Bid ("Bidding Documents") enters into the Contract with County on the terms and conditions required by the Bidding Documents and furnishes the performance and payment bonds, evidence of insurance and other documents that Principal is required to submit under the terms of the Bidding Documents, then this obligation shall be null and void; otherwise, it shall remain in full force and effect and the sum guaranteed by this bond shall, at the option of County, be forfeited to County to pay all losses and damages suffered by County as a result thereof and permitted by applicable law, including, without limitation, the difference between the Bid Amount and amount for which the County may legally contract with another party to perform the Work (if such latter amount be greater than the Bid Amount), costs of publication, and all other losses and damages suffered by County (including, without limitation, those associated with delay to the Project); provided, however, that Surety's liability shall not exceed the penal amount of this bond.

Surety, for value received, hereby agrees that no change, extension of time, alteration or addition to the terms of the Contract or the Bidding Documents, or to the work to be performed thereunder, nor any withdrawal of the Bid in a manner not permitted by the requirements of the Bidding Documents shall in any way

CALIFORNIA ALL-PURPOSE ACKNOWLEDGEMENT

Civil Code § 1189

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfullness, accuracy or validity of that document.

State of Colorado

County of Arapahoe

On 4/26/2017 (Date) before me, Lee Anne Meaux (Name and Title of Notary), Notary Public

personally appeared Susan J. Lattarulo (Name and or Names of Signer(s))

Who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

Witness my hand and official seal.

Signature _____ (Notary Public Signature)

LEE ANNE MEAUX
NOTARY PUBLIC
STATE OF COLORADO
NOTARY ID 20144031508
MY COMMISSION EXPIRES AUGUST 12, 2018

Place Notary Public Seal Above

OPTIONAL

Though the information below is not required by law, it may prove valuable to the persons relying on the document and could prevent fraudulent removal and reattachment of this form to another document.

Description of Attached Document

Title or Type of Document _____

Document Date _____ Number of Pages: _____

Signer's Name: _____

☐ Individual
☐ Corporate Officer – Title(s):_____
☐ Partner - ☐ Limited ☐ General
☐ Guardian or Conservator
☒ Attorney-in-Fact
☐ Trustee
☐ Other: _____
Signer is representing _____

RIGHT THUMBPRINT OF SIGNER
Top of thumb

☐ Individual
☐ Corporate Officer – Title(s):_____
☐ Partner - ☐ Limited ☐ General
☐ Guardian or Conservator
☐ Attorney-in-Fact
☐ Trustee
☐ Other: _____
Signer is representing _____

RIGHT THUMBPRINT OF SIGNER
Top of thumb

POWER OF ATTORNEY

Direct Inquiries/Claims to:
THE HARTFORD
BOND, T-12
One Hartford Plaza
Hartford, Connecticut 06155
Bond.Claims@thehartford.com
call: **888-266-3488** *or fax:* **860-757-5835**

Agency Name: HOLMES MURPHY AND ASSOC LLC
Agency Code: 34-346205

KNOW ALL PERSONS BY THESE PRESENTS THAT:

- [X] **Hartford Fire Insurance Company**, a corporation duly organized under the laws of the State of Connecticut
- [X] **Hartford Casualty Insurance Company**, a corporation duly organized under the laws of the State of Indiana
- [X] **Hartford Accident and Indemnity Company**, a corporation duly organized under the laws of the State of Connecticut
- [ ] **Hartford Underwriters Insurance Company**, a corporation duly organized under the laws of the State of Connecticut
- [ ] **Twin City Fire Insurance Company**, a corporation duly organized under the laws of the State of Indiana
- [ ] **Hartford Insurance Company of Illinois**, a corporation duly organized under the laws of the State of Illinois
- [ ] **Hartford Insurance Company of the Midwest**, a corporation duly organized under the laws of the State of Indiana
- [ ] **Hartford Insurance Company of the Southeast**, a corporation duly organized under the laws of the State of Florida

having their home office in Hartford, Connecticut, (hereinafter collectively referred to as the "Companies") do hereby make, constitute and appoint, ***up to the amount of*** Unlimited :

Florietta Acosta, Don Appleby, Todd Bengford, Sarah Brown, Susan J. Lattarulo, Mark Sweigart
of GREENWOOD VILLAGE, Colorado

their true and lawful Attorney(s)-in-Fact, each in their separate capacity if more than one is named above, to sign its name as surety(ies) only as delineated above by ☒, and to execute, seal and acknowledge any and all bonds, undertakings, contracts and other written instruments in the nature thereof, on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

In Witness Whereof, and as authorized by a Resolution of the Board of Directors of the Companies on May 6, 2015 the Companies have caused these presents to be signed by its Senior Vice President and its corporate seals to be hereto affixed, duly attested by its Assistant Secretary. Further, pursuant to Resolution of the Board of Directors of the Companies, the Companies hereby unambiguously affirm that they are and will be bound by any mechanically applied signatures applied to this Power of Attorney.

John Gray, Assistant Secretary

M. Ross Fisher, Senior Vice President

STATE OF CONNECTICUT
COUNTY OF HARTFORD } ss. Hartford

On this 11th day of January, 2016, before me personally came M. Ross Fisher, to me known, who being by me duly sworn, did depose and say: that he resides in the County of Hartford, State of Connecticut; that he is the Senior Vice President of the Companies, the corporations described in and which executed the above instrument; that he knows the seals of the said corporations; that the seals affixed to the said instrument are such corporate seals; that they were so affixed by authority of the Boards of Directors of said corporations and that he signed his name thereto by like authority.

Nora M. Stranko
Notary Public
My Commission Expires March 31, 2018

CERTIFICATE

I, the undersigned, Assistant Vice President of the Companies, DO HEREBY CERTIFY that the above and foregoing is a true and correct copy of the Power of Attorney executed by said Companies, which is still in full force effective as of April 26, 2017

Signed and sealed at the City of Hartford.

Kevin Heckman, Assistant Vice President

BID SECURITY RECEIPT

The undersigned Bidder has submitted as Bid Security for its Bid in the form of (check appropriate box):

- ☒ Bid Bond executed by an Admitted Surety, made payable to the County of Riverside,
- ☐ cash,
- ☐ cashier's check payable to the order of the County of Riverside, or
- ☐ certified check payable to the order of the County of Riverside,

in the amount of Ten Percent of Amount Bid dollars/_____ cents ($ 10%), which amount is equal to ten percent (10%) of the Bidder's Bid Amount, as defined in the Instructions to Bidders.

Signature

ProWest PCM, Inc., dba ProWest Constructors
Print Name of Bidder

Randy Craig
Print Name of Signer

DESIGNATION OF SUBCONTRACTORS

In compliance with the Subletting and Subcontracting Fair Practices Act (Chapter 4, commencing at Section 4100, Division 2, Part 1 of the Public Contract Code of the State of California) and any amendments thereto ("Act"), Bidder sets forth below the information required by the Act for those Subcontractors who are required to be listed by Bidder pursuant to the provisions of the Act [Insert information requested. Attach additional sheets, if needed.]:

Portion of Work	Subcontractor Name	Subcontractor License	Location
2. Selective Demolition	Brickley	610414	San Bernardino
3. Infection Control	Brickley	610414	San Bernardino

Date: May 5, 2017

ProWest PCM, Inc., dba ProWest Constructors
(Name of Bidder)

By: _____
(Signature of Bidder)

Address: 22710 Palomar Street

Wildomar, CA 92595

Phone: (951) 678-1038

DESIGNATION OF SUBCONTRACTORS

In compliance with the Subletting and Subcontracting Fair Practices Act (Chapter 4, commencing at Section 4100, Division 2, Part 1 of the Public Contract Code of the State of California) and any amendments thereto ("Act"), Bidder sets forth below the information required by the Act for those Subcontractors who are required to be listed by Bidder pursuant to the provisions of the Act [Insert information requested. Attach additional sheets, if needed.]:

Portion of Work	Subcontractor Name	Subcontractor License	Location
4. Structural & Misc. Steel	Steel Connections	858267	Temecula
	ETS RC	891698	El Monte RC
6. Cabinets	ETS	891698	El Monte

Date: May 5, 2017

ProWest PCM, Inc., dba ProWest Constructors
(Name of Bidder)

By: _____
(Signature of Bidder)

Address: 22710 Palomar Street

Wildomar, CA 92595

Phone: (951) 678-1038

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Portion of Work	Subcontractor Name	Subcontractor License	Location
7. Solid Surface Countertops	In line 6		
10. Doors/Frames/Hardware/ Installation	CFO Doors	859157	Anaheim

Date: May 5, 2017

ProWest PCM, Inc., dba ProWest Constructors
(Name of Bidder)

By: _____
(Signature of Bidder)

Address: 22710 Palomar Street

Wildomar, CA 92595

Phone: (951) 678-1038