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BEING PLACED BEHIND OR IN TRIMS AND MOLDINGS. REFER SPECIAL CONDITIONS TO ARCHITECT PRIOR

18. EMERGENCY BATTERY PACKS SHALL BE CONNECTED SO AS TO BE ABLE TO OPERATE IN THE TEST MODE WHEN THE NORMAL SWITCH LEG IS TURNED ON, AND SHALL ILLUMINATE ONE FIXTURE LAMP

19. THE ELECTRICAL CONTRACTOR SHALL RUN BRANCH CIRCUITS IN A NEAT AND WORKMANLIKE MANNER SO AS TO CONSERVE OPEN SPACES AS MUCH AS POSSIBLE. HVAC DUCTWORK AND PLUMBING SHALL

20. THE CONTRACTOR SHALL PROVIDE A WIRE MESH COVER OVER ALL RECESSED LIGHTS TO KEEP BLOWN IN INSULATION AT LEAST THREE INCHES AWAY FROM THE FIXTURE HOUSING.

21. THE CLARITY OF RECORD DRAWING CHANGES MADE BY THE CONTRACTOR SHALL BE EQUAL TO THE ORIGINAL DRAWINGS AS JUDGED BY THE ARCHITECT OR THE RECORD SET WILL BE RETURNED TO THE

22. ALL CONVENIENCE OUTLETS MUST BE MOUNTED FLUSH WITH THE COVER PLATE AND SECURED FIRMLY

23. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE TO REVIEW ALL SWITCH LOCATIONS WITH THE GENERAL CONTRACTOR PRIOR TO ROUGH-IN TO PREVENT ANY SWITCHES FROM BEING LOCATED ON

24. THE BOTTOM OF WALL MOUNTED FIXTURES MUST BE A MINIMUM OF 6'-8" AFF UNLESS FIXTURES ARE

25. PROVIDE AN INSULATED EQUIPMENT GROUNDING CONDUCTOR IN ALL SERVICE, FEEDER, AND BRANCH

26. PROVIDE A NEUTRAL CONDUCTOR FOR EACH BREAKER TRIP HANDLE. NEUTRALS SHALL NOT BE

27. ALL CIRCUITS TO BE MINIMUM #12 CU IN MINIMUM 3/4" CONDUIT UNLESS OTHERWISE NOTED. 28. MC CABLE IS AN APPROVED ALTERNATE TO CONDUCTORS IN CONDUIT FOR CONCEALED WIRING

29. DO NOT INSTALL MORE THAN THREE PHASE CONDUCTORS IN ANY HOME-RUN CONDUITS UNLESS

30. WHERE THERE ARE CONFLICTS IN THE DRAWINGS AND/OR SPECIFICATIONS THE CONTRACTOR SHALL NOTIFY THE ARCHITECT/ENGINEER PRIOR TO BID. WHERE NO NOTIFICATION IS GIVEN THE MORE STRINGENT INTERPRETATION (GENERALLY INTERPRETED TO BE THE MORE COSTLY) WILL BE

GENERAL DIAGRAM NOTES

ALL INSTALLATIONS TO COMPLY WITH TIA/EIA STANDARD 586B FOR CAT 6 CABLE. ALL RACEWAYS, BACK BOXES, GUTTERS, WALL RACKS BY CONTRACTOR. ALL STATION

OUTLETS, ASSOCIATED CABLING, PUNCH BLOCKS, PATCH PANELS, CROSS CONNECTS AND

CONTRACTOR SHALL TEST ALL COPPER RUNS TO VERIFY dB LOSSES AND SHALL PROVIDE

PROVIDE WIDE-SWEEP BENDS FOR ALL CONDUITS.

PROVIDE CONNECTORS WITH INSULATED THROATS OR PLASTIC BUSHINGS ON ALL

○ DIAGRAM KEYED NOTES

PROVIDE 1.5" CONDUIT FROM CONCESSION BUILDING TO NEW PRESSBOX.

. PROVIDE 19" 4U WALL MOUNT NETWORK/DVR DATA CABINET BLACK ENCLOSURE (CNAWEB.COM CNA# 604956 OR EQUIVALENT WITH OWNER'S IT REP APPROVAL).

. PROVIDE ELECTRICALLY BONDED RACEWAY SYSTEM - BOND COMM DEVICE CONDUITS TO

. (3) DATA JACKS WITH (1) CAT 6 CABLE PER JACK FROM DATA RACK TO EACH COMPLETELY FILLED TRIANGLE OUTLET SHOWN ON FLOOR PLANS. WHERE OUTLETS HAVE A NUMERICAL SUPERSCRIPT, "X" INDICATES QUANTITY OF JACKS AND CABLES WHERE "X" IS

. (2) DATA JACKS WITH (1) CAT 6 CABLE PER JACK FROM DATA RACK TO EACH HALF-FILLED TRIANGLE OUTLET SHOWN ON FLOOR PLANS. CABLE BY OWNER.

(1)DATA JACK WITH (1)CAT 6 CABLE FROM DATA RACK TO EACH EMPTY TRIANGLE OUTLET SHOWN ON FLOOR PLANS. CABLES BY OWNER.

(2)F-CONNECTORS WITH (2)RG-6 COAX CABLES FROM TV DISTRIBUTION TO EACH TV

. PROVIDE 5" SQ x 2-7/8"D J-BOX WITH 1-GANG 5/8"D MUD-RING FOR OUTLETS. SEE POWER SHEET, FOR LOCATIONS AND COUNTS. TV OUTLETS SHOWN ADJACENT TO COMM OUTLETS ON FLOOR PLAN MAY BE COMBINED INTO THE SAME BOX/RACEWAY/FACEPLATE.

10. PROVIDE BLANK COVER ON EACH LOW VOLTAGE J-BOX.

1. PROVIDE SURGE SUPPRESSOR OUTLET IN ENCLOSURE CIRCUITED AS SHOWN ON E301. 2. PROVIDE 20"W X 8"H X6"D RECESSED GUTTER. LOCATE GUTTER BEHIND WALL RACK AND

3. PROVIDE NEMA 3R 12"X12"X6" JUNCTION BOX ON CONCESSION BUILDING. PROVIDE 1.25"

4. PROVIDE NEMA 3R 12"X12"X6" JUNCTION BOX ON CONCESSION BUILDING. PROVIDE 1.25" CONDUIT PATHWAY FROM JUNCTION BOX TO PRESS BOX. PROVIDE 1.25" PATHWAY FROM

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$\left(\begin{array}{c} X \\ X \\ X \\ X \\ \end{array} \right)$	DETAIL CALL-OUT; TOP "X" REFERS "XXX" REFERS TO SHEET NUMBER	S TO DETAIL N	NUMBER & BOTTOM		PANELBOA			E003 SPECIFICATION	S			- 3	 95 W Gol	lf Course Road
					METER / M		-	ES101 ELECTRICAL SI	E PLAN			- L \	Suite 102	<u>2</u>
<u> </u>							-	E101 ELECTRICAL PL	ANS TAILS & SCHEDULES			C	Logan, U	t 84321
	FIXTURES					CATIONS RACEWAY; OPEN D-RINGS OR J-HOOKS. SEE							office: (4	35) 787-1445
					DETAILS A	ND SPECIFICATIONS	-			ן ט		_	ax: 1-87 www.sin	7-207-3199 lesource.net
							-						, _	<u>_</u>
	EXITLIGHT: WALL - FACE(S) AS SH	OWN			TELEVISIO	N OUTLET (5" SQ x 2-7/8"D J-BOX; 1-GANG x 5/8"D	-				The design repre	sented by the	ese drawings	are, and shall remain the
					MUD-RING COMMUNI	; 1" CONDUIT; 1-RG-6 COAX BY OWNER) CATIONS OUTLET (5" SQ x 2-7/8"D J-BOX; 1-GANG x 5/8"D	-				property of Sine Engineering, LL represented t	Source Engine C retains tota v these drawi	eering, LLC a al ownership a ngs is sold to	and as such Sine Source and control. The design the client listed in the
					MUD-RING	; 1" CONDUIT; 1 CAT 6 CABLE BY OWNER) CATIONS OUTLET (5" SQ x 2-7/8"D J-BOX; 1-GANG x 5/8"D	-				titleblock Any other use	for a one time or reproduct	e use at the p ion must be	ropety indicated. permitted in writing by
					MUD-RING	; 1" CONDUIT; 2 CAT 6 CABLES BY OWNER) CATIONS OUTLET (5" SQ x 2-7/8"D J-BOX; 1-GANG x 5/8"D	-				CON		TA1	
Ю				X	MUD-RING	; 1" CONDUIT; 3 CAT 6 CABLES BY OWNER) CATIONS OUTLET (5" SQ x 2-7/8"D J-BOX; 1-GANG x 5/8"D	-					<u>501</u>		
	CONTROL				ELECTRON	; 1° CONDUIT; x CAT 6 CABLES BY OWNER)	-							
<u></u> \$ ^X	SINGLE POLE SWITCH: "X" INDICATI	FS SWITCH G	ROUP				-							
\$3	THREE WAY SWITCH			(E)UC	FXISTING		-							
\$3	FOUR WAY SWITCH			(E)UF	EXISTING		-							
↓ ↓	DIMMER SWITCH: LED: 600 W MININ	MUM		UF	UNDERGR		-					-01	FESSIO	
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 ⊕	DUPLEX OUTLET: GROUND FAULT	INTERRUPTEI	R		BRANCH P	ANEL WITH MAIN BREAKER	-				-			
 ⊕=	DUPLEX OUTLET: WEATHERPROOF	F-IN-USE COV	'ER	x x	FEEDER S	ZE (REFER TO CONDUIT AND CONDUCTOR SCHEDULE	-				(
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	LINEAR FIXTURE			4		ICATIONS OUTLET (5" SQ x 2-7/8"D J-BOX; 1-GANG x 5/8"D - 1" CONDUIT: 2 CAT 6 CABLE S BY OWNER)	-			Any other use or reproduction must b Source Engineering
77.0773	EMERGENCY FIXTURE			•		ICATIONS OUTLET (5" SQ x 2-7/8"D J-BOX; 1-GANG x 5/8"D - 1" CONDUIT: 3 CAT 6 CABLES BY OWNER)	-			CONSULTA
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AMPERE ALUMINU	INTERRUPTING CAPACITY	equip ex. exist	EQUIPMENT EXISTING		MLO MTD	MAIN LUGS ONLY MOUNTED	SW SWBD	SWITCH SWITCHBOARD		
ARCHITE	ICT(URAL)	FBO	FURNISHED BY OTHE	ERS		NATIONAL ELECTRICAL CODE	SWGR	SWITCH GEAR		
G AMERICA	AN WIRE GAUGE	FF	FINISHED FLOOR		NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION	TEMP	TEMPORARY		
G BUILDING D BACKBO/	j ARD	FLEX	FIXTURE FLEXIBLE METALLIC	CONDUIT (STEEL)	NEUT	NEUTRAL NATIONAL FIRE CODE	TWP	TELEPHONE TWISTED PAIR		MARK DATE
CONDUIT		Fluor Ft	FLUORESCENT FEET OR FOOT		NC NIC	NORMALLY CLOSED NOT IN CONTRACT	TWSP XFMR	TWISTED SHEILDED PAIR TRANSFORMER		PROJECT NUMBER:
	G/CATEGORY BREAKER	GFI GND	GROUND FAULT INTE	ERRUPTER	NL NO	NIGHT LITE NORMALLY OPEN	T-STAT			DATE:
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L EACH		LIG	LIGHTING		KM	KOOM		NEMA 3R or 4		

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SECT	ION 260500 - COMMON WORK RESULTS FOR ELECTRICAL		criteria.
1.1 A.	PERFORMANCE REQUIREMENTS Seismic Performance: Electrical equipment shall withstand the effects of earthquake motions determined according to SEI/ASCE 7.	B. C. D.	Raceway and Cable Supports: As described in NECA 1 and NECA 101. Conduit and Cable Support Devices: Steel and malleable-iron hangers, or types and sizes of raceway or cable to be supported. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36
	subjected to the seismic forces specified."	E.	galvanized. Mounting, Anchoring, and Attachment Components: Items for fastening
1.2 A.	QUALITY ASSURANCE Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.		 Surfaces include the following: Powder-Actuated Fasteners: Threaded-steel stud, for use in hardener with tension, shear, and pullout capacities appropriate for supported line in the state of the state
1.3 A. B.	SLEEVES FOR RACEWAYS AND CABLES Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends. Sleeves for Rectangular Openings: Galvanized sheet steel.		 Mechanical-Expansion Anchors: insert-wedge-type, stainless ste concrete with tension, shear, and pullout capacities appropriate for which used. Concrete Inserts: Steel or malleable-iron, slotted support system up
1.4 A.	SLEEVE SEALS Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.		 MFMA-4 or MSS SP-58. Clamps for Attachment to Steel Structural Elements: MSS SP-58, typ Through Bolts: Structural type, hex head, and high strength. Comply
	 Sealing Elements: EPDM or NBR interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable. Pressure Plates: Stainless steel. Include two for each sealing element. 	1.3	 Toggle Bolts: All-steel springhead type. Hanger Rods: Threaded steel. FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES
1.5	 Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element. ELECTRICAL ENCLOSURES 	A.	Description: Welded or bolted, structural-steel shapes, shop or field equipment.
A.	 Flush- and surface-mounted cabinets. Rated for environmental conditions at installed location. a. Indoor Dry and Clean Locations: NEMA 250, Type 1. 	1.4 A.	Comply with NECA 1 and NECA 101 for application of hangers and sup except if requirements in this Section are stricter.
	b. Outdoor Locations: NEMA 250, Type 3R.	1.5 A.	SUPPORT INSTALLATION Comply with NECA 1 and NECA 101 for installation requirements except a
	 d. Other Wet or Damp Indoor Locations: NEMA 250, Type 4. 	В.	Mounting and Anchorage of Surface-Mounted Equipment and Componer their supports to building structural elements by the following methods unle
1.6 Δ	COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION		 To Wood: Fasten with lag screws or through bolts. To No. 2 screws by the screws of through bolts.
В.	Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.		 To New Concrete: Boil to concrete inserts. To Masonry: Approved toggle-type bolts on hollow masonry units masonry units. To Existing Concrete: Expansion another factories.
C.	Right of Way: Give to piping systems installed at a required slope.		 For Existing Controller. Expansion and in tradition trademistic. Instead of expansion anchors, powder-actuated driven threaded stude to used in a subject actuated driven threaded stude to use the subject actuated drine t
1.7 A.	SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.		 be used in existing standard-weight concrete 4 incres thick of lightweight-aggregate concrete or for slabs less than 4 inches thick. To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, (MSS Tupp 10, 21, 23, 25 or 27) complying with MSS SP 60.
В. С.	Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall. Seal space outside of sleeves with grout for penetrations of concrete and masonry		 To Light Steel: Sheet metal screws. Items Mounted on Hollow Walls and Nonstructural Building Surfaces
D. E.	Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway and cable penetrations. Install sleeves and seal raceway and cable penetration sleeves with firestop materials. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units		switches, control enclosures, pull and junction boxes, transformers, attached to substrate by means that meet seismic-restraint strength a
1.8	applied in coordination with roofing work.	SECT	ION 260533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS
A.	Apply firestopping to penetrations of fire-rated floor and wall assemblies for electrical installations to restore original fire-resistance rating of assembly.	1.1 A.	METAL CONDUITS, TUBING, AND FITTINGS Listing and Labeling: Metal conduits, tubing, and fittings shall be listed qualified testing agency, and marked for intended location and application.
SECT	ION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES	В.	Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B. 1. Conduit Fittings for Hazardous (Classified) Locations: Comply with U
1.1 A. B.	CONDUCTORS AND CABLES Conductor Insulation: Comply with NEMA WC 70/ICEA S-95-658 for Type THHN-2-THWN-2 or Type XHHW-2. Multiconductor Cable: Comply with NEMA WC 70/ICEA S-95-658 for metal-clad cable, Type MC and Type SOW with		 2. Fittings for EMT: a. Material: Steel or die cast. b. Type: Setscrew or compression.
12		1.2	NONMETALLIC CONDUITS, TUBING, AND FITTINGS
т.2 А.	Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.	A. 1.3	Listing and Labeling: Nonmetallic conduits, tubing, and fittings shall be lisi qualified testing agency, and marked for intended location and application. METAL WIREWAYS AND AUXILIARY GUTTERS
1.3 A.	CONDUCTOR MATERIAL APPLICATIONS Feeders: Copper for feeders smaller than No. 4 AWG; copper or aluminum for feeders No. 4 AWG and larger.	A.	Description: Sheet metal, complying with UL 870 and NEMA 250, unless NFPA 70.
В. 1.4	Branch Circuits: Copper. CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS	В.	Fittings and Accessories: Include covers, couplings, offsets, elbows, ex end caps, and other fittings to match and mate with wireways as required f
A. B	Feeders: Type THHN-2-THWN-2 or Type XHHW-2, single conductors in raceway. Exposed Branch Circuits, Including in Crawlspaces: Type THHN-2-THWN-2, single conductors in raceway.	1.4	BOXES, ENCLOSURES, AND CABINETS
C.	Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-2-THWN-2, single conductors in raceway or Metal-clad cable, Type MC. Cord Drops and Portable Appliance Connections: Type SOW, hard service cord with stainless-steel, wire-mesh, strain	B.	Cast-Metal Outlet, Device, Pull, and Junction Boxes: Comply with NEMA
1 5	relief device at terminations to suit application.	о. D	with gasketed cover. Metal Floor Boxes:
1.5 A.	Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.	5.	1. Material: sheet metal.
B.	Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.		 Type: Fully adjustable. Shape: Rectangular. Listing and Labeling: Metal floor boxes shall be listed and labeled a
C. D.	Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible. Support cables according to Section 260529 "Hangers and Supports for Electrical Systems."	E.	agency, and marked for intended location and application. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, with cor otherwise indicated.
1.6	CONNECTIONS Make splices, terminations, and taps that are compatible with conductor material	1.5 A	HANDHOLES AND BOXES FOR EXTERIOR UNDERGROUND WIRING General Requirements for Handholes and Boxes:
A. B.	 Use oxide inhibitor in each splice, termination, and tap for aluminum conductors. Wiring at Outlets: Install conductor at each outlet, with at least 12 inches of slack. 	Λ.	 Boxes and handholes for use in underground systems shall be desi for intended location and application. Boxes installed in wet gross shall be listed and labeled as defined in
1.7 Д	IDENTIFICATION Identify and color-code conductors and cables according to Section 260553 "Identification for Electrical Systems "	r	 DOARS INStalled IN Wet areas shall be listed and labeled as defined in marked for intended location and application. Polymor Concrete Handheles and Daves with Delymor Concrete Handheles and Daves with Delymort Concrete Handheles.
SECT	ION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS	В.	together with polymer resin, and reinforced with steel, fiberglass, or a comb 1. Cover Legend: Molded lettering. "ELECTRIC.".
1.1	CONDUCTORS	1.6	RACEWAY APPLICATION
A.	Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction. Bare Copper Conductors:	A.	Outdoors: Apply raceway products as specified below unless otherwise in 1. Above-grade: GRC.
U.	1 Solid Conductors: ASTM B 3		2. Underground Conduit: KNC, Type EPC-40-PVC or Type EPC-80-PV

- 2. Stranded Conductors: ASTM B 8.
- 3. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.

B

D

- 2 CONNECTORS
- A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for
- specific types, sizes, and combinations of conductors and other items connected. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.
- GROUNDING ELECTRODES
- A. Ground Rods: Copper-clad Zinc-coated steel; 3/4 inch by 10 feet in diameter.
- 4 APPLICATIONS
- 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.
- B. Conductor Terminations and Connections:
- 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors. 2. Connections to Ground Rods: Bolted connectors.
- 3. Connections to Structural Steel: Welded connectors.
- EQUIPMENT GROUNDING
- Install insulated equipment grounding conductors with all service, feeder, and branch circuits, in addition to those required by NFPA 70:
- INSTALLATION
- A. Ground Rods: Drive rods until tops are 2 inches below finished floor or final grade unless otherwise indicated. B. 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 bonding so vibration is not transmitted to rigidly Mounted Equipment

SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

- PERFORMANCE REQUIREMENTS
- A. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
- B. 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. SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS
- A. Steel Slotted Support Systems with galvanized metallic coatings and channel dimensions selected for applicable load

- clamps, and a
- 6M, steel plate a electrical iter
- ned portland ce l loads and bui
- teel, for use i supported I
- units similar to vpe suitable for
- y with ASTM A
- fabricated t
- upports for electron
- as specified in
- ents: Anchor a less otherwise
- ds provided wi greater. [
- l, with lock was
- Mount cabi s, and other dev and anchorage
- and labeled
- 886 and NF
- isted and labele
- s otherwise in
- xpansion joint for complete s
- enclosures
- A OS 1 and UL
- A FB 1, ferrou
- as defined in ntinuous-hinge
- signed and ide
- NFPA 70, by
- Molded o bination of the
- dicated:
- /C where rea 3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pne Motor-Driven Equipment): LFMC.
- 4. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.
- B. Indoors: Apply raceway products as specified below unless otherwise indicated.
- 1. Exposed, Not Subject to Physical Damage: EMT.
- 2. Exposed and Subject to Physical Damage: GRC. 3. Concealed in Ceilings and Interior Walls and Partitions: EMT.
- 4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pne
- Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations. 5. Damp or Wet Locations: GRC.
- 6. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4 stair commercial kitchens and damp or wet locations.
- Minimum Raceway Size: 3/4-inch trade size. D. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth.
- 1.7 INSTALLATION
- A. Comply with NECA 1 and NECA 101 for installation requirements except where require article are stricter. Comply with NECA 102 for aluminum conduits. Comply with NFI raceways allowed in specific occupancies and number of floors.
- Raceways Embedded in Slabs: Change from RNC to wrapped, GRC before rising above floor.
- Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways where required by NFPA 70: D. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority
- to ADA requirements. Install boxes with height measured to top of box unless otherwise indicated.
- E. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel. F. Locate boxes so that cover or plate will not span different building finishes.
- G. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.
- H. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits. I. Set metal floor boxes level and flush with finished floor surface.
- 1.8 INSTALLATION OF UNDERGROUND CONDUIT A. Direct-Buried Conduit:
- 1. Excavate trench bottom to provide firm and uniform support for conduit.
- 2. Install backfill 3. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances
- through floor. a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches
- of concrete for a minimum of 12 inches on each side of the coupling. b. For stub-ups at equipment mounted on outdoor concrete bases and where conduits penetrate building
- foundations, extend steel conduit horizontally a minimum of 60 inches from edge of foundation or equipment base. Install insulated grounding bushings on terminations at equipment.

A

	3	l 4
	SPECIFICATIONS	
	4 Underground Warning Tape: Comply with requirements in Section 260553 "Identification for Electrical Systems."	1 Light-Level Monitoring Range: 1.5 to 10 fc. with an adjustment for turn-on and turn-off levels within that range
amps, and associated fittings, designed for	1.9 INSTALLATION OF UNDERGROUND HANDHOLES AND BOXES	 Time Delay: Thirty-second minimum, to prevent false operation. Lightning Arrester: Air gap type
A steel plates shapes and bars black and	A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting conduits to minimize bends and deflections required for proper entrances.	 Lighting Arester. All-gap type. Mounting: Twist lock complying with NEMA C136.10, with base.
alostrical items or their supports to building	B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.	1.3 INDOOR OCCUPANCY SENSORS A General Requirements for Sensors: Wall- or ceiling-mounted, solid-state indoor occupancy sensors with a senarate
	C. Elevation: In paved areas, set so cover surface will be flush with finished grade. Set covers of other enclosures 1 inch above finished grade.	power pack.
d portland cement concrete, steel, or wood, bads and building materials where used.	SECTION 260548 - VIBRATION AND SEISMIC CONTROLS FOR ELECTRICAL SYSTEMS	 Operation: Oness otherwise indicated, turn lights off, adjustable over a minimum range of 1 to 15 minutes. Senser Output: Contents rated to apporte the connected rate, completing with ULL 7720. Senser is powered
el, for use in hardened portland cement supported loads and building materials in	1.1 PERFORMANCE REQUIREMENTS A. Seismic-Restraint Loading:	 Sensor Output: Contacts rated to operate the connected relay, complying with OL 775A. Sensor is powered from the power pack. Development Provide the sense of the
its similar to MSS Type 18; complying with	 Site Class as Defined in the IBC: D. Assigned Seismic Use Group or Building Category as Defined in the IBC: III. 	 Power Pack: Dry contacts rated for 20-A ballast load at 120- and 277-V ac, for 13-A tungsten at 120-V ac, and for 1 hp at 120-V ac. Sensor has 24-V dc, 150-mA, Class 2 power source, as defined by NFPA 70.
e suitable for attached structural element.	a. Component Importance Factor:	 Indicator: Digital display, to show when motion is detected during testing and normal operation of sensor. Bypass Switch: Override the "on" function in case of sensor failure.
with ASTM A 325.	2) Life Safety (EM): 1.5	 Automatic Light-Level Sensor: Adjustable from 2 to 200 fc; turn lights off when selected lighting level is present. PIR Type: Ceiling mounted; detect occupants in coverage area by their heat and movement.
	b. Component Response Modification Factor:1) Fixtures: 1.0	1. Detector Sensitivity: Detect occurrences of 6-inch- minimum movement of any portion of a human body that presents a target of not less than 36 sg. in.
fabricated to fit dimensions of supported	 Equipment: 2.5 Conduit and Cables: 5.0. 	 Detection Coverage (Room): Detect occupancy anywhere in a circular area of 1000 sq. ft. when mounted on a 96-inch- high ceiling.
	 c. Component Amplification Factor: 2.5. 3. Design Spectral Response Acceleration at Short Periods (0.2 Second): 173% 	 Detection Coverage (Corridor): Detect occupancy within 90 feet when mounted on a 10-foot- high ceiling. Duel Technology Type: Ceiling mounted; detect occupancy in coverage cross using BIR and ultraspic detection.
ports for electrical equipment and systems	 Design Opectral Response Acceleration at 1.0-Second Period: 76%. 	methods. The particular technology or combination of technologies that control on-off functions is selectable in the field by coesting control on units of technologies.
	1.2 SEISMIC-RESTRAINT DEVICESA. General Requirements for Restraint Components: Rated strengths, features, and application requirements shall be as	 Sensitivity Adjustment: Separate for each sensing technology.
s specified in this Article.	defined in reports by an agency acceptable to authorities having jurisdiction.	 Detector Sensitivity: Detect occurrences of 6-inch- minimum movement of any portion of a human body that presents a target of not less than 36 sq. in., and detect a person of average size and weight moving not less than
ss otherwise indicated by code:	four times the maximum seismic forces to which they will be subjected.	 12 inches in either a horizontal or a vertical manner at an approximate speed of 12 inches/s. Detection Coverage (Standard Room): Detect occupancy anywhere within a circular area of 1000 sq. ft. when
	b. Restant cables. Acrim A dos gavanzed steel cables with end connectors made of steel assembles with timbles, brackets, swivels, and bolts designed for restraining cable service; and with a minimum of two clamping bolts for cable engagement	mounted on a 96-inch- high ceiling.
and expansion anchor fasteners on solid	C. Mechanical Anchor: Drilled-in and stud-wedge or female-wedge type in zinc-coated steel for interior applications and staipless steel for exterior applications. Select anchors with strength required for anchor and as tested according to	A. General Requirements for Sensors: Automatic-wall-switch occupancy sensor, suitable for mounting in a single gang
s provided with lock washers and nuts may	Astronomic	 Operating Ambient Conditions: Dry interior conditions, 32 to 120 deg F.
greater. Do not use for anchorage to	D. 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 steal for interior applications and steiplose steal for exterior applications. Solid applys holts with strength required for	 Switch Rating: Not less than 800-VA fluorescent at 120 V, 1200-VA fluorescent at 277 V, and 800-W incandescent.
with lock washers and nuts or Beam clamps	anchor and as tested according to ASTM E 488.	1.5 INSTALLATION A Install and aim sensors in locations to achieve not less than 90 percent coverage of areas indicated. Do not exceed
· Mount cabinets, nanelhoards, disconnect	 APPLICATIONS A. Strength of Support and Seismic-Restraint Assemblies: Where not indicated, select sizes of components so strength 	 A. Install and and sensors in locations to achieve not less than so percent coverage of aleas indicated. Do not exceed coverage limits specified in manufacturer's written instructions. D. Occurrence: Adjustmentation within 12 mentals from data of Substantial Completion, provide on eiter
and other devices on slotted-channel racks	will be adequate to carry present and future static and seismic loads within specified loading limits.	B. Occupancy Adjustments: When requested within 12 months from date of Substantial Completion, provide on-site assistance in adjusting sensors to suit actual occupied conditions. Provide up to two visits to Project during other than normal accupancy hours for this nurses.
	1.4 SEISMIC-RESTRAINT DEVICE INSTALLATIONA. Install bushing assemblies for mounting bolts for wall-mounted equipment, arranged to provide resilient media where	1. For occupancy and motion sensors, verify operation at outer limits of detector range. Set time delay to suit
	equipment or equipment-mounting channels are attached to wall. B. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at	C. Identify components and power and control wiring according to Section 260553 "Identification for Electrical Systems."
and labeled as defined in NEPA 70, by a	upper truss chords of bar joists, or at concrete members. C. Drilled-in Anchors:	1.6 FIELD QUALITY CONTROL A Perform the following tests and inspections:
and labeled as defined in NrTA 70, by a	 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 	 Operational Test: After installing time switches and sensors, and after electrical circuitry has been energized,
_ 886 and NFPA 70.	or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.	 Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
	 Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be 	
	 Wedge Alchols: I rolect threads from damage during alchol installation. Theavy-duty sleeve alchols shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened. Adhesive Archorst, Clean heles to remain leave material and drilling dust prior to installation. Place 	SECTION 262416 - PANELBOARDS
ed and labeled as defined in NFPA 70, by a	 Adhesive Anchols: Clean holes to remove loose material and dhilling dust phot 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 peakets in the adhesive. 	A. Product Data: For each type of product indicated.
	 Set anchors to manufacturer's recommended torque, using a torque wrench. 	 B. Shop Drawings: For each panelboard and related equipment. 1.2 OLIALITY ASSUBANCE
otherwise indicated, and sized according to	 Install zinc-coated steel anchors for interior and stainless-steel anchors for exterior applications. ADJUSTING 	A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a
pansion joints, adapters, hold-down straps,	 A. Adjust isolators after isolated equipment is at operating weight. A divist limit stops on restrained spring isolators to mount equipment at normal operating height. After equipment 	1.3 GENERAL REQUIREMENTS FOR PANELBOARDS
n complete system.	B. Adjust limit stops on restance spring isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so they are out of contact during normal operation.	A. Fabricate and test panelboards according to IEEE 344 to withstand seismic forces defined in Section 260548 "Vibration and Seismic Controls for Electrical Systems."
enclosures, and cabinets installed in wet	 Adjust active height of spring isolators. D. Adjust restraints to permit free movement of equipment within normal mode of operation. 	 B. Enclosures: Flush- and surface-mounted cabinets. 1 Pated for environmental conditions at installed location
OS 1 and UL 514A. FB 1_ferrous alloy or aluminum_Type FD		 Raced for environmental conditions at instance location. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions for fluck means to fluck accurate here.
	SECTION 260553 IDENTIFICATION FOR ELECTRICAL SYSTEMS	 Directory Card: Inside panelboard door, mounted in transparent card holder.
	A. Location: Install identification materials and devices at locations for most convenient viewing without interference with	C. Phase, Neutral, and Ground Buses: Tin-plated aluminum or Hard-drawn copper, 98 percent conductivity.
	operation and maintenance of equipment. B. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location	 D. Conductor Connectors: Suitable for use with conductor material and sizes. 1. Material: Tin-plated aluminum or Hard-drawn copper, 98 percent conductivity.
s defined in NFPA 70, by a qualified testing	and substrate. C. System Identification Color-Coding Bands for Raceways and Cables: Each color-coding band shall completely	 Mechanical type. Subfeed (Double) Lugs: Mechanical type suitable for use with conductor material. Locate at
tinuous-hinge cover with flush latch unless	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 maximum intervals in straight runs, and at 25-foot	same end of bus as incoming lugs or main device. E Service Equipment Label: NRTL labeled for use as service equipment for panelboards with one or
	maximum intervals in congested areas. D. Underground-Line Warning Tape: During backfilling of trenches install continuous underground-line warning tape	 E. Survice Equipment Earth and it is as a set the equipment of panetosta as with one of more main service disconnecting and overcurrent protective devices. E. Future Devices: Mounting brackets bus connections filler plates and necessary appurtenances.
gned and identified as defined in NFPA 70,	directly above line at 6 to 8 inches below finished grade. Use multiple tapes where width of multiple lines installed in a common trenchexceeds 16 inches overall.	 required for future installation of devices. C Developed Short Circuit Current Deting. Fully reted to intermut summatricel short circuit summatrices.
NFPA 70, by a qualified testing agency, and	1.2 IDENTIFICATION SCHEDULE	G. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals.
: Molded of sand and aggregate, bound	 A. Power-circuit conductor identification, occ v or Less. For conductors in vadits, pull and junction boxes, mannoles, and handholes, use color-coding conductor tape to identify the phase. A. Ocla Oction for the phase of the p	1.4 DISTRIBUTION PANELBOARDSA. Panelboards: NEMA PB 1, power and feeder distribution type.
ination of the two.	 Color-Coding for Phase Identification, 600 V or Less: Use colors listed below for ungrounded service feeder and branch-circuit conductors. 	B. Doors: Secured with vault-type latch with tumbler lock; keyed alike.
	 Color shall be factory applied or field applied for sizes larger than No. 8 AWG, if authorities having jurisdiction permit. 	Plug-in or Bolt-on circuit breakers.
licated:	b. Colors for 120/240-V Circuits:1) Phase A: Black	D. Branch Overcurrent Protective Devices: For Circuit-Breaker Frame Sizes Larger Than 125 A: Bolt-on circuit breakers; plug-in circuit breakers where individual positive-locking device requires
C where required by utility. lydraulic, Pneumatic, Electric Solenoid, or	 Phase B: Red Neutral: White with colored stripe to match associated phase 	1.5 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS
	4) Ground: Green with continuous vellow strip	 A. Panelboards: NEMA PB 1, lighting and appliance branch-circuit type. B. Branch Overcurrent Protective Devices: Plug-in or Bolt-on circuit breakers, replaceable without
ated.	 c. Color shall be factory applied or field applied for sizes larger than No. 8 AWG, if authorities having invited interview. 	 B. Branen Overentent Protective Devices. Flug-in of Bort-on encut breakers, replacease without disturbing adjacent units. C. Contratory in Main Dury, NEMA ICS 2, Class A, plastically, an machanically, held as anothing to the second instance of the s
	d. Colors for 277/480-V Circuits:	c. Contactors in Main Bus: NEMA ICS 2, Class A, electrically or mechanically held as coordinated with fuel dispenser supplierd, general-purpose controller, with same short-circuit interrupting rating as nonelboard
lydraulic, Pneumatic, Electric Solenoid, or	 Phase A: Match Existing Phase B: Match Existing 	 External Control-Power Source: As required by fuel dispenser vendor .
ations.	3) Phase C: Match Existing4) Neutral: Grav with colored stripe to match associated phase	 D. Doors: Concealed hinges; secured with flush latch with tumbler lock; keyed alike. DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES
, Type 4 stainless steel in institutional and	5) Ground: Green B. Auxilian Electrical Systems Conductor Identifications Identific fold installed electric control and investigations	A. Molded-Case Circuit Breaker (MCCB): Comply with UL 489, with interrupting capacity to meet
or earth	 Auxiliary Electrical Systems Conductor identification: identify field-installed alarm, control, and signal connections. C. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control withing and entired fiber only. 	 Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and
o, ourai.	control wiring and optical fiber cable.D. Workspace Indication: Install floor marking tape to show working clearances in the direction of access to live parts.	instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
where requirements on Drawings or in this mply with NFPA 70 limitations for types of	Workspace shall be as required by NFPA 70 and 29 CFR 1926.403 unless otherwise indicated. Do not install at flush-mounted panelboards and similar equipment in finished spaces.	2. GFCI Circuit Breakers: Single- and two-pole configurations with Class A ground-fault protection (6-mA trip).
	E. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Self-adhesive warning labels.	3. Ground-Fault Equipment Protection (GFEP) Circuit Breakers: Class B ground-fault protection

- BRANCH-CIRCUIT PANELBOARDS g and appliance branch-circuit type.
- ICS 2, Class A, electrically or mechanically held as coordinated
- eral-purpose controller, with same short-circuit interrupting rating
- I with flush latch with tumbler lock; keyed alike.
- CCB): Comply with UL 489, with interrupting capacity to meet eakers: Inverse time-current element for low-level overloads, and
- element for short circuits. Adjustable magnetic trip setting for) A and larger. ingle- and two-pole configurations with Class A ground-fault
- 3. Ground-Fault Equipment Protection (GFEP) Circuit Breakers: Class B ground-fault protection (30-mA trip).
- a. Standard frame sizes, trip ratings, and number of poles. b. Lugs: Mechanical style, suitable for number, size, trip ratings, and conductor materials. c. Application Listing: Appropriate for application; Type SWD for switching fluorescent
- lighting loads; Type HID for feeding fluorescent and high-intensity discharge (HID) lighting
- d. Shunt Trip: 120 or 24-V (per system requirements) trip coil energized from separate circuit, set to trip at 75 percent of rated voltage. e. Handle Padlocking Device: Fixed attachment, for locking circuit-breaker handle in on or
- off position.
- 1.7 INSTALLATION A. Comply with mounting and anchoring requirements specified in Section 260548 "Vibration and Seismic Controls for Electrical Systems."
- B. Mount panelboard cabinet plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.
- C. Install overcurrent protective devices and controllers not already factory installed.
- D. Install filler plates in unused spaces.
- E. Arrange conductors in gutters into groups and bundle and wrap with wire ties.
- F. Comply with NECA 1.
- 1.8 IDENTIFICATION

A. Description: Solid state, with SPST dry contacts rated for 1800 VA, to operate connected load, complying with UL 773.

1. Identify system voltage with black letters on an orange background.

3. Install arc-flash hazard warning for equipment likely to be examined while energized.

a. Indoor Equipment: Self-adhesive, engraved, laminated acrylic or melamine label.

fasteners that do not change the NEMA or NRTL rating of the enclosure.

b. Outdoor Equipment: Engraved, laminated acrylic or melamine label.

F. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with

wiring diagrams, schedules, and the 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

c. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.

d. Unless provided with self-adhesive means of attachment, fasten labels with appropriate mechanical

2. Apply to exterior of door, cover, or other access.

equipment is provided with its own identification.

1. Labeling Instructions:

SECTION 260923 - LIGHTING CONTROL DEVICES

A. Product Data: For each type of product.

1.2 OUTDOOR PHOTOELECTRIC SWITCHES

B. Operation and maintenance data

1.1 SUBMITTALS

1. Set field-adjustable, circuit-breaker trip ranges.

- ime switches and sensors, and after electrical circuitry has been energized,
- s. Replace damaged and malfunctioning controls and equipment.
- duct indicated.
- ard and related equipment.
- nd Accessories: Listed and labeled as defined in NFPA 70, by a ked for intended location and application.
- OR PANELBOARDS according to IEEE 344 to withstand seismic forces defined in smic Controls for Electrical Systems."
- ounted cabinets.
- tions at installed location. concealed trim clamps. For surface-mounted fronts, match box fronts, overlap box
- oard door, mounted in transparent card holder.
- uses: Tin-plated aluminum or Hard-drawn copper, 98 percent
- or use with conductor material and sizes.
- m or Hard-drawn copper, 98 percent conductivity.
- chanical type suitable for use with conductor material. Locate at ugs or main device.
- labeled for use as service equipment for panelboards with one or and overcurrent protective devices.
- kets, bus connections, filler plates, and necessary appurtenances
- Rating: Fully rated to interrupt symmetrical short-circuit current
- and feeder distribution type. atch with tumbler lock; keyed alike.
 - Devices: For Circuit-Breaker Frame Sizes 125 A and Smaller: Devices: For Circuit-Breaker Frame Sizes Larger Than 125 A: circuit breakers where individual positive-locking device requires

 - evices: Plug-in or Bolt-on circuit breakers, replaceable without
 - ce: As required by fuel dispenser vendor .

 - CURRENT PROTECTIVE DEVICES

- A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs complying with Section 260553 "Identification for Electrical Systems."
- B. Create a directory to indicate installed circuit loads and incorporating Owner's final room designations. Obtain approval before installing. Use a computer or typewriter to create directory; handwritten directories are not acceptable.
- C. Panelboard Nameplates: Label each panelboard with a nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems.
- D. Device Nameplates: Label each branch circuit device in distribution panelboards with a nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
- SECTION 262213 LOW-VOLTAGE DISTRIBUTION TRANSFORMERS

1.1 SUBMITTALS

- A. Product Data: For each type of product
- B. Shop Drawings:
- 1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection. 2. Vibration Isolation Base Details: Detail fabrication including anchorages and attachments to structure and to
- supported equipment.
- 3. Include diagrams for power, signal, and control wiring. C. Seismic Qualification Data: Certificates, for transformers, accessories, and components, from manufacturer.
- D. Field quality-control reports.
- E. Operation and maintenance data.
- 2.1 MANUFACTURERS
- A. <u>Manufacturers:</u> Subject to compliance with requirements, provide products by one of the following: 1. <u>Acme Electric Corporation</u>.
- 2. Eaton.
- 3. Federal Pacific.
- 4. General Electric Company. 5. <u>Hammond Power Solutions Inc.</u>
- 6. SIEMENS Industry, Inc.; Energy Management Division.
- 7. Square D; by Schneider Electric.
- 2.2 PERFORMANCE REQUIREMENTS
- A. Seismic Performance: Transformers shall withstand the effects of earthquake motions determined according to ASCE/SEI 7. 1. The term "withstand" means "the transformer will remain in place without separation of any parts when subjected
- to the seismic forces specified."
- 2.3 GENERAL TRANSFORMER REQUIREMENTS A. Description: Factory-assembled and -tested, air-cooled units for 60-Hz service.

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

- C. Transformers Rated 15 kVA and Larger: 1. Comply with 10 CFR 431 (DOE 2016) efficiency levels.
- 2. Marked as compliant with DOE 2016 efficiency levels by an NRTL.
- D. Encapsulation: Transformers smaller than 30 kVA shall have core and coils completely resin encapsulated.
- E. Cores: Electrical grade, non-aging silicon steel with high permeability and low hysteresis losses.
- F. Coils: Continuous windings without splices except for taps.
- 1. Coil Material: Copper. 2. Internal Coil Connections: Brazed or pressure type.
- 3. Terminal Connections: Bolted.
- G. Shipping Restraints: Paint or otherwise color-code bolts, wedges, blocks, and other restraints that are to be removed after installation and before energizing. Use fluorescent colors that are easily identifiable inside the transformer enclosure.

2.4 DISTRIBUTION TRANSFORMERS

- A. Comply with NFPA 70.
- B. Provide transformers that are constructed to withstand seismic forces specified in Section 260548.16 "Seismic Controls for Electrical Systems."
- C. Cores: One leg per phase. D. Enclosure: Ventilated.
- 1. NEMA 250, Type 3R: Core and coil shall be encapsulated within resin compound to seal out moisture and air. 2. KVA Ratings: Based on convection cooling only and not relying on auxiliary fans.
- 3. Wiring Compartment: Sized for conduit entry and wiring installation.
- E. Taps for Transformers 25 kVA and Larger: Four 2.5 percent taps above and two 2.5 percent taps below normal full capacity.
- F. Insulation Class, 30 kVA and Larger: 220 deg C, UL-component-recognized insulation system with a maximum of 150
- deg C rise above 40 deg C ambient temperature. G. Grounding: Provide ground-bar kit or a ground bar installed on the inside of the transformer enclosure.
- 2.5 IDENTIFICATION
- A. Nameplates: Engraved, laminated-acrylic or melamine plastic signs for each distribution transformer, mounted with corrosion-resistant screws. Nameplates and label products are specified in Section 260553 "Identification for Electrical Svstems.

3.1 EXAMINATION

- A. Examine conditions for compliance with enclosure- and ambient-temperature requirements for each transformer.
- B. Verify that field measurements are as needed to maintain working clearances required by NFPA 70 and manufacturer's written instructions. C. Examine walls, floors, roofs, and concrete bases for suitable mounting conditions where transformers will be installed.
- Verify that ground connections are in place and requirements in Section 260526 "Grounding and Bonding for Electrical Systems" have been met. Maximum ground resistance shall be 5 ohms at location of transformer. E. Environment: Enclosures shall be rated for the environment in which they are located. Covers for NEMA 250, Type 4X
- enclosures shall not cause accessibility problems.
- 3.2 INSTALLATION
- A. Install transformers level and plumb on a concrete base with vibration-dampening supports. Locate transformers away from corners and not parallel to adjacent wall surface.
- B. Construct concrete bases with steel reinforcement and concrete complying with USU standards.. Anchor floor-mounted transformers according to manufacturer's written instructions, seismic codes applicable to Project, and requirements in Section 260529 "Hangers and Supports for Electrical Systems."
- 1. Coordinate size and location of concrete bases with actual transformer provided. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified with concrete. C. Secure covers to enclosure and tighten all bolts to manufacturer-recommended torques to reduce noise generation.
- 3.3 CONNECTIONS
- A. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."
- B. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If
- manufacturer's torque values are not indicated, use those specified in UL 486A-486B. D. Provide flexible connections at all conduit and conductor terminations and supports to eliminate sound and vibration transmission to the building structure.
- 3.4 FIELD QUALITY CONTROL A. Perform tests and inspections.
- B. Small (Up to 167-kVA Single-Phase or 500-kVA Three-Phase) Dry-Type Transformer Field Tests:
- 1. Visual and Mechanical Inspection.
- Inspect physical and mechanical condition.
- b. Inspect anchorage, alignment, and grounding.
- c. Verify that resilient mounts are free and that any shipping brackets have been removed.
- d. Verify the unit is clean.
- e. Perform specific inspections and mechanical tests recommended by manufacturer.
- f. Verify that as-left tap connections are as specified. g. Verify the presence of surge arresters and that their ratings are as specified.
- Electrical Tests:
- a. Measure resistance at each winding, tap, and bolted connection.
- b. Perform insulation-resistance tests winding-to-winding and each winding-to-ground. Apply voltage according to manufacturer's published data. In the absence of manufacturer's published data, comply with NETA ATS,
- Table 100.5. Calculate polarization index: the value of the index shall not be less than 1.0. c. Perform turns-ratio tests at all tap positions. Test results shall not deviate by more than one-half percent
- from either the adjacent coils or the calculated ratio. If test fails, replace the transformer. d. Verify correct secondary voltage, phase-to-phase and phase-to-neutral, after energization and prior to
- loading. C. Remove and replace units that do not pass tests or inspections and retest as specified above.
- D. Test Labeling: On completion of satisfactory testing of each unit, attach a dated and signed "Satisfactory Test" label to tested component.
- 3.5 CLEANING
- Vacuum dirt and debris; do not use compressed air to assist in cleaning



B. Comply with NFPA 70.

	L 1		2
		S	SECTION 262726 - WIRING DEVICES
		1	.1 ADMINISTRATIVE REQUIREMENTS
			A. Coordination: 1. Receptacles for Owner-Furnished Equipment: Match plug configura
		1	.2 GENERAL WIRING-DEVICE REQUIREMENTS
			A. Wiring Devices, Components, and Accessories: Listed and labeled a agency, and marked for intended location and application.
		1	.3 STRAIGHT-BLADE RECEPTACLES
			A. Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NI FS W-C-596.
			B. Isolated-Ground, Duplex Convenience Receptacles, 125 V, 20 A: Configuration 5-20R, UL 498, and FS W-C-596.
D			 Description: Straight blade; equipment grounding contacts shall be terminal of the device and with interent electrical isolation from the
			receptacle construction and not dependent on removable parts.
		1	.4 GFCI RECEPTACLES A. General Description:
			1. Straight blade, feed-through type.
			 Comply with NEWA WD 1, NEWA WD 0, OL 490, OL 940 Class A, a Include indicator light that shows when the GFCI has malfunct
			protection. B. Duplex GFCI Convenience Receptacles, 125 V, 20 A:
		1	.5 TOGGLE SWITCHES
			 Comply with NEWA VID 1, OL 20, and FS W-S-896. B. Switches, 120/277 V, 20 A:
			 C. Pilot-Light Switches, 20 A: 1. Description: Single pole, with neon-lighted handle, illuminated when
		1	.6 WALL-BOX DIMMERS
			A. Dimmer Switches: Modular, full-wave, solid-state units with integral, quie EMI/RFI suppression filters.
			B. Control: Continuously adjustable toggle switch; with single-pole or three-
			dimmer-driver combination capable of consistent dimming with low end n
		1	.7 WALL PLATES
			 Ongoe and combination types shall match corresponding wiring devices. Plate-Securing Screws: Metal with head color to match plate finish.
			 Material for Finished Spaces: 0.035-inch- thick, satin-finished, Type Material for Unfinished Spaces: Galvanized steel
			 Material for Damp Locations: Thermoplastic or Cast aluminum labeled for use in wet and damp locations
			 B. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with T or thormoplectic with labeled a surregeletic structure.
		1	.8 FINISHES
\sim			A. Device Color:
С			 vvining Devices Connected to Normal Power System: As select required by NFPA 70 or device listing.
			 Isolated Ground Devices: Orange. Wall Plate Color: For plastic covers, match device color.
		1	.9 INSTALLATION
			 A. Comply with NECA 1, including mounting heights listed in that standard, u B. Conductors:
			Do not strip insulation from conductors until right before they are spli
			 Strip insulation evenly around the conductor using tools designed solid wire or cutting strands from stranded wire.
			 The length of free conductors at outlets for devices shall meet provis Existing Conductors:
			a. Out back and pigtail, or replace all damaged conductors.
			 c. Pigtailing existing conductors is permitted, provided the outlet b
			 C. Device Installation: 1. Replace devices that have been in temporary use during constru
			finishing operations were complete.
			 Connect devices to branch circuits using pigtains that are not less that When conductors larger than No. 12 AWG are installed on 15- or
			device connections. D. Dimmers:
			 Install unshared neutral conductors on line and load side of dimme conditions in the written instructions.
		S	SECTION 262816 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS
		1	A. Electrical Components, Devices, and Accessories: Listed and labeled a
			agency, and marked for intended location and application. B. Comply with NFPA 70.
		1	.2 NONFUSIBLE SWITCHES
B			A. Type GD, General Duty, Single Throw, 600 A and Smaller: UL 98 and Ne with capability to accept two padlocks. and interlocked with cover in close
_			B. Accessories:
			 Equipment Ground Nt. Internally mounted and labeled for copper al Neutral Kit: Internally mounted; insulated, capable of being gro
			aluminum neutral conductors.3. Lugs: Suitable for number, size, and conductor material.
		1	.3 MOLDED-CASE CIRCUIT BREAKERS
			 General Requirements: Comply with UL 489, NEMA AB 1, and NEMA A available fault currents.
			B. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low trip element for short circuits. Adjustable magnetic trip setting for circuit-
			C. Features and Accessories:
			 Suitable for number, size, trip ratings, and conductor material Lugs: Suitable for number, size, trip ratings, and conductor material
			Application Listing: Appropriate for application; Type SWD for swit feeding fluorescent and high-intensity discharge lighting circuits.
		1	.4 INSTALLATION
			A. Install individual wall-mounted switches and circuit breakers with tops at uB. Comply with NECA 1.
		1	.5 IDENTIFICATION
			A. Comply with requirements in Section 260553 "Identification for Electrical
		s	SECTION 262913 - ENCLOSED CONTROLLERS
		1	.1 SUBMITTALS A. Operation and maintenance data
		1	.2 FULL-VOLTAGE CONTROLLERS
			A. General Requirements for Full-Voltage Controllers: Comply with NEMA I B. Motor-Starting Switches: "Ouick make quick brook" togals at such but
			or on.
٨			 Configuration: Nonreversing. Surface mounting.
Z			3. Pilot light. C. Fractional Horsenower Manual Controlleror: "Outlok make swick brack"
			whether unit is off, on, or tripped.
			 Configuration: Nonreversing. Overload Relays: Inverse-time-current characteristics; NEMA ICS
			matched to nameplate full-load current of actual protected motor or melting alloy type.
			3. Surface mounting.
			4. Pilot light.
			A. Wall-Mounted Controllers: Install enclosed controllers on walls with the population handles not bished the 20 is the 2000 million of the second se
			operating nanales not higher than 79 inches (2006 mm) above finisher bolting units to wall or mounting on lightweight structural-steel channels
			provide treestanding racks complying with Section 260529 "Hangers andB. Seismic Bracing: Comply with requirements specified in Section 260548
			Systems."
LAS	1		2

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	SPECIFICATIONS			
	C. Install heaters in thermal overload relays. Select heaters based on actual nameplate full-load amperes after motors	1.3 DELIVERY, STORAGE, AND HANDLING		
	 D. Identify enclosed controllers, components, and control wiring. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems " 	A. Test cables upon receipt at Project site. Test each pair of UTP cable for open and short circuits.		
nt: Match plug configurations.	1. Label each enclosure with engraved nameplate.	A. Cable Support: NRTL labeled for support of Category 6 cabling, designed to prevent degradation of cable performance and pinch points that could damage cable.		
: Listed and labeled as defined in NFPA 70, by a qualified testing plication.	1.4 ADJUSTINGA. Set field-adjustable switches and overload-relay pickup and trip ranges.	 Support brackets with cable tie slots for fastening cable ties to brackets. Lacing bars, spools, J-hooks, and D-rings. Straps and other devices. 		L Suite 102
ly with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498, and	SECTION 265100 - INTERIOR LIGHTING	B. Conduit and Boxes: Comply with requirements in Division 26 Section "Raceway and Boxes for Electrical Systems." Flexible metal conduit shall not be used.		Logan, Ut 84321
otacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6	1.1 ACTION SUBMITTALSA. Product Data: For each type of lighting fixture, arranged in order of fixture designation. Include data on features,	 Outlet boxes shall be no smaller than 2 inches wide, 3 inches high, and 2-1/2 inches deep. LABELING 		office: (435) 787-1445
unding contacts shall be connected only to the green grounding screw lectrical isolation from mounting strap. Isolation shall be integral to	accessories, and finishes. 1.2 QUALITY ASSURANCE	A. Comply with TIA/EIA-606-A and UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.		D fax: 1-877-207-3199
on removable parts.	A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.B. Comply with NFPA 70.	 GROUNDING Comply with requirements in Division 26 Section "Grounding and Bonding for Electrical Systems" for grounding conductors and connectors 		
498 UI 943 Class A and FS W-C-596	1.3 GENERAL REQUIREMENTS FOR LIGHTING FIXTURES AND COMPONENTS A Recessed Eixtures: Comply with NEMA LE 4 for colling compatibility for recessed fixtures	1.7 BACKBOARDS		The design represented by these drawings are, and shall remain the
he GFCI has malfunctioned and no longer provides proper GFCI	 B. Fluorescent Fixtures: Comply with UL 1598. Where LER is specified, test according to NEMA LE 5 and NEMA LE 5A as applicable. 	 A. Backboards: Plywood, fire-retardant treated, 3/4 by 48 by 96 inches. 1.8 UTP CABLE 		Engineering, LLC retains total ownership and control. The design represented by these drawings is sold to the client listed in the
20 A:	 C. HID Fixtures: Comply with UL 1598. Where LER is specified, test according to NEMA LE 5B. D. Metal Parts: Free of burrs and sharp corpers and edges. 	 A. Description: 100-ohm, 4-pair UTP, covered with a blue thermoplastic jacket. 1. Comply with ICEA S-90-661 for mechanical properties. 		titleblock for a one time use at the propety indicated. Any other use or reproduction must be permitted in writing by Source Engineering LLC
96.	 E. Diffusers and Globes: Activity Lighting Diffusers: 100 percent virgin activity plastic. High resistance to vellowing and other changes due 	 Comply with TIA/EIA-568-B.1 for performance specifications. Comply with TIA/EIA-568-B.2 Category 6. 		
handle, illuminated when switch is "off."	 a. Lens Thickness: At least 0.125 inch minimum unless otherwise indicated. b. UV stabilized. 	 4. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444 and NFPA 70 for the following types: a. Communications, General Purpose: Type CM or CMG; or MPP, CMP, MPR, CMR, MP, or MPG. 		CONSULIANIS
e units with integral, quiet on-off switches, with audible frequency and	1.4 LED LUMINAIRES	b. Communications, Plenum Rated: Type CMP or MPP, complying with NFPA 262.		<u> </u> _
with single-pole or three-way switching. Comply with UL 1472.	 A. Solid State Drivers and LED: Comply with DOE LM 79 1. Total Harmonic Distortion Rating: Less than 10 percent 	 1.9 UTP CABLE HARDWARE A. General Requirements for Cable Connecting Hardware: Comply with TIA/EIA-568-B.2, IDC type, with modules designed for purch down come or tools. Cobleg chall be terminated with connecting horthware of come or tools. 		
ble with dimmer drivers; trim potentiometer to adjust low-end dimming; dimming with low end not greater than 1 percent of full brightness.	 Iransient Voltage protection Power factor: 0.90 or higher 	higher.		
ponding wiring devices	 Temperatures: Minus 40 deg F (minus 40 deg C) and higher Heat sink to remove heat from circuits 	 Connecting Blocks. The style IDC for Category 6. Cross-Connect: Modular array of connecting blocks arranged to terminate building cables and permit interconnection between cables. 		
lor to match plate finish.	 L70 compliant to 70,000 hours minimum Color Rendering Index: 80 CRI minimum 	1. Number of Terminals per Field: One for each conductor in assigned cables. Detable Detable Maddae genetic berging multiple graphered industry with UDC base generations at each industry.		TECOL
nick, satin-finished, Type 302 stainless steel. I steel.	 Dimmable Dimming Range: 100 to 1 percent of rated lamp lumens 	 D. Patch Panel: Modular panels housing multiple-numbered jack units with IDC-type connectors at each jack for permanent termination of pair groups of installed cables. A Number of lealer are Field. One for each four pair UTD cable indicated. 		D PROFESSION AL
stic or Cast aluminum with spring-loaded lift cover, and listed and	 Input watts: Can be reduced to 20 percent of normal Emergency Battery Pack: Minimum 1100 lumen output. 	 Number of Jacks per Field: One for each four-pair UTP cable indicated. Jacks and Jack Assemblies: Modular, color-coded, eight-position modular receptacle units with integral IDC-type 		No. 6813611
IA 250, complying with Type 3R, weather-resistant, die-cast aluminum	1.5 EXIT SIGNS	terminals. F. Patch Cords: Factory-made, four-pair cables in varying lengths; terminated with eight-position modular plug at each		ERIC C.
	A. General Requirements for Exit Signs: Comply with UL 924; for sign colors, visibility, luminance, and lettering size, comply with authorities having jurisdiction.	 Patch cords shall have bend-relief-compliant boots and color-coded icons to ensure Category 6 performance. Patch cords shall have latch quarks to protect against spagging. 		1/10/2025
wer System: As selected by owner unless otherwise indicated or	 B. Internally Lighted Signs: 1. Lamps for AC Operation: LEDs, 50,000 hours minimum rated lamp life. 	1.10 COAXIAL CABLE		C OF UTAL
ce color.	 Self-Powered Exit Signs (Battery Type): Integral automatic charger in a self-contained power pack. LIGHTING FIXTURE SUPPORT COMPONENTS 	A. General Coaxial Cable Requirements: Broadband type, recommended by cable manufacturer specifically for broadband data transmission applications. Coaxial cable and accessories shall have 75-ohm nominal impedance with		
	 A. Wires: ASTM A 641/A 641M, Class 3, soft temper, zinc-coated steel, 12 gage. B. Wires for Humid Spaces: ASTM A 580/A 580M. Composition 302 or 304, appealed stainless steel, 12 gage. 	a return loss of 20 dB maximum from 7 to 806 MHz. B. RG-6/U (Plenum Rated): NFPA 70, Type CMP.		
s listed in that standard, unless otherwise indicated.	1.7 INSTALLATION	C. Coaxial-Cable Connectors: Type BNC, 75 ohms.		
right before they are spliced or terminated on devices. or using tools designed for the purpose. Avoid scoring or nicking of	A. Lighting fixtures: Set level, plumb, and square with ceilings and walls. Install lamps in each fixture.B. Comply with NFPA 70 for minimum fixture supports.	A. Jacks: 100-ohm, balanced, twisted-pair connector; four-pair, eight-position modular. Comply with TIA/EIA-568-B.1. Workstation Outlets: Four and six part connector assemblies mounted in single faceneets.		
vire. devices shall meet provisions of NFPA 70, Article 300, without pigtails.	1.8 FIELD QUALITY CONTROL A Test for Emergency Lighting: Interrupt neuror cumply to demonstrate proper operation. Verify transfer from permal	 For use with snap-in jacks accommodating any combination of UTP work area cords. Leagned: Sape in close label environment and machine printed approximates. 		
naged conductors.	power to battery and retransfer to normal.	1.12 IDENTIFICATION PRODUCTS		
remove corrosion and foreign matter. ted, provided the outlet box is large enough.	SECTION 270528 - PATHWAYS FOR COMMUNICATIONS SYSTEMS	A. Comply with TIA/EIA-606-A and UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.		
rary use during construction and that were installed before building	1.1 ACTION SUBMITTALS	 B. Comply with requirements in Division 26 Section "Identification for Electrical Systems." 1.13 WIRING METHODS 		
stails that are not less than 12 inches in length.	A. Product Data: For each type of product.B. Shop Drawings: For each type of cable tray.	 A. Wiring Method: Install cables in raceways and cable trays except within consoles, cabinets, desks, and counters and except in accessible ceiling spaces, in attics, and in gypsum board partitions where unenclosed wiring method may be 		$ O_{\hat{O}} = 5$
are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for	C. Delegated-Design Submittal: For seismic restraints.	used. Conceal raceway and cables except in unfinished spaces. 1. Install plenum cable in environmental air spaces, including plenum ceilings.		$ \mathbf{N}_{\mathbf{w}} \underline{0}_{\mathbf{w}} $
and load side of dimmers according to manufacturers' device listing	A. See section 260533 "Raceways and boxes for Electrical Systems".	Comply with requirements for raceways and boxes specified in Division 26 Section "Raceway and Boxes for Electrical Systems."		
	1.3 BOXES, ENCLOSURES, AND CABINETSA. See section 260533 "Raceways and boxes for Electrical Systems" unless otherwise indicated below.	B. Wiring within Enclosures: Bundle, lace, and train cables to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.		
UIT BREAKERS	 B. Device Box Dimensions: 4 inches square by 2-1/2 inches deep. 14 HANDHOLES AND BOXES FOR EXTERIOR UNDERGROUND CABLING 	1.14 INSTALLATION OF PATHWAYS A Comply with TIA/FIA-569-A for pull-box sizing and length of conduit and number of bends between pull points		
es: Listed and labeled as defined in NFPA 70, by a qualified testing	A. See section 260533 "Raceways and boxes for Electrical Systems".	 B. Comply with requirements in Division 26 Section "Raceway and Boxes for Electrical Systems" for installation of conduits and wireways. 		
plication.	1.5 WIRE-BASKET CABLE TRAYS A. Description:	C. Install manufactured conduit sweeps and long-radius elbows.		— ຊ ່ທີ.
	 Configuration: Wires are formed into a standard 2-by-4-inch wire mesh pattern with intersecting wires welded together. Mesh sections must have at least one bottom longitudinal wire along entire length of section. 	 Position conduit ends adjacent to a corner on backboard where a single piece of plywood is installed, or in the corner of room where multiple sheets of plywood are installed around perimeter walls of room. 		│_│ ── Ё
bocked with cover in closed position.	 Materials: High-strength-steel longitudinal wires with no bends. Safety Provisions: Wire ends along wire-basket sides (flanges) rounded during manufacturing to maintain 	 Secure conduits to backboard when entering room from overhead. Install metal conduits with grounding bushings and connect with grounding conductor to grounding system. 		
and labeled for copper and aluminum ground conductors.	4. Sizes:	1.15 INSTALLATION OF CABLES		
, copacie of being grounded and bonded, labeled for copper and	 a. Straight sections shall be turnished in standard 118-inch lengths. b. Wire-Basket Depth: 4-inch usable loading depth by 12 inches wide. 	 A. Comply with NECA 1. B. General Requirements for Cabling: 		
ciu material.	 Connector Assemblies: Bolt welded to plate shaped to fit around adjoining tray wires and mating plate. Mechanically joins adjacent tray wires to splice sections together or to create horizontal fittings. 	 Comply with TIA/EIA-568-B.1. Comply with BICSI ITSIM, Ch. 6, "Cable Termination Practices." 		
EMA AB 1, and NEMA AB 3, with interrupting capacity to comply with	 Connector Assembly Capacity: Splices located within support span shall not diminish rated loading capacity of cable tray. Hordware and Easteners: ASTME 502 and ASTME 504 steiplace steel. Type 316 	 Install 110-style IDC termination hardware unless otherwise indicated. Terminate conductors; no cable shall contain unterminated elements. 		
e-current element tor low-level overloads and instantaneous magnetic tic trip setting for circuit-breaker frame sizes 250 A and larger.	1.6 PATHWAY APPLICATION	 Pulling Cable: Comply with BICSI ITSIM, Ch. 4, "Pulling Cable." Monitor cable pull tensions. UTP Cable Installation: 		
ber of poles.	 A. See section 260533 "Raceways and boxes for Electrical Systems" unless otherwise indicated below. B. Indoors: Apply pathway products as specified below unless otherwise indicated: 	 Comply with TIA/EIA-568-B.2. D. Separation from EMI Sources: 		
, and conductor material. tion; Type SWD for switching fluorescent lighting loads; Type HID for	C. Minimum Pathway Size: 1 inch.	 Comply with BICSI TDMM and TIA/EIA-569-A for separating unshielded copper voice and data communication cable from potential EMI sources, including electrical power lines and equipment. 		
arge lighting circuits.	A. See section 260533 "Raceways and boxes for Electrical Systems" unless otherwise indicated below.	1.16 IDENTIFICATION A Identify system components wiring and cabling complying with TIA/FIA-606-A. Comply with requirements for		
it breakers with tops at uniform height unless otherwise indicated.	 B. Install no more than the equivalent of two 90-degree bends in any pathway run. Support within 12 incres of changes in direction. Utilize long radius ells for all optical-fiber cables. C. Stub up to Above Responsed Ceilings: 	identification specified in Division 26 Section "Identification for Electrical Systems."		
	 Stub-ups to Above Recessed Centrings. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure. 	labels. B. Labels shall be preprinted or computer-printed type with printing area and font color that contrasts with cable jacket		
entification for Electrical Systems."	 Coal field-cut threads on PVC-coaled pathway with a consistin-preventing conductive compound prior to assembly. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install insulated hubbings on conduits torpinated with locknuts. 	color but still complies with requirements in TIA/EIA-606-A.		
	 F. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path. 			MARK DATE DESCRIPTION
	 G. Spare Pathways: Install pull wires in empty pathways. Cap underground pathways designated as spare above grade alongside pathways in use. 			ISSUE: Construction Documents
	 H. Pathways for Communications Cable: Install pathways as follows: 1. 1-Inch Trade Size and Larger: Install pathways in maximum lengths of 75 feet 			PROJECT NUMBER: 2024069 DATE: IAN 10, 2025
eak" toggle or push-button action; marked to show whether unit is off	 Install with a maximum of two 90-degree bends or equivalent for each length of pathway unless Drawings show stricter requirements. 			DESIGNED BY: ECR
	1.8 INSTALLATION OF UNDERGROUND CONDUIT			DRAWN BY: MJR
	 A. See section 260533 "Raceways and boxes for Electrical Systems" unless otherwise indicated below. 1.9 INSTALLATION OF UNDERGROUND HANDHOLES AND BOXES 			
ICK-make, quick-break" toggle or push-button action; marked to show	A. See section 260533 "Raceways and boxes for Electrical Systems" unless otherwise indicated below.			
aracteristics; NEMA ICS 2, Class 10 tripping characteristics; heaters	SECTION 271500 - COMMUNICATIONS CABLING			SPECIFICATIONS
actual protected motor; external reset push button; bimetallic type	1.1 PERFORMANCE REQUIREMENTS			
	A. General Performance: Horizontal cabling system shall comply with transmission standards in TIA/EIA-568-B.1, when tested according to test procedures of this standard.			
ntrollers on walls with tops at uniform height, and with disconnect	1.2 QUALITY ASSURANCEA. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a gualified			
2006 mm) above finished floor, unless otherwise indicated, and by structural-steel channels bolted to wall. For controllers not at walls,	testing agency. Identify products with appropriate markings of applicable testing agency. 1. Flame-Spread Index: 25 or less.			
n 200529 "Hangers and Supports for Electrical Systems." cified in Section 260548 "Vibration and Seismic Controls for Electrical	 Smoke-Developed Index: 50 or less. Telecommunications Pathways and Spaces: Comply with TIA/EIA-569-A. 			
	C. Grounding: Comply with ANSI-J-STD-607-A.			

er of poles.

ntification for Electrical System

- 3

4

Golf Course Road 102 , Ut 84321 : (435) 787-1445 -877-207-3199 sinesource.net ngs are, and shall remain the LC and as such Sine Source hip and control. The design Id to the client listed in the he propety indicated. t be permitted in writing by S ing, LLC. NTS NAH ENGINEER **CAH** SOUTH 84321 162 WEST 100 LOGAN, UTAH DESCRIPTION truction Documents 2024069 JAN 10, 2025 ECR MJR TIONS 5





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A4 ELECTRONIC SYSTEMS PLAN:LOWER LEVEL



C4 ELECTRONIC SYSTEMS PLAN:UPPER LEVEL







SS B SS

TB

LOGAN F

DATE

ELECTRICAL

PLANS

E101

MARK

ISSUE:

DATE:

PROJECT NUMBER:

DESIGNED BY:

DRAWN BY:

0 0 0 4

162 WES⁻ LOGAN, L

DESCRIPTION

2024069

ECR

MJR

JAN 10, 2025

Construction Documents

			1										2						
D																			
	PANEL	PB NEW EXISTING NEMA RATING SOLT ON BREAKERS	TYPE REMARKS	-*=VER	RIFY W	NQ ITH EC	OB QUIPME	ENT N	AMEPL	ATE AND/C	1 DR SUBMIT	_ Ø TAL PRIC	3 DR TO GEAR	WIRE	SE	1;	20/240	V	OLTS
		SOLATED GROUND BUS SURGE PROTECT (SPD)									1								
	No. BRK		RIPTION	L 0	м	PH 12S	WIRE	/CND G 12S	C 3/4S	CIRC. LOAD	A 1120	В	LOAD	PH	N 12S	G	C 3/45	LC	о м 5
	3 20 5 20 7 20 9 20	1 INTERIOR LIGHTING 1 SPARE 1 SPARE 1 SPARE 1 SPARE 1 SPARE		17		128	128	12S	3/4S	340	720	1060 720	720 720 720 720 720	12S 12S 12S 12S 12S	12S 12S 12S 12S 12S	12S 12S 12S 12S 12S	3/4S 3/4S 3/4S 3/4S 3/4S		4 4 4 4 4
	11 20 13 20 15 20	1 SPARE 1 SPARE 1 SPARE									0	0							
С	17 20 19 20 21 20	1 SPARE 1 SPARE 1 SPARE									0	0							
Ŭ	23 20 25 20 27 25	1 SPARE 1 SPARE 2 HEATER EH-1				10	10	10	3/4	2000	1200	1200 3200	1200 1200 1200	10 10 10	10 10	10 10	3/4		
	29 -					10				2000 TOTALS	<u>3200</u> <u>6960</u>	<u>6180</u>	1200	10					
	FEE	EDER SEE ONE-I	LINE						AM	PS/PHASE	<u>58</u>	<u>52</u>							
	BREAK	ER CODES A=ARC-FAULT; G=GROUNI) FAULT; H=HA	CR; L=L	.OCKIN	IG HAN	IDLE; S	S=SHL	JNT TR	P; R=RED	PAINTED F	IANDLE							
	WIRE C I GENER	ODES =ADD'L ISO GROUND TO M AL CODES	ATCH SAFETY	GROUN	ID; S=L	JNLES	S OTHI	ERWIS	SE SPE	CIFIED									
	1LIN=SEE ONE-LINE DIAGRAM; AS=AS SPECIFIED																		
	MECHANICAL EQUIPMENT SCHEDULE																		
	SYM EH- 1 ELEC	DESCRIPTION	G MOUNTED	LO, 4 K	AD (W	VOLTS 240	PHA 1 PH	ASE	EQU QMARK	IPMENT CAL	LOUT -T-DS-TK		* STARTER BY EQUIP	DISCON BY ELE	INECT	PROVID	E ELEC	TRIC HE	ATER W
				Y SINGLE S	PEED OR	I TWO SPEED	STARTE	RS WIT	H MECI	HANICA	L DRAV	VINGS.							
-	LIGHT FIXTURE SCHEDULE																		
В	TYPE E- 1B	LITHONIA ELM2LF-SCBO-S OR EQUIVALENT	MANUFACTURE	R/CATA	ALOG N	10.				LED EN HOUSI	DESCRIPTION LED EMERGENCY LIGHT HOUSING COLOR BY OWNER, NICKEL CADMIUM BATTERY SELE DIAGNOSTICS								
	LS4- L4K	LITHONIA TRUM-48-AL06-F OR EQUIVALENT	MP-8SWW2-ZT-I	MVOLT						LED 1X SWITC	LED 1X4 LED WRAPAROUND, LOW PROFILE, SURFACE MOUNT;120V 0-10V DIMM SWITCHABLE LUMEN OUTPUT (4000, 5000, 6000) SET TO 5000LM						DIMMI		
											HABLE CC	י נטטטע <i>ג,</i> י	4000K, 5000ł	N 251 [J 4000	n.			
	OW2- L2K OW2- L2K(B)	LITHONIA WDGE2 LED-P2-	35K-70CRI-T2M-I IOR APPROVAL	MVOLT-	PIR1F(C3V-SC	80-(EN	И: E20	WC)	EXTER MULTI- INTEGR MOTIO	NOR WALL VOLT, DIMI RAL BI-LEV N=100%; AI	I RAPEZO MABLE DE EL MOTIC FTER 15 N ER RATTE	NU AREA LIG RIVER; SCBC DN SENSOR MIN NO MOT	6HT; LED D=STNDA WITH PH ION=20% /HFRF I№	LAMPI ARD CC IOTOCI 6	ING; TY DLOR B ELL EN,	PE 2 O Y OWN ABLED DRA\\//	PTICAL ER FOR DI	. DISTR USK TC FIXT! "
	RC4- L07	JUNO-WF4-SWW5-MVOLT- OR EQUIVALENT	90CRI-SCBA-WF	4 PAN F	R12-CA	BLES				COVEF SCBA= NEW C	RED EXTER	IOR CANI ARCHITE TION PAN	ESS LED 4" CT BASED C AND CABLE	ROUND DN OPTI	FIXTUI	RE DR MAT	TEWH	ITE, MA	
	RC6- L1K	LITHONIA LDN6-AL1-SWW1 OR EQUIVALENT	1-L06-AR-LD-MV(OLT-UG	Z-SCA6	6-10D				LED 6" SLOPE	ROUND FI) D CEILING	KTURE; IC ADAPTEF	RATED; 120)/277, 0-^	10V DIN	/MING ⁻	TO 10 %	6 DRIVE	ER
A	S3- L5K	LITHONIA CLX-L36-5250LM OR EQUIVALENT	-SEF-FDL-MVOL	T-GZ10-	-40K-80	OCRI-SO	CBA-MS	SD7		3' LINE PIR INT	AR LED ST FEGRAL OC	RIP FIXTL CUPANC	JRE; 0-10V 12 Y SENSOR	20/277 D	RIVER	; FLAT [DIFFUS	E LENS	3
	S4- L5K LITHONIA CLX-L48-5000LM-SEF-FDL-MVOLT-GZ10-40K-80CRI-SCBA OR EQUIVALENT								4' LINE	AR LED ST	RIP FIXTU	JRE; 0-10V 1	20/277 D	RIVER	; FLAT I	DIFFUS	E LENS	3	
	LIGHT FIXTURE ACCESSORY SCHEDULI											ULE							
Jan 25	B	AS SPECIFIED									IDED TO FI	X I URE TY	r PE; 1100 Ll	JMEN EI	VI BATT	ERA SI	JHHLA		
SAVED: 08 ,	NOTES	-FIXTURE APPENDS ARE A	ADDED TO STAN	DARD F	IXTUR	e type	ES. AP	PEND	S ARE I	NTENDED	TO MODIFY	FIXTURE	CATALOG N	NUMBER	S GIVE	en abo	VE AS I	NOTED	IN APF
AST S	L		1										2						

	WALL	2.5W	LED
V 0-10V DIMMING DRIVER;	CEILING	53 W	4000/ 5000 /6000 LM
	SURFACE MOUNTED	SWITCHABLE	NOMINAL LED
			3000/ 4000 /5000K
			SWITCHABLE
PTICAL DISTRIBUTION	WALL	19 W	2087 LUMEN
IER	CENTERED OVER DOOR		NOMINAL LED
FOR DUSK TO DAWN OPERATION			3500K
ING BY FIXTURE APPEND (B)			
ζ, γ			
	RECESS	9 W	700 LUMEN
IITE, MATTE BLACK, OR BRONZE			NOMINAL LED
			3500K
% DRIVER	RECESS	13 W	1100 LUMEN
			NOMINAL LED
			3500K
E LENS	SURFACE	34.8 W	5250 LUMEN
			NOMINAL LED
			4000K
SE LENS	SURFACE	34.8 W	5000 LUMEN
			NOMINAL LED
			4000K
		l	
		[
	AS SPECIFIED		
NOTED IN APPEND DESCRIPTION			

3

MOUNTING

POWER LAMPS

		-		-	-	20	
		COMM RACK		30	2	28]
		-		-	-	30	
		AIC	10000				
		SCCR	10000				
		PARALLEL RUNS	SEE ONE-LIN	١E			
							1
]
		R	EMARKS				
					05.146		
RIC	HEATE	R WITH INTEGRAL THERMOS	SIAI, DISCONNECT	, SURFA	CE MOU	IN F KIT, A	ND TRIM RING
L DR	AWING	GS.					

			то		LOCATION	М	OUNTI	NG
		VOL	.15		PRESS BOX	Х	FLUSI SURF	H ACE
						100 100	AMP N LUGS BREA	/AIN KER
	L	0	М	CIRCUIT DE	SCRIPTION	BR	KR	No.
						А	Р	
İ		5		PLUGS: LOWER LE	EVEL	20	1	2
Ì		4		PLUGS: UPPER LE	VEL	20	1	4
I		4		PLUGS: COUNTER		20	1	6
I		4		PLUGS: COUNTER		20	1	8
Ī		4		PLUGS: COUNTER		20	1	10
Ī				SPARE		20	1	12
Ī				SPARE		20	1	14
Ī				SPARE		20	1	16
I				SPARE		20	1	18
I				SPARE		20	1	20
I				SPARE		20	1	22
I				AUDIO RACK		30	2	24
				-		-	-	26
				COMM RACK		30	2	28
				-		-	-	30
				AIC SCCR PARALLEL RUNS	10000 10000 SEE ONE-LIN	IE		



J