#### SECTION 26 27 26 WIRING DEVICES

#### PART 1 GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- 1.2 SUMMARY A. This Section Includes:
  - Wiring devices.
- B. Related Sections: Section 26 05 00: Common Work Results for Electrical.
   Section 26 05 19: Low-Voltage Electrical Power Conductors and Cables.

3. Section 26 05 26: Grounding and Bonding for Electrical Systems.

4. Section 26 05 33: Raceway and Boxes for Electrical Systems.

#### PART 2 PRODUCTS

#### 2.1 RECEPTACLES

- A. General All receptacles shall be listed by Underwriters Laboratories, Inc.: 1. Mounting straps shall be plated steel, with break-off plaster ears and shall include a self- grounding feature (this feature does not substitute for a grounding conductor
- terminated on grounding strap of device). Terminal screws shall be brass, brass plated 2. Receptacles shall be of a screw terminal type, "pressure type quick wire" terminations are not allowed.
- B. Duplex receptacles shall be premium specification grade single phase, 20 ampere, 120 volts, 2-pole, 3-wire, and conform to the NEMA 5-20R configuration in NEMA WD 6. The duplex type shall have bussing break-off feature for two-circuit operation. The ungrounded pole of each receptacle shall be provided with a separate terminal: 1. Wiring device color shall be standard white. Contractor to verify device color with Architect prior to procurement.
  - 2. Ground Fault Interrupter Duplex Receptacles Shall be an integral unit suitable for mounting in a standard outlet box: a. Ground fault interrupter shall be commercial grade and consist of a differential current transformer, solid state sensing circuitry and a circuit interrupter switch. It shall be rated for operation on a 60 Hz, 120 volt, 20-ampere branch circuit. Device shall meet CEC requirements. Device shall have a minimum nominal tripping time
- C. Receptacles; 20, 30 and 50 ampere, 250 volts: Shall be complete and match with appropriate cord grip plug. Devices shall meet UL 231.

of 1/30th of a second. Devices shall meet UL 943.

D. Weatherproof Receptacles: Shall consist of a listed weather resistant duplex receptacle, mounted in box with a gasketed, while in use weatherproof, cast metal cover plate and cap receptacle opening. The cap shall be permanently attached to the cover plate by a springhinged flap. Approved manufacturers: Intermatic WP10 Series, Thomas & Betts/Red Dot 2CK Series, or engineer approved equal.

> WIRING DEVICES 26 27 26 - 1

E. Approved receptacles are Hubbell HBL5352 Series, and Hubbell GF20, GFCI Series.

#### 2.2 SWITCHES

- A. Toggle switches shall be totally enclosed tumbler type with bodies of phenolic compound. Toggle handles color to match receptacle device color unless otherwise specified. Approved toggle switch is Hubbell SB120:
  - 1. Shall be single unit toggle, butt contact, quiet AC type, heavy-duty general-purpose use with an integral self-grounding mounting strap with break-off plasters ears and be of a screw terminal type. Shall be color coded for current rating, listed by Underwriters Laboratories, Inc., and meet the requirements of NEMA WD 1, Heavy-Duty and UL20.
- a. 120 volt circuits: 20 amperes at 120-277 volts AC.
- b. 277 volt circuits: 20 amperes at 277 volts AC.
  4. The switches shall be mounted on the strike plate side of doors. 5. Incorporate barriers between switches with multi-gang outlet boxes where required by
- 6. All toggle switches shall be of the same manufacturer. Key lockable switches shall be Hubbell HBL122 Series.

#### 2.3 WALL PLATES

- A. Wall plates for switches and receptacles shall be type 302 stainless steel.
- B. Standard NEMA design, so that products of different manufacturers will be interchangeable. Dimensions for openings in wall plates shall be accordance with NEMAWD1.
- C. For receptacles or switches ganged together, wall plates shall be a single ganged plate.
- D. Wall plates for data, telephone or other communication outlets shall be as specified in the associated specification.
- E. Surface mounted boxes, NEMA1, shall be industrial grade raised galvanized steel covers. In shop areas, all receptacles shall be dust proof and or waterproof where applicable. F. Waterproof device covers shall be cast iron, 4-corner screw type, for FS and FD type

## mounting. Device covers shall be zinc galvanized finish. Weatherproof covers shall be

#### PART 3 EXECUTION 3.1 INSTALLATION

- A. Installation shall be in accordance with the CEC, NECA "Standard of Installation", and as shown as on the drawings.
- B. Ground terminal of each receptacle shall be bonded to the outlet box with an approved green bonding jumper, and also be connected to the green equipment grounding conductor.
- C. General: Devices shall be of the type specified herein. All devices shall be installed with "pigtailed" leads from the outlet box. No device shall be used in the "feed through" application. Screw terminals shall be used to connect all devices to the circuit and shall be grounded by means of a ground wire where grounding terminals are provided in the device.

WIRING DEVICES 26 27 26 - 2

D. Installation: Devices and plates shall be installed in a "plumb" condition and must be flush with the finish surface of the wall where boxes are recessed.

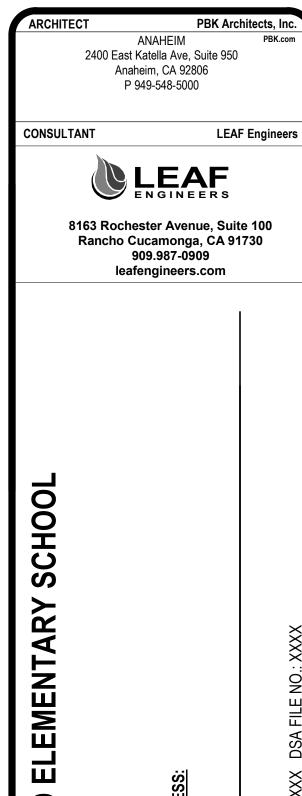
Mounting heights: All control and convenience devices shall comply with California Code of Regulations Title 24 and ADA with respect to accessibility requirements. Mounting heights indicated on plans shall have precedence.

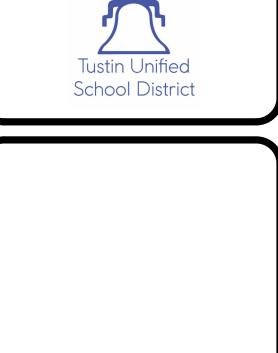
- Install switches with the off position down.
- G. Clean debris from outlet boxes. H. Provide extension rings as required to bring outlet boxes flush with finished surface or
- Test each receptacle device for proper polarity.

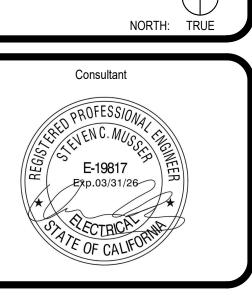
END OF SECTION 26 27 26

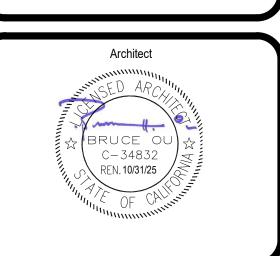
WIRING DEVICES 26 27 26 - 3











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CONGRESS PL

**GENERAL NOTES** 

- 1. ELECTRICAL ENGINEERING FOR THIS PROJECT IS BASED ON EXISTING DRAWINGS OF THE ELECTRICAL SYSTEM. IN CASE OF ANY DISCREPANCIES WITH EXISTING FIELD CONDITIONS, ELECTRICAL CONTRACTOR SHALL VERIFY THE EXACT DIFFERENCES AND NOTIFY THE ELECTRICAL ENGINEER FOR POSSIBLE REVISION TO THESE DOCUMENTS.
- 2. COORDINATE ROUTING FOR ALL UNDERGROUND ELECTRICAL BRANCH CIRCUITS AND FEEDERS WITH OTHER DISCIPLINES PRIOR TO TRENCHING.
- 3. UNLESS NOTED OTHERWISE, ALL UNDERGROUND CONDUIT SHOWN ON THIS PLAN TO BE MINIMUM 1" IN SIZE.
- CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO EXISTING UTILITIES CAUSED BY INSTALLATION OF NEW WORK.
- ALL PANELBOARDS ARE PRE-INSTALLED BY PORTABLE MANUFACTURER. CONTRACTOR SHALL COORDINATE EXACT LOCATIONS AND QUANTITY PRIOR TO ROUGH-IN.
   PATHWAY IS APPROXIMATE. CONTRACTOR SHALL VERIFY PROPER PATHWAY PRIOR TO
- 7. REFER TO SINGLE LINE DIAGRAM ON 4/E5.01 FOR FEEDER SIZING.

INSTALLATION.

#### **KEY NOTES**

1 100A, 120/208V, 3PH, 4W PANEL TO BE PROVIDED WITH NEW PORTABLE BUILDING. PANEL TO BE FED AS SHOWN IN SINGLE LINE DIAGRAM ON SHEET E5.01. CONTRACTOR TO FIELD VERIFY CIRCUITS ARE OPEN TO USE.

PBK

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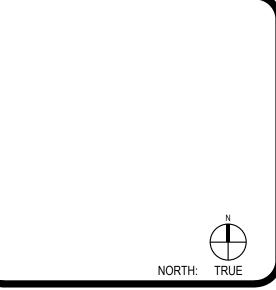
LEAF Engineers

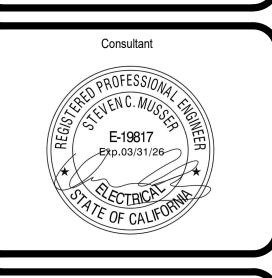
8163 Rochester Avenue, Suite 100 Rancho Cucamonga, CA 91730 909.987-0909

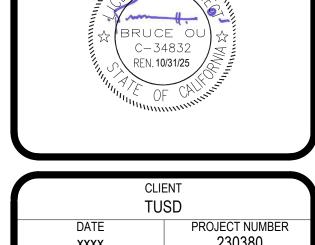
leafengineers.com

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Tustin Unified
School District







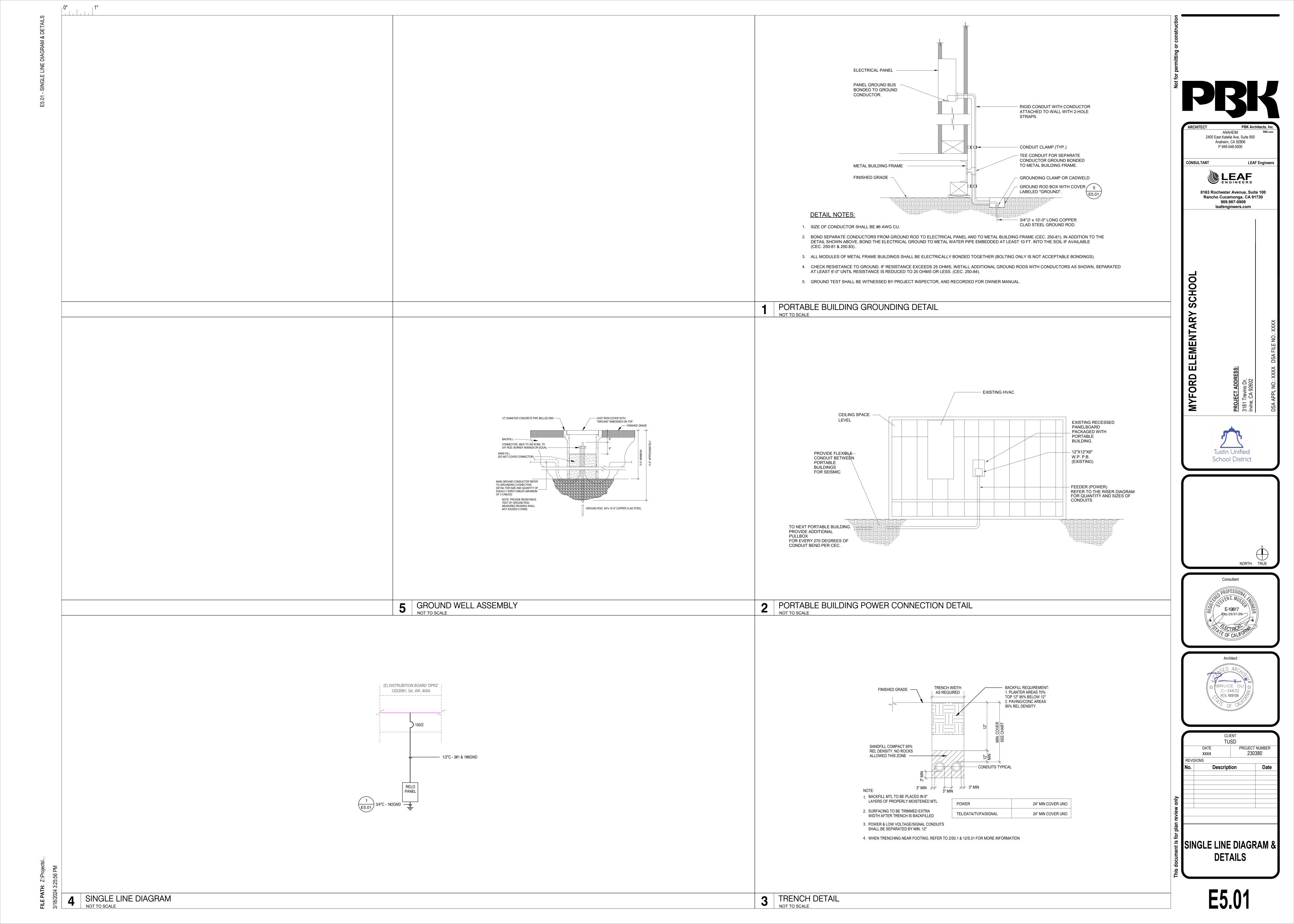
DATE PROJECT NUMBER XXXX 230380

REVISIONS

No. Description Date

ELECTRICAL SITE PLAN

E1.01



	DEVICE SCHEDULE							
SYMBOL	DESCRIPTION	MODEL	MANUFACTURER	BACKBOX	MOUNTING HEIGHT	C.S.F.M. NUMBER		
FACP	EXISTING FIRE ALARM VOICE EVAC CONTROL PANEL (A#04-116954)	FIREVAC IV	GAMEWELL-FCI	PROVIDED				
FAPS	NEW FIRE ALARM POWER SUPPLY	HPFPS6	GAMEWELL-FCI	N/A		7315-1637:0102		
(S) <sub>P</sub>	ADDRESSABLE AREA SMOKE DETECTOR (PHOTOELECTRIC)	ASD-PL3 B300-6	GAMEWELL-FCI	4S DEEP BOX W/ 3-0 RING	CEILING	7272-1703:0501 7300-1653:0109		
	ADDRESSABLE AREA HEAT DETECTOR	ATD-L3H B300-6	GAMEWELL-FCI	4S DEEP BOX W/ 3-0 RING	ATTIC/ CEILING	7270-1703-0502 7300-1653:0109		
<b>▼</b> WP	FIRE ALARM EXTERIOR WEATHERPROOF SPEAKER	SPRK	SYSTEM SENSOR	4S DEEP BOX W/ 4S EXTENSION		7320-1653:0201		
<b>&gt;</b>	FIRE ALARM CEILING MOUNTED SPEAKER/STROBE	SPSCRL	SYSTEM SENSOR	4S DEEP BOX W/ 4S EXTENSION		7320-1653:0505		
——	END OF LINE RESISTOR	N/A	N/A	N/A		N/A		

ARCH.	ARCHITECT; ARCHITECTURAL	PNL	PANEL
AWG	AMERICAN WIRE GAUGE	PWR	POWER
С	CONDUIT	REC/RECEPT	RECEPTACLE
CKT	CIRCUIT	REQ'D	REQUIRED
CL.	CEILING MOUNTED DEVICE	RM	ROOM
C.O.	CONDUIT ONLY WITH PULL WIRE	SF	SQUARE FEET
CU	COPPER	SHT	SHEET
DWG	DRAWING	SP	SINGLE POLE
ER	EXISTING DEVICE TO BE REMOVED	SPECS	SPECIFICATIONS
EMT	ELECTRICAL METALLIC TUBING	SW	SWITCH
EQUIP	EQUIPMENT	TYP	TYPICAL
EXIST / (E)	EXISTING	UG	UNDERGROUND
FIN.	FINISH	U.O.N.	UNLESS OTHERWISE NOTED
FLR	FLOOR	V	VOLTS
FT	FEET	V-A	VOLT-AMPERES
GFI	GROUND FAULT INTERRUPTER	W	WATTS
GND	GROUND	W/	WITH
LTG.	LIGHTING	W/O	WITHOUT
MTG	MOUNTING	WP	WEATHERPROOF
N	NEW	CEC	CALIFORNIA ELECTRICAL CODE
FS	FLOW SWITCH		PULL BOX (WEATHERPROOF)
JB	JUNCTION BOX	<b>##</b>	RISER UP AND DOWN
PIV	POST INDICATOR VALVE	TS	TEMPER SWITCH
			COMPINATION ON OUT FIRE DAMPER

**LEGENDS** 

<u>ABBREVIATION</u>

PH. OR Ø

DESCRIPTION

NUMBER

PHASE

NOT IN CONTRACT

COMBINATION SMOKE FIRE DAMPER

DESCRIPTION

ABOVE FINISHED FLOOR

AMPERES INTERRUPTING CAPACITY

DOUBLE CHECK DETECTOR VALVE

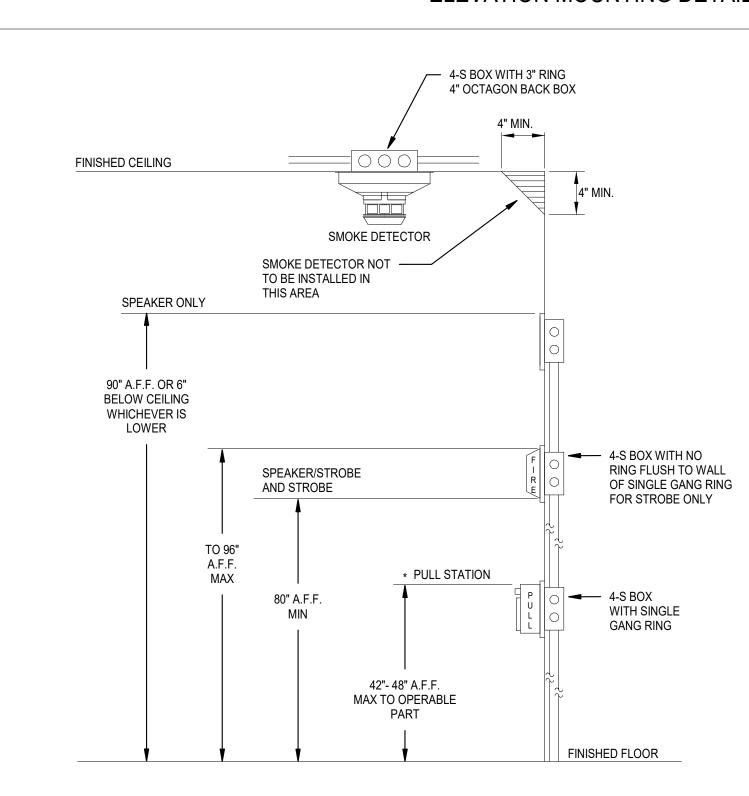
A OR AMP

DCDV

#### FIRE WATCH NOTE

A FIRE WATCH SHALL BE ESTABLISHED AND THE FIRE DEPARTMENT & FIRE CODE OFFICIAL SHALL BE NOTIFIED IMMEDIATELY WHENEVER THE FIRE PROTECTION / ALARM SYSTEM IS RENDERED OUT OF SERVICE. A FIRE WATCH SHALL BE STAGED WHENEVER THE BUILDING IS OCCUPIED (PARTIAL OR WHOLE) PER DSA IR F-2 AND CFC 901.7.

#### **ELEVATION MOUNTING DETAIL**



\* ALL FIRE ALARM DEVICES AND EQUIPMENTS ARE NEW UNLESS NOTED AS EXISTING.

NOTES: THE ENTIRE LENS OF STROBE LIGHTS MUST BE BETWEEN 80" AND 96" ABOVE FLOOR FINISH (AFF)

IF CEILING HEIGHTS EXCEED 30 FEET, STROBE LIGHTS MUST BE SUSPENDED AT OR BELOW 30 FEET MANUAL FIRE ALARM BOXES SHALL BE INSTALLED IN

ACCORDANCE WITH 2022 CBC SECTIONS 907.4.2

MANUAL FIRE ALARM BOXES SHALL BE LOCATED NOT MORE THAN 5 FEET FROM THE ENTRANCE TO EACH EXIT. ADDITIONAL MANUAL FIRE ALARM BOXES SHALL BE LOCATED SO THAT THE TRAVEL DISTANCE TO THE NEAREST BOX DOES NOT EXCEED 200 FEET.

THE HEIGHT OF THE MANUAL FIRE ALARM BOXES SHALL BE A MINIMUM OF 42 INCHES AND A MAXIMUM OF 48 INCHES, MEASURED VERTICALLY, FROM THE FLOOR LEVEL TO THE HIGHEST POINT OF THE ACTIVATING HANDLE OR LEVER OF THE BOX. MANUAL FIRE ALARM BOXES SHALL ALSO COMPLY WITH 2022 CBC SECTION 11B-309.4. PER NFPA 72 CHAPTER A.17.7.4.1 DETECTORS SHOULD NOT BE LOCATED IN ADIRECT AIRFLOW OR CLOSER THAN 36 IN. (910 MM) FROM AN AIR SUPPLY DIFFUSER OR RETURN AIR OPENING. SUPPLY OR RETURN SOURCES LARGER THAN THOSE COMMONLY FOUND IN RESIDENTIAL AND SMALL COMMERCIAL ESTABLISHMENT CAN REQUIRE GREATER CLEARANCE TO SMOKE DETECTORS. SIMILARLY, SMOKE DETECTORS SHOULD BE LOCATED FARTHER AWAY FROM HIGH VELOCITY AIR SUPPLIES.

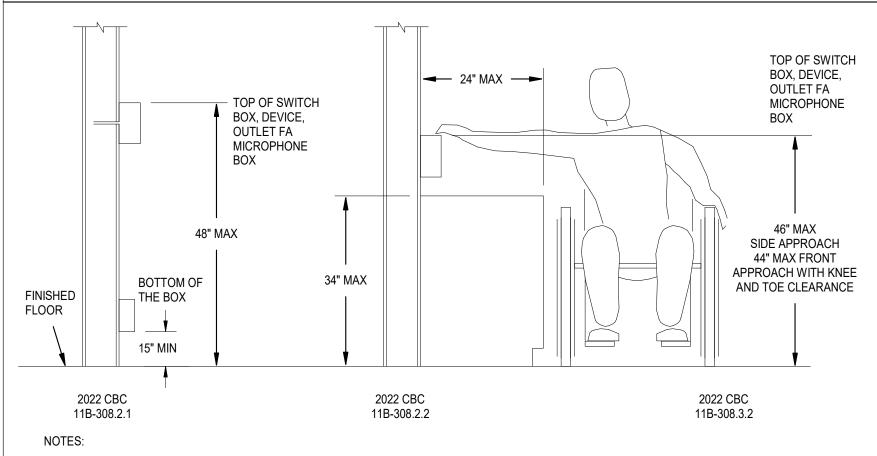
#### SEQUENCE OF OPERATIONS

DEVICE ACTION	AREA SMOKE/ BEAM DETECTOR	HEAT DETECTOR	120VAC POWER FAILURE	SHORT CIRCUIT	GROUND FAULT	BATTERY FAILURE
SOUND ALARM AT "FACP"	YES	YES	NO	NO	NO	NO
SOUND TROUBLE BUZZER AT "FACP"	NO	NO	YES	YES	YES	YES
ANNUNCIATE AT "FACP" AND THE REMOTE ANNUNCIATOR (ALARM OR TROUBLE)	YES	YES	YES	YES	YES	YES
ACTIVATE AUDIBLE / VISUAL ALARM SIGNAL THROUGHOUT BUILDING	YES	YES	NO	NO	NO	NO
ACTIVATE SIGNAL FOR OFF-SITE MONITORING	YES	YES	YES	NO	NO	NO
MUTE AUTONOMOUS LOCAL SOUND SYSTEM	YES	YES	YES	NO	NO	NO

#### SCOPE OF WORK

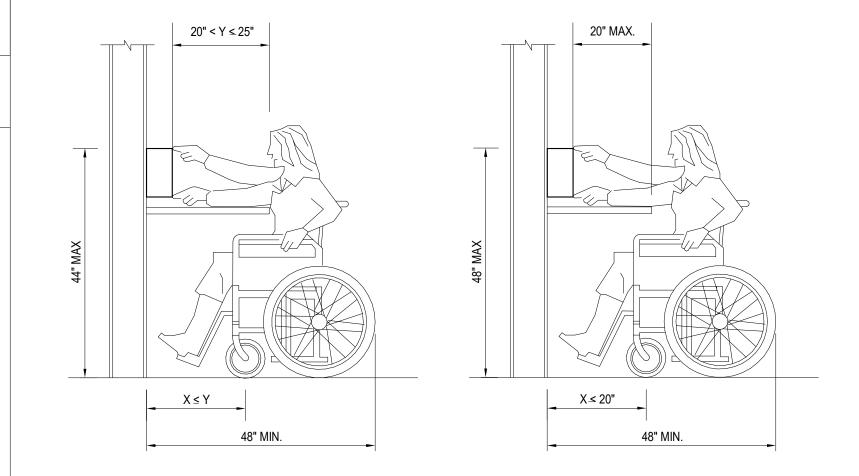
PROVIDE COMPLETE FULL AUTOMATIC ADDRESSABLE FIRE ALARM SYSTEM WITHIN THE AREA OF WORK. PROVIDE FIRE ALARM SYSTEM DEVICES AS SHOWN IN EQUIPMENT LEGEND. FLOOR PLANS, AND SPECIFICATIONS IN THIS CONSTRUCTION DOCUMENT SET, USE EXISTING FIRE ALARM CONTROL PANEL TO CONNECT NEW FIRE ALARM SYSTEM DEVICES SHOWN PER DRAWING AND SPECIFICATION DOCUMENT, UPON COMPLETION, A COMPLETE PRE TEST SHALL BE PERFORMED TO VERIFY FUNCTIONALITY, IF FUNCTIONALITY IS COMPLETE THEN THE PROPER DOCUMENTATION SHALL BE SUBMITTED TO THE AUTHORITY HAVING JURISDICTION PRIOR TO SCHEDULING A FINAL INSPECTION.

#### MOUNTING OVER OBSTRUCTION DETAIL



1. THIS DETAIL APPLIES TO MOUNTING OF ANY MECHANICAL AND ELECTRICAL DEVICE WHICH CONTAINS AN OPERABLE PART THAT IS ADJUSTABLE BY THE OCCUPANT. THIS DOES NOT APPLY TO SENSORS OR CONTROLS THAT ARE ONLY ADJUSTABLE THROUGH THE BUILDING AUTOMATION SYSTEM (IE: TEMPERATURE AND HUMIDITY SENSORS).

2. FORWARD OR FRONT APPROACH FOR DEVICES MOUNTED ABOVE COUNTERS ASSUMES THAT DIRECTLY BELOW THE DEVICE, THE COUNTER HAS A 30"MIN. WIDTH x27" HIGH x19" MIN. DEEP CLEAR OPENING. CBC SECTIONS 11B-306 & 11B-308.



#### APPLICABLE CODES DRAWING INDEX

PARTIAL LIST OF APPLICABLE CODES: 2022 CALIFORNIA ADMINISTRATIVE CODE (CAC), PART 1. TITLE 24 CCR 2022 CALIFORNIA BUILDING CODE (CBC), PART 2, TITLE 24 CCR 2022 CALIFORNIA ELECTRICAL CODE (CEC), PART 3, TITLE 24 CCR

2022 CALIFORNIA MECHANICAL CODE (CMC), PART 4, TITLE 24 CCR 2022 CALIFORNIA PLUMBING CODE (CPC), PART 5, TITLE 24 CCR 2022 CALIFORNIA ENERGY CODE (CEC), PART 6, TITLE 24 CCR 2022 CALIFORNIA FIRE CODE (CFC), PART 9, TITLE 24 CCR

2022 CALIFORNIA EXISTING BUILDING CODE (CEBC), PART 10, TITLE 24 CCR 2022 CALIFORNIA GREEN BUILDING STANDARDS CODE (CALGREEN), PART 11, TITLE 24 CCR 2022 CALIFORNIA REFERENCED STANDARDS CODE, PART 12, TITLE 24 CCR TITLE 19 CCR, PUBLIC SAFETY, STATE FIRE MARSHAL REGULATIONS

NFPA 72 NATIONAL FIRE ALARM AND SIGNALING CODE (CA AMENDED): 2022 EDITION NFPA 720 STANDARD FOR THE INSTALLATION OF CARBON MONOXIDE DETECTION AND WARNING **EQUIPMENT**; 2015 EDITION NFPA 80 STANDARD FOR FIRE DOORS AND OTHER OPENING PROTECTIVES; 2019 EDITION UL 464 AUDIBLE SIGNALING DEVICES FOR FIRE ALARM AND SIGNALING SYSTEMS, INCLUDING ACCESSORIES; 2003 EDITION UL 521 STANDARD FOR HEAT DETECTORS FOR FIRE PROTECTIVE SIGNALING SYSTEMS; 1999 EDITION UL 1971 STANDARD FOR SIGNALING DEVICES FOR THE HEARING IMPAIRED; 2018 EDITION (R2010)

SEE CALIFORNIA BUILDING CODE, CHAPTER 35, FOR STATE OF CALIFORNIA AMENDMENTS TO THE NFPA

#### FIRE ALARM SITE PLAN FIRE ALARM ENLARGED SITE PLAN FIRE ALARM DETAILS

FIRE ALARM SYMBOLS, LEGENDS & GENERAL NOTES FA0.0 FIRE ALARM SPECIFICATION FA2.1 FA6.1

**DESCRIPTION** 

PARTIAL LIST OF APPLICABLE STANDARDS

FOR A COMPLETE LIST OF APPLICABLE NFPA STANDARDS REFER TO 2022 CBC (SFM) CHAPTER 35 AND CALIFORNIA FIRE CODE CHAPTER 80.

#### ANCHORAGE AND BRACING NOTES **GENERAL NOTES**

ALL WORK SHALL BE IN CONFORMANCE WITH TITLE 24, 2022 CALIFORNIA CODE OF REGULATIONS (CCR), 2022 CALIFORNIA BUILDING CODE, PART 2, TITLE 24 CCR, 2022 CALIFORNIA ELECTRICAL CODE, PART 3, TITLE 24

CUTTING, BORING, SAWCUTTING OR DRILLING THROUGH THE NEW OR EXISTING STRUCTURAL ELEMENTS TO BE DONE ONLY WHEN SO DETAILED IN THE DRAWINGS OR ACCEPTED BY THE ARCHITECT AND STRUCTURAL ENGINEER WITH THE APPROVAL OF DSA REPRESENTATIVE.

MEP COMPONENT ANCHORAGE NOTE ALL MECHANICAL, PLUMBING, AND ELECTRICAL COMPONENTS SHALL BE ANCHORED AND INSTALLED PER

THE FOLLOWING COMPONENTS SHALL BE ANCHORED OR BRACED TO MEET THE FORCE AND DISPLACEMENT REQUIREMENTS PRESCRIBED IN THE 2022 CBC SECTIONS 1617A.1.18 THROUGH 1617A.1.26 AND ASCE 7-16 CHAPTERS 13, 26 AND 30: 1. ALL PERMANENT EQUIPMENT AND COMPONENTS. 2. TEMPORARY, MOVABLE OR MOBILE EQUIPMENT THAT IS PERMANENTLY ATTACHED (E.G. HARD WIRED) TO

THE DETAILS ON THE DSA APPROVED CONSTRUCTION DOCUMENTS.

THE BUILDING UTILITY SERVICES SUCH AS ELECTRICITY, GAS OR WATER. "PERMANENTLY ATTACHED" SHALL INCLUDE ALL ELECTRICAL CONNECTIONS EXCEPT PLUGS FOR 110/220 VOLT RECEPTACLES HAVING A FLEXIBLE CABLE. 3. TEMPORARY, MOVABLE OR MOBILE EQUIPMENT WHICH IS HEAVIER THAN 400 POUNDS OR HAS A CENTER OF MASS LOCATED 4 FEET OR MORE ABOVE THE ADJACENT FLOOR OR ROOF LEVEL THAT DIRECTLY SUPPORT THE COMPONENT IS REQUIRED TO BE RESTRAINED IN A MANNER APPROVED BY DSA.

STRUCTURE BUT NEED NOT DEMONSTRATE DESIGN COMPLIANCE WITH THE REFERENCES NOTED ABOVE. THESE COMPONENTS SHALL HAVE FLEXIBLE CONNECTIONS PROVIDED BETWEEN THE COMPONENT AND ASSOCIATED DUCTWORK, PIPING, AND CONDUIT. FLEXIBLE CONNECTIONS MUST ALLOW MOVEMENT IN BOTH TRANSVERSE AND LONGITUDINAL DIRECTIONS: A. COMPONENTS WEIGHING LESS THAN 400 POUNDS AND HAVE A CENTER OF MASS LOCATED 4 FEET OR LESS ABOVE THE ADJACENT FLOOR OR ROOF LEVEL THAT DIRECTLY SUPPORT THE COMPONENT. B. COMPONENTS WEIGHING LESS THAN 20 POUNDS. OR IN THE CASE OF DISTRIBUTED SYSTEMS. LESS THAN

5 POUNDS PER FOOT, WHICH ARE SUSPENDED FROM A ROOF OR FLOOR OR HUNG FROM A WALL.

THE FOLLOWING MECHANICAL AND ELECTRICAL COMPONENTS SHALL BE POSITIVELY ATTACHED TO THE

THE ANCHORAGE OF ALL MECHANICAL, ELECTRICAL AND PLUMBING COMPONENTS SHALL BE SUBJECT TO THE APPROVAL OF THE DESIGN PROFESSIONAL IN GENERAL RESPONSIBLE CHARGE OR STRUCTURAL ENGINEER DELEGATED RESPONSIBILITY AND ACCEPTANCE BY DSA. THE PROJECT INSPECTOR WILL VERIFY THAT ALL COMPONENTS AND EQUIPMENT HAVE BEEN ANCHORED IN ACCORDANCE WITH ABOVE

PIPING, DUCTWORK, AND ELECTRICAL DISTRIBUTION SYSTEM BRACING NOTE

REQUIREMENTS.

PIPING, DUCTWORK, AND ELECTRICAL DISTRIBUTION SYSTEMS SHALL BE BRACED TO COMPLY WITH THE FORCES AND DISPLACEMENTS PRESCRIBED IN ASCE 7-16 SECTION 13.3 AS DEFINED IN ASCE 7-16 SECTIONS 13.6.5, 13.6.6, 13.6.7, 13.6.8; AND 2022 CBC SECTIONS 1617A.1.24, 1617A.1.25 AND 1617A.1.26.

THE METHOD OF SHOWING BRACING AND ATTACHMENTS TO THE STRUCTURE FOR THE IDENTIFIED DISTRIBUTION SYSTEM ARE AS NOTED BELOW. WHEN BRACING AND ATTACHMENTS ARE BASED ON A PREAPPROVED INSTALLATION GUIDE (E.G., OSHPD OPM FOR 2013 CBC OR LATER), COPIES OF THE BRACING SYSTEM INSTALLATION GUIDE OR MANUAL SHALL BE AVAILABLE ON THE JOBSITE PRIOR TO THE START OF AND DURING THE HANGING AND BRACING OF THE DISTRIBUTION SYSTEMS. THE STRUCTURAL ENGINEER OF RECORD SHALL VERIFY THE ADEQUACY OF THE STRUCTURE TO SUPPORT THE HANGER AND BRACE LOADS. MECHANICALPIPING (MP), MECHANICAL DUCTS (MD), PLUMBING PIPING (PP), ELECTRICAL DISTRIBUTION

MP [] MD [] PP [] E [X] OPTION 1: DETAILED ON THE APPROVED DRAWINGS WITH PROJECT SPECIFIC NOTES

MP[]MD[]PP[]E[]OPTION 2: SHALL COMPLY WITH THE APPLICABLE OSHPD PRE-APPROVAL (OPM #)

#### WIRE SCHEDULE

WIRE DESIGNATION	WIRE IN CONDUIT	WIRE IN CONDUIT UNDERGROUND/WET LOC.	UNDERGROUND/W WIRE DESIGNATIO
INIT. LOOP Z	2 CONDUCTOR #16 FPL TWISTED/ SHIELDED WEST PENN #D991	2 CONDUCTOR #16 FPLP SHIELDED WEST PENN #AQ-294	INIT. LOOP Z
SBUS B	4 CONDUCTOR #18 TWISTED SHIELDED PAIR CABLE	4 CONDUCTOR #18 TWISTED SHIELDED PAIR CABLE	SBUS B
VBUS C	2 CONDUCTOR #18 TWISTED SHIELDED PAIR CABLE	2 CONDUCTOR #18 TWISTED SHIELDED PAIR CABLE	VBUS C
SPEAKER CKT. S	2 CONDUCTOR #14 THHN/THWN STRANDED	2 CONDUCTOR #14 THHN/THWN STRANDED	SPEAKER CKT. S
VISUAL CKT. V	2 CONDUCTOR #12 THHN/THWN STRANDED	2 CONDUCTOR #12 THHN/THWN STRANDED	VISUAL CKT. V
POWER CKT. P	2 CONDUCTOR #12 THHN/THWN STRANDED	2 CONDUCTOR #12 THHN/THWN STRANDED	POWER CKT. P

ALL WIRE MODEL NUMBERS ARE WEST PENN. EQUIVALENT BY OTHER MANUFACTURER IS ACCEPTABLE.

## FIRE ALARM REQUIREMENTS

THE CONTRACTOR SHALL PROVIDE AND SUBMIT THE FIRE ALARM SHOP DRAWINGS TO THE ARCHITECT FOR REVIEW AND APPROVAL PRIOR TO INSTALLATION OF THE FIRE ALARM SYSTEM. THE SUBMITTAL SHALL CONTAIN THE FOLLOWING:

A. SHOP DRAWINGS: COMPLETE 1/8" SCALE FLOOR PLANS SHOWING ALL DEVICES. COMPONENTS. CONDUIT AND WIRING INDICATING A COMPLETE AND OPERABLE SYSTEM AS DESIGNED AND SPECIFIED. REPRODUCED COPIES OF BID SET FIRE ALARM PLANS ARE NOT ACCEPTABLE AS SHOP DRAWINGS. SHOP DRAWINGS MUST ALSO INDICATE DEVICE MOUNTING HEIGHTS, ROOM NAMES AND NUMBERS AND THE LOCATION OF ALL FIRE RATED WALLS. B. ELECTRICAL CONTRACTOR'S AND FIRE ALARM SYSTEM INSTALLER'S NAME, ADDRESS, PHONE NUMBER AND

C. LIST OF SYSTEM COMPONENTS, EQUIPMENT AND DEVICES, INCLUDING MANUFACTURERS' MODEL NUMBER(S) AND CALIFORNIA STATE FIRE MARSHALL LISTING NUMBERS. D. ORIGINAL COPIERS OF MANUFACTURERS' SPECIFICATION SHEETS FOR ALL EQUIPMENT AND DEVICES E. VOLTAGE DROP CALCULATIONS -- INCLUDE THE FOLLOWING INFORMATION FOR THE WORST CASE:

1. POINT-TO-POINT OR OHMS LAW CALCULATIONS. 2. IDENTIFICATION OF ZONE USED IN CALCULATIONS. 3. VOLTAGE DROP PERCENT (NOT TO EXCEED MANUFACTURERS' REQUIREMENTS).

a. NOTE: IF VOLTAGE DROP EXCEEDS 10%, INDICATE MANUFACTURERS' LISTED OPERATING RANGE(S) OR EQUIPMENT AND DEVICES. 4. NOTE CIRCUIT NUMBER FOR WORST CASE CALCULATION.

F. BATTERY TYPE(S), AMPS HOURS AND LOAD CALCULATIONS -- INCLUDE THE FOLLOWING INFORMATION: 1. NORMAL OPERATION: 100% OF APPLICABLE DEVICES FOR 24 HOURS = CONTROL PANEL AMPS PLUS LIST OF AMPS PER DEVICE WHICH DRAW POWER FROM THE PANEL DURING STANDBY POWER -- I.E.: a. ZONE MODULES b. DETECTORS

c. OTHER DEVICES (IDENTIFY) 2. ALARM CONDITION: 100% OF APPLICABLE DEVICES FOR 15 MINUTES = CONTROL PANEL AMPS PLUS LIST OF AMPS PER DEVICE WHICH DRAW POWER FROM THE PANEL DURING STANDBY POWER -- I.E.: a. ZONE MODULES b. SIGNAL MODULES

c. DETECTORS d. SIGNAL DEVICES e. ANNUNCIATOR

AND APPLIANCES FOR TESTING.

f. OTHER DEVICES (IDENTIFY) 3. NORMAL OPERATION + ALARM OPERATION a. TOTAL AMP HOURS REQUIRED.

b. TOTAL AMP HOURS PROVIDED. 10% OF EXISTING FIRE ALARM DEVICES AND APPLIANCES SHALL BE ADDED TO THE NEW FIRE ALARM DEVICES

APPLICABLE STANDARD 2022, NFPA 72, AS ADOPTED AND AMENDED IN CBC CHAPTER 35

SPECIFICATION, INCLUDING STATE FIRE MARSHAL LISTING NUMBERS FOR EACH COMPONENT OF THE SYSTEM, HAS BEEN APPROVED BY DSA. UPON COMPLETION OF SYSTEM INSTALLATION, A SATISFACTORY TEST OF THE ENTIRE SYSTEM SHALL BE MADE IN

THE PRESENCE OF A DSA PROJECT INSPECTOR. A STAMPED SET OF APPROVED FIRE ALARM DESIGN DOCUMENTS SHALL BE ON THE JOB SITE AND USED FOR INSTALLATION. ANY DISCREPANCIES BETWEEN THE DRAWINGS AND THE CODE OR RECOGNIZED STANDARDS SHALL BE BROUGHT TO THE ATTENTION OF DSA AND THE ARCHITECT/ENGINEER OF THE PROJECT.

INSTALLATION OF THE SYSTEMS SHALL NOT BE STARTED UNTIL DETAILED DESIGN DOCUMENTS AND

INSPECTION AND /OR TESTING ALL PENETRATIONS THROUGH RATED ASSEMBLIES REQUIRING OPENING PROTECTION SHALL BE PROVIDED WITH A PENETRATION FIRE STOP SYSTEM AS IDENTIFIED IN CBC CHAPTER 7, UL OR OTHER APPROVED LAB TESTING CRITERIA. APPROVED TYPES OF MATERIALS SHALL BE IDENTIFIED WITHIN THE PROJECT SPECIFICATIONS WITHIN

DSA, ARCHITECT/ENGINEER AND OWNER SHALL BE NOTIFIED A MINIMUM OF 48 HOURS PRIOR TO THE FINAL

THE FIRE ALARM SECTION. WALL MOUNTED VISIBLE NOTIFICATION DEVICES SHALL HAVE THEIR BOTTOMS MOUNTED AT 80" MINIMUM AND 96" MAXIMUM FROM FINISHED FLOOR. WALL MOUNTED AUDIBLE NOTIFICATION DEVICES SHALL HAVE THEIR TOPS ABOVE THE FINISHED FLOORS AT HEIGHTS OF NOT LESS THAN 90" AND BELOW THE FINISHED CEILINGS AT DISTANCES OF NOT LESS THAN 6".

). AUDIBLE DEVICES SHALL PROVIDE A SOUND PRESSURE LEVEL OF 15 DECIBELS (DBA) ABOVE THE AVERAGE AMBIENT SOUND LEVEL OR FIVE DBA ABOVE THE MAXIMUM SOUND LEVEL HAVING A DURATION OF AT LEAST 60 SECONDS, WHICHEVER IS GREATER, IN EVERY OCCUPIABLE SPACE WITHIN THE BUILDING. . AUDIBLE DEVICES SHALL BE SYNCHRONIZED TEMPORAL CODE 3 PATTERN.

DEVICES WITHIN 55' FROM EACH OTHER SHALL BE SYNCHRONIZED.

12. THE CONTRACTOR SHALL ADJUST/INSTALL ALL DEVICES TO MAXIMIZE PERFORMANCE AND TO MINIMIZE FALSE ALARMS. 3. VISIBLE DEVICES SHOULD NOT EXCEED TWO FLASHES PER SECOND AND SHOULD NOT BE SLOWER THAN ONE FLASH EVERY SECOND. THE DEVICE SHALL HAVE A PULSING LIGHT SOURCE NOT LESS THAN 15 CANDELLA. VISIBLE

4. UNDERGROUND AND EXTERIOR CONDUITS TO HAVE WATER TIGHT FITTINGS AND WIRE TO BE APPROVED FOR WET LOCATIONS. . ALL FIRE ALARM WIRING SHALL BE FPL OR FPLP (FIRE POWER LIMITED OR FIRE POWER LIMITED PLENUM) AS REQUIRED FOR APPLICATION. WIRING IN CONDUIT ABOVE GROUND MAY BE TYPE THHN OR THWN.

6. PER CEC STANDARDS, ALL WIRING IS TO BE PULLED THROUGH EACH JUNCTION BOX AND CONNECTED DIRECTLY TO EACH FIRE DEVICE. DO NOT SPLICE THE WIRE. ALL BOXES TO BE SIZED PER CEC. SMOKE DETECTORS SHALL NOT BE ANY CLOSER THAN 1' FROM FIRE SPRINKLERS OR 3' FROM ANY SUPPLY DIFFUSER. IN AREA OF CONSTRUCTION OR POSSIBLE DAMAGE/CONTAMINATION ON NEWLY INSTALLED FIRE ALARM.

DEVICES SHALL BE COVERED UNTIL THAT AREA IS READY TO BE TURNED OVER TO THE OWNER. 18. ALL FIRE ALARM CIRCUITS SHALL BE IN CONDUIT, SURFACE RACEWAY OR OPEN RUN ABOVE CEILINGS, UNDER FLOORS AND IN WALLS IN A NEAT AND PROTECTED MANOR AS INDICATED ON DESIGN DOCUMENTS.

20. FIRE ALARM PANEL, REMOTES, AND COMPONENTS SHALL BE SECURED TO MOUNTING SURFACES PER MANUFACTURERS SPECIFICATIONS. NO SINGLE DEVICE SHALL EXCEED 20 LBS. WITHOUT SPECIAL MOUNTING

19. EXPOSED CIRCUITS ARE ONLY PERMITTED WHEN NOTED AS EXPOSED ON DESIGN DOCUMENTS.

1. A DEDICATED BRANCH CIRCUIT SHALL BE PROVIDED FOR FIRE ALARM EQUIPMENT. THIS CIRCUIT SHALL BE ENERGIZED FROM THE COMMON USE AREA PANEL AND SHALL HAVE NO OTHER OUTLETS. THE BREAKER SHALL HAVE A RED LOCKING DEVICE TO BLOCK THE HANDLE IN THE "ON" POSITION. THE CIRCUIT BREAKER SHALL BE LABELED "FIRE ALARM CIRCUIT CONTROL." CIRCUIT ID TO BE LABELED AT FIRE PANEL/EXTENDERS. . THE INSTALLING CONTRACTOR SHALL PROVIDE A COMPLETED "SYSTEM RECORD OF COMPLETION" PER NFPA 72,

23. FIRE ALARM CONTROL PANELS AND REMOTE ANNUNCIATORS SHALL BE INSTALLED WITH THEIR BOTTOMS

MOUNTED AT 48" ABOVE THE FINISHED FLOOR. 4. MICROPHONES ASSOCIATED WITH EMERGENCY VOICE ALARM COMMUNICATION SYSTEMS (EVAC) SHALL BE ACCESSIBLE FOR USE, INSTALLED IN COMPLIANCE WITH CBC SECTIONS 11B-305 AND 11B-308. 25. THE INSTALLING CONTRACTOR SHALL PROVIDE SYSTEM PROGRAMMING FOR SUPERVISORY MONITORING PER CBC

26. SUPERVISORY MONITORING SHALL BE TESTED AND VERIFIED AS SENDING CORRECT SIGNALS IN CONJUNCTION WITH FINAL ACCEPTANCE TEST. OWNER SHALL BE RESPONSIBLE FOR ESTABLISHING A FIRE SYSTEM MONITORING CONTRACT OR PROVISIONS.

28. ALL CARBON MONOXIDE SIGNALS SHALL SOUND A FOUR-PULSE TEMPORAL PATTERN PER NFPA 720, 5.8.6.5.1. 29. ALL EQUIPMENT SHALL BE U.L. AND C.S.F.M. LISTED.

30. ELECTRICAL CONTRACTOR SHALL FURNISH ACCESS PANELS TO AREAS THAT REQUIRE ACCESS FOR ATTIC HEAT DETECTOR, SERVICING, TROUBLESHOOTING, ETC. 31. DO NOT DEVIATE FROM CONDUIT RUNS AS SHOWN ON FLOOR PLANS WITHOUT PRIOR APPROVAL FROM SYSTEM SUPPLIER. FACTORS SUCH AS EXCESSIVE VOLTAGE DROP, ADDITIONAL PARTS, ENGINEERING, ETC., THAT ARE A

RESULT OF CONDUIT RUN DEVIATIONS SHALL BE THE SOLE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR. 34. ALL 120VAC POWER REQUIREMENTS FOR THE FIRE ALARM SYSTEM SHALL BE FURNISHED BY THE ELECTRICAL CONTRACTOR AND SHALL MEET ALL REQUIREMENTS OF THE AUTHORITIES HAVING JURISDICTION. 35. ALL FIRE ALARM DEVICE BACKBOXES, FIRE ALARM TERMINAL CABINETS, GUTTERS, JUNCTION BOXES, AND ASSOCIATED CONDUITS SHALL BE FURNISHED AND INSTALLED BY ELECTRICAL CONTRACTOR UNLESS OTHERWISE

NOTED. REFER TO FIRE ALARM SYMBOL LIST AND/OR MOUNTING DETAILS FOR ADDITIONAL INFORMATION. SYSTEM SUPPLIER PROVIDED BACKBOXES SHALL BE INSTALLED BY ELECTRICAL CONTRACTOR UNLESS OTHERWISE NOTED. 36. SMOKE DETECTOR TESTING SHALL BE ACCOMPLISHED PER THE MANUFACTURER'S INSTRUCTIONS.

37. ALL WIRING, INITIATING DEVICES AND ANNUNCIATOR PANEL SHALL BE SUPERVISED TO THE PRINCIPAL POINT OF ANNUNCIATION. THE FIRE ALARM CONTROL PANEL TO SUPERVISE THE ANNUNCIATOR PANEL, ALL INITIATING AND INDICATING DEVICE CIRCUITS. 38. ALL WIRING SHALL BE CUT FOR IN AND OUT. WIRING SHALL NOT BE LOOPED THROUGH DEVICES.

39. POINT, COMMON ANNUNCIATION, AND T-TAPPING ARE PROHIBITED. 40. PROVIDE 3/4" CONDUIT FROM FIRE ALARM CONTROL PANEL TO TELEPHONE BACKBOARD FOR OWNER PROVIDED CENTRAL STATION MONITORING. 41. MINIMUM CONDUIT SIZE SHALL BE 3/4" AND CONTRACTOR SHOULD PROVIDE APPLICABLE CONDUIT SIZE AS REQUIRED PER THE SHOP DRAWING AND SPECIFICATION.

43. ALL DEVICES IN THE ALARM SYSTEM SHALL BE COMPATIBLE AND INSTALLED PER MANUFACTURER'S

SPECIFICATIONS. 44. FIRE ALARM SYSTEM SHALL BE UL LISTED. 45. CBC 907.6.6.3 (SFM AMENDMENT) REQUIRES FIRE ALARM TO ... "TRANSMIT THE ALARM, SUPERVISORY AND TROUBLE SIGNALS TO AN APPROVED SUPERVISORY STATION IN ACCORDANCE WITH NFPA 72. THE SUPERVISORY STATION SHALL BE LISTED AS EITHER UUFX (CENTRAL STATION) OR UUJS (REMOTE AND PROPRIETARY) BY THE

UNDERWRITERS LABORATORY INC. (UL) OR OTHER APPROVED LISTING AND TESTING LABORATORY OR SHALL COMPLY WITH THE REQUIREMENTS OF STANDARD, FM 3011)." 46. SUBSTITUTION OF SYSTEM COMPONENTS OR MANUFACTURER WILL REQUIRE THE CONTRACTOR TO SEPARATELY

OBTAIN APPROVAL WITH THE DSA AT CONTRACTOR'S EXPENSE AND SHALL MEET ALL REQUIREMENTS OF THE SYSTEM AS DESIGNED AND PRE-APPROVED. ALL PROPOSED SUBSTITUTIONS SHALL BE LISTED WITH THE CALIFORNIA STATE FIRE MARSHAL. 47. FINAL ACCEPTANCE TEST TO INCLUDE TESTING THE CONNECTION BETWEEN THE FIRE ALARM PANEL AND THE

SUPERVISING STATION. 48. COORDINATE WITH THE ENGINEER FOR USE OF EXISTING CONDUIT ON A CASE BY CASE BASIS. 49. PRIOR TO DEMOLITION, CONTRACTOR SHALL TEST THE INTERCOM SYSTEM TO ENSURE FULL FUNCTIONALITY. GENERATE A LIST OF FAULTY EQUIPMENT AND PROVIDE TO THE OWNER AND THE ARCHITECT. PROVIDE PRICING

FOR ANY REQUIRED EQUIPMENT REPAIRS OR REPLACEMENT. 50. CONTRACTOR SHALL DISCONNECT EXISTING FIRE ALARM SYSTEM FROM THE EXISTING INTERCOM SYSTEM. ENSURE THE INTERCOM SYSTEM IS COMPLETELY FUNCTIONAL AFTER DISCONNECTION. 51. CONTRACTOR SHALL CLEARLY MARK THE ABANDON SECTION OF PUBLIC ADDRESS SYSTEM.

52. PROVIDE A FIRE ALARM DOCUMENTATION CABINET PER NFPA72.7.7. 53. FIRE SAFETY DURING DEMOLITION AND CONSTRUCTION SHALL COMPLY WITH CBC CHAPTER 33 AND CFC CHAPTER 33. 54. SHOULD ANY EXISTING CONDITIONS SUCH AS DETERIORATION OR NON-COMPLYING CONSTRUCTION BE

DISCOVERED WHICH IS NOT COVERED BY THE DSA APRROVED DOCUMENTS WHEREIN THE FINISHED WORK WILL NOT COMPLY WITH TITLE 24, CALIFORNIA CODE OF REGULATION CHANGE DOCUMENT, OR A SEPERATE SET OF PLANS AND SPECIFICATIONS, DETAILING AND SPECIFYING THE REQUIRED REPAIR WORK SHALL BE SUBMITTED TO AND APPROVED BY DSA BEFORE PROCEEDING WITH THE REPAIR WORK (CAC 4-317(C)) 5. CHANGES TO THE DIVISION OF THE STATE ARCHITECT APPROVED DRAWINGS AND SPECIFICATIONS SHALL BE MADE BY ADDENDA OR CONSTRUCTION CHANGE DOCUMENTS FOR CHANGES TO THE STRUCTURAL, ACCESSIBILITY OR FIRE -SAFETY PORTIONS OF THE PROJECT. CHANGES SHALL BE SUBMITTED TO AND APPROVED BY DSA PRIOR

TO COMMENCEMENT OF THE WORK SHOWN THEREON CAC 4-338(C)). 56. PROJECT INSPECTOR TO APPROVE SYSTEM VOICE-EVACUATION INTELLIGIBILITY DURING TESTING PHASE. 7. CONTRACTOR SHALL PROVIDE ALL CABLING, RELAYS, MOUNTING HARDWARE AND ANY OTHER DEVICES (FIRE ALARM SYSTEM DEVICES) TO PROVIDE A FULLY FUNCTIONING FIRE ALARM OVERRIDE SYSTEM. WHEN FIRE ALARM CEASES, EACH LOCAL SOUND SYSTEM SHALL AUTOMATICALLY REVERT TO NORMAL OPERATION. FIRE ALARM

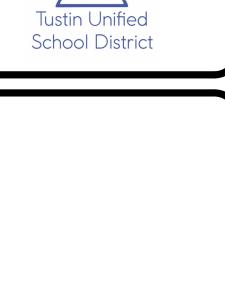
MODULES AND CABLING BY FIRE ALARM CONTRACTOR. 58. FOR ALL HEAT DETECTORS THAT ARE LOCATED ABOVE CEILING/ATTIC SPACES. CONTRACTOR SHALL PROVIDE STICKER AND LABEL "HD" AT THE REFLECTED CEILING DIRECTLY BELOW THE DEVICE TO INDICATE LOCATION. 60. AUTOMATIC FIRE ALARM SYSTEMS SHALL BE MONITORED AND SHALL TRANSMIT THE ALARM. SUPERVISORY AND TROUBLE SIGNALS TO AN APPROVED SUPERVISING STATION IN ACCORDANCE WITH NFPA 72. THE SUPERVISING STATION SHALL BE LISTED AS EITHER UUFX (CENTRAL STATION) OR UUJS (REMOTE & PROPRIETARY) BY THE UNDERWRITERS LABORATORY INC. (UL) OR OTHER APPROVED LISTING AND TESTING LABORATORY OR SHALL

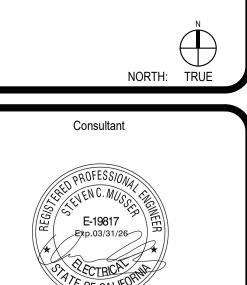
COMPLY WITH THE REQUIREMENTS OF FM 3011. TERMINATION OF MONITORING SERVICES SHALL BE IN ACCORDANCE WITH SECTION 907.6.6.2. 11. THE NEW PROJECT SUBMITTAL TO INCLUDE DIRECTION THAT FIRE ALARM SYSTEM RECORD OF COMPLETION AND FIRE ALARM SYSTEM RECORD OF INSPECTION AND TESTING FORM THESE TWO DOCUMENTS FROM NFPA 72 ARE TO BE COMPLETED AND SUBMITTED PRIOR TO CLOSE OUT OF THE PROJECT. A COPY OF COMPLETED AND SIGNED FORM SHALL BE GIVEN TO THE ARCHITECT OR ENGINEER OF RECORD. THE PROJECT INSPECTOR. THE OWNER

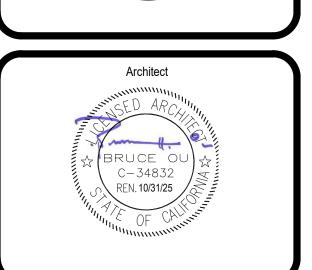
(SCHOOL DISTRICT) AND LOCAL FIRE AUTHORITY. 62. INTELLIGIBILITY SHALL BE TESTED ACCORDING TO NFPA 72 ANNEX D.2 (SPEECH INTELLIGIBILITY). 63. UNLESS SPECIFICALLY SHOWN ON THESE PLANS NO STRUCTURAL MEMBERS SHALL BE CUT, DRILLED NOR NOTCHED WITHOUT PRIOR WRITTEN AUTHORIZATION FROM THE STRUCTURAL ENGINEER AND THE DISTRICT STRUCTURAL ENGINEER FROM THE DIVISION OF THE STATE ARCHITECT.

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#### SECTION 28 31 00 FIRE DETECTION AND ALARM PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section. 1.2 SUMMARY

A. This Section Includes: 1. Provide a complete, fully addressable, power limited, fire detection and voice evacuation system for this project. The system shall be connected, tested, verified by AHJ to be acceptable and left in first class operating condition. All equipment herein specified shall be engineer-approved and California State Fire Marshal (CSFM) listed. The entire installation shall conform to the National Fire Protection Association (NFPA) Standard 72, 2022 90A & CEC Article 760 and authorities having jurisdiction as applicable. The system specified and depicted on the plan is a complete and approved system. The entire fire alarm system has been submitted and approved by the Division of the State Architect as a complete submittal. Any routing of the system wiring that is significantly different than shown on the approved drawings shall have the approval of the engineer and must be obtained prior to construction. 2. Provide all work and material as shown and / or required to provide a fully functional and adequate system as described hereon and as required by the California State Fire Marshal. 3. Supervision: The fire alarm system shall monitor the integrity of all alarm initiating and indicating appliance circuits and provide local and remote status of all connected systems. The

system shall be provided with automatically charged standby batteries to maintain system operation for 24 HRS in the normal supervisory mode and 15 minutes of alarm. Batteries shall be supervised for connection to the system and low voltage threshold. The automatic battery charger shall be capable of charging fully discharged system batteries to 100% in 8 hours. 4. The system wiring and installation shall be as stated in drawings and as required by the manufacturer. All wiring shall be color coded, tagged and verified to assure that it is free from shorts and grounds and shall be rated for the appropriate environmental conditions such as well locations.

5. Testing: The completed system shall be tested in accordance with NFPA Standard 72 7.6.6 and 7.8.2.

6. All Fire Alarm wiring shown in drawings shall be installed in conduit. 7. System Operation shall include:

a. Separate zone signaling and device status indication for all initiating devices. b. Audible to sound the California uniform fire alarm signal in temporal mode. Devices shall be at least 15dBA above average ambient sound level, but not less than 75dBA at 10' or more than 120dBA. c. Visual devices shall not exceed 2 flashes per second and shall not be slower than 1 flash per second. Visual devices shall be synchronized when 3 or more devices are within the

same field of view. d. Supervision of all circuits to indicate any abnormal wiring condition. e. N.O./N.C. integral relays for external device interface or as indicated on drawings.

f. Central station connection capable of indicating (3) distinct separate signals as being tamper, trouble and alarm with point reporting capabilities. 8. All work shall be completed as shown on the plans and or as specified within this specification and shall include the following (but is not limited to):

a. Life safety fire alarm detection and signaling system

b. Furnishing and installation of equipment and devices. c. Conductors, connections and interconnections where specified and all in conduit system.

d. Conduit, wire and connections for control of heating and ventilation motors, smoke dampers and smoke exhaust. e. Testing, cleaning and adjusting of completed work. f. Wiring diagrams, as-built drawings and three (3) sets of equipment operations and maintenance instructions for Owner.

g. Complete maintenance for two years. h. Proposal for subsequent maintenance contract.

i. All work and material for complete and operable systems as indicated or specified. j. Permits, inspections and fees.

k. Identification and instruction to Owner Representative. Training shall consist of a minimum or two (2) 6-hour sessions.

9. Coordination with Section 26 05 33: Raceway and Boxes for Electrical Systems.

10. Furnishing of special back boxes where required for installation of fire alarm devices. 11. All conductors to be installed in conduit pursuant to Specification Section 26 05 33: Raceway and Boxes for Electrical Systems.

12. Qualifications: Contractor shall receive written approval and verified test results which shall be submitted to the owner for system from manufacturers recognized representative prior to completion and acceptance.

13. All initiating devices shall be separately addressed for individual identification at control panel.

14. As-Built Drawings: A complete set of reproducible "as-built" drawings showing installed wiring, color coding, wire tag notations exact locations of all installed equipment, specific interconnections between all equipment and internal wiring of the equipment shall be delivered to the owner upon completion of the system. 15. Maintenance Instructions: Three (3) submittals of maintenance instructions shall be provided and shall be complete, easy to read, understandable and shall provide the following

a. Instructions for replacing any components of the system, including internal parts. b. Instructions for periodic cleaning and adjustments of equipment with a schedule of these functions.

c. A complete list of all equipment and components with information as to the address and telephone number of both the manufacturer and local supplier of each item. d. User operating instructions shall be prominently displayed on a separate sheet located next to the control unit in accordance with UL Standard 864. The contractor shall warrant all equipment and wiring free from inherent mechanical and electrical defects for two years from the date of final acceptance.

16. The FACP shall integrate with the to prevent bells from activating during a fire alarm. 17. The FACP shall meet the requirements of UL ANSI 864 Ninth Edition. Systems listed to UL ANSI 864 Eighth Edition or earlier revisions are not acceptable. 18. Per DSA IRA-1 chapter of approval for temporary school use of DSA approved relocatable buildings, Approval of fire alarm and/or fire sprinkler systems for temporary use buildings shall be in accordance with the Chapter 9, CCR, Title 24, Part 2.

a. Fire Alarm: Section 3.4.4.4 For buildings sited less than three years and used for educational purposes (instruction), provide an approved manual fire alarm system consisting of

manual pull-stations, visual notification appliances and audible device(s) (with a minimum rating of 95 dBA at 10 feet). Buildings more than 25 feet apart are to be provided with additional audible devices to ensure the fire alarm signal can be heard within adjacent buildings. b. Communications: Section 3.4.4.5 Buildings more than 25 feet from other buildings, including other temporary buildings, with a stand-alone fire alarm system must be provided with

approved "two-way communication" with the main administration offices consisting of an intercom system, permanently mounted telephone or "walkie-talkie" devices or other similar systems. Buildings that are less than 25 feet from existing permanent buildings on the site shall be interconnected with the campus fire alarm system. B. Substitutions

1. Substitution of system components or manufacturer will require the contractor to separately obtain approval with DSA at Contractor's expense and shall meet all requirements of the system as designed and pre-approved.

2. All proposed substitutions shall be listed with the California State Fire Marshal. 1.3 SUBMITTALS

3. For equipment other than that specified, the contractor shall provide proof that the

A. Comply with applicable provisions of Section 26 05 00: Common Work Results for Electrical.

1. Two (2) copies of all submittals shall be submitted to the Architect/Engineer for review and approval.

2. All references to manufacturers model numbers and other pertinent information herein is intended to establish minimum standards of performance, function, and quality.

proposed substitute equipment equals or exceeds the form, feature, function, performance, and quality of the specified equipment. C. Product Data:

1. A complete list of all supplied equipment including model numbers with catalog data sheets on each component.

2. Data sheets show California State Fire Marshal Listing, U.L. listing, equipment ratings, dimensions and finishes. 3. Highlight actual devices to be used and their amp draw in stand-by and alarm modes.

D. Shop Drawings: 1. Provide schematic layout, floor plan, drawings indicating location of all components and equipment, required size and location of conduit and outlets and type and quantity of system conductors. Include voltage drop calculations and battery calculations based on actual number of devices to be installed.

2. Include riser and wiring diagrams for overall system and components including control panels, annunciators, power supplies, initiating circuits, notification appliances, control devices and FATC. Address numbers shall be noted on all appliances. 3. Include physical and electrical characteristics of equipment to indicate conformance with the Specifications.

4. Describe system characteristics and function as well as device wiring diagrams. 5. Voltage drop and battery calculations for each control panel and power supply and initiating circuits at 24 hour stand-by and 15 mins alarm.

6. System operational matrix. E. Operating and Maintenance Instruction Manual:

1. Manual shall include the following tailored to this specific project: a. Operational description.

c. Two wire circuit diagrams. d. Wiring destination schedule e. Schematic component diagrams and PC board layouts.

b. Coded cabling plan.

f. Maintenance and alignment procedures. g. Voltage drop and battery calculations.

Other documentation

1. In addition to the shop drawings, the following information shall also be included with the submittal. a. Manufacturer's technical data sheets for each piece of equipment that will be installed.

b. Standby battery calculations for the FACP and any remote power supply or other panels that include their own standby batteries c. Voltage drop calculations showing the worst-case end of line voltage for all notification appliance circuits.

d. Detailed description of the overall operation of the system or a sequence of operation matrix. e. Proof of factory training and certification of the supervising technician assigned to the project.

f. Proof of factory training and certification of a service technician employed by the installation company that can be onsite to troubleshoot and repair any service-related problems with the system, within 4 hours of being notified of the problem. 1.4 PERFORMANCE REQUIREMENTS

A. Alarm, trouble and supervisory signals from all intelligent reporting devices shall be encoded on NFPA Style 4 (Class B) Signaling Line Circuits (SLC).

B. Device Circuits (IDC) shall be wired Class A (NFPA Style D) as part of an addressable device connected by the SLC Circuit. C. Notification Appliance Circuits (NAC) shall be wired Class A (NFPA Style Z) as part of an addressable device connected by the SLC Circuit.

D. On Style 6 or 7 (Class A) configurations a single ground fault or open circuit on the system Signaling Line Circuit shall not cause system malfunction, loss of operating power or the

ability to report an alarm. E. Alarm signals arriving at the FACP shall not be lost following a primary power failure (or outage) until the alarm signal is processed and recorded.

F. NAC circuits and control equipment shall be arranged such that loss of any one (1) NAC circuit will not cause the loss of any other NAC circuit in the system. G. Two-way emergency telephone communication circuits shall be supervised for open and short circuit conditions.

H. The secondary power source of the fire alarm control panel shall be capable of providing at least 24 hours of backup power with the ability to power the system for an additional 15 minutes in an alarm condition, at the end of the 24-hour backup period. I. Basic System Operation

1. When an off normal condition occurs (Alarm, Supervisory, or Trouble) the respective LED on the FACP shall illuminate. 2. A piezo sounder shall activate at the FACP during any off normal condition until the SILENCE button is pressed by an authorized user.

3. A Red LED shall illuminate when an alarm or pre-alarm condition exists. 4. An Amber (yellow) LED shall illuminate when a Supervisory or Trouble condition exists.

5. A backlit 4-line 40-character LCD screen shall display all messages that refer to an off-normal condition. 6. An Alarm condition shall have priority over all other signals.

7. The FACP shall include an event buffer that maintains the last 4,000 system events including a date and time stamp for each. 8. In response to a fire alarm condition, the systems notification appliances and relay-controlled output circuits that are associated through programming with the device initiating the alarm, shall automatically activate. Additionally, the system shall notify an approved central station via dial-up, IP, or cellular means as deemed acceptable by the local Authority Having Jurisdiction (AHJ).

1.5 QUALITY ASSURANCE A. Loads of Equipment and Components

a. Follow IEEE Standard where applicable. b. Provide fuse protection for equipment and spare fuses

c. Design systems for operation at 120 volts, normal or emergency power as indicated, 60 Hz nominal input. d. Operating voltage dissipated by resistors shall not exceed 25% of ratings.

e. Operating voltage of capacitors shall not exceed 80% of rated voltage.

f. Operating loads and voltages on transistors and solid-state devices shall not exceed manufacturer's recommendation for normal full load operation. g. Use electronic components of types and rating commonly available from stock of established commercial distribution.

Regulatory Requirements 1. The specifications and standards shall fully comply with the latest issue of the current code and standards.

2. All requirements of the Authority Having Jurisdiction (AHJ).

The FACP and associated field devices system shall comply with the following Underwriters Laboratories Inc. (UL) USA listing standards as applicable. 1. No. 38 Manually Actuated Signaling Boxes

2. No. 50 Cabinets and Boxes 3. No. 864 Control Units for Fire Protective Signaling Systems

4. No. 268 Smoke Detectors for Fire Protective Signaling Systems

5. No. 268A Smoke Detectors for Duct Applications 6. No. 346 Waterflow Indicators for Fire Protective Signaling Systems

7. No. 464 Audible Signaling Appliances 8. No. 521 Heat Detectors for Fire Protective Signaling Systems

9. No. 1638 Private Mode Emergency and General Utility Signaling 10. No. 1971 Visual Notification Appliances

1.6 WARRANTY

A. For a period of three years from date of final acceptance, the system shall be under full guarantee for materials and labor at no cost to the Owner. The system shall be under a service contract with a technician authorized by the manufacturer. Replacement parts and labor shall be readily available during normal business hours while the service contract is in effect. A complete system inspection and test shall be performed at five months and again at eleven months after final acceptance. Tests shall include all smoke detector sensitivity settings

B. Conform to applicable provisions of the General Requirements.

C. Service technicians and replacement components for the system shall be available locally from a service representative of the manufacturer who is able to provide evidence of technical training and authorization by the manufacturer.

D. All component failures shall be remedied to the satisfaction of the Owner. E. A continuing service contract shall be offered at time of bid to commence at the expiration of warranty included with the system.

1.7 ACCEPTABLE MANUFACTURER

A. All fire alarm system devices and equipment shall be manufactured with the one indicated on the drawing or approved equivalent. No other manufacturers will be accepted. B. All equipment, materials, accessories, devices, etc. covered by the specifications and/or noted on the contract drawings shall be new and unused and be UL. listed for their intended

All equipment provided shall be available for purchase from at least two authorized distributors within the service area.

1.8 MAINTENANCE: Maintenance and testing shall be on a semi-annual basis or as required by the AHJ. A preventative maintenance schedule shall be provided by the contractor describing the protocol for preventative maintenance. The schedule shall include: Systematic testing and complete inspection of the entire fire alarm system including control panels, field devices, and wiring terminations including smoke sensors, heat sensors, manual pull stations, sprinkler system switches, remote panels, power supplies, and terminal boxes, and all other fire alarm accessories, in accordance with NFPA 72. Cleaning and adjusting of

An inspection and test of system power supplies, batteries, circuit breakers, and fuses as well as a load test of the batteries shall be conducted in accordance with NFPA 72. Placing the system into an alarm condition and checking each notification device for proper operation. Removing devices from the FACP SLC circuit to ensure a trouble condition occurs.

Input and output mapping shall be tested to ensure proper sequence of operation. Signal transmission shall be tested to the Monitoring Station.

A report showing the calibrated sensitivity of each of the systems smoke detectors shall be generated from the fire alarm control panel and verified to ensure all smoke detectors are Following each periodic maintenance and test, the owner shall be provided with a detailed report of the test results including any deficiencies found. PART 2 PRODUCT

2.1 MANUFACTURERS A. Fire Alarm Control Panel (FACP): Gamewell-FCI B. Fire Alarm Power Supply: Gamewell-FCI

C. Area Smoke Detectors and Heat Detectors: Gamewell-FCI D. Combination Speaker/strobe and Weatherproof Speaker: System Sensor

2.2 MATERIALS A. Main FACP or network node shall contain a microprocessor based Central Processing Unit (CPU) and power supply in an economical space saving single board design. The CPU shall communicate with and control the following types of equipment used to make up the system: intelligent addressable smoke and thermal (heat) detectors, addressable modules, printer, annunciators, and other system-controlled devices.

B. System Devices and components shall be provided as specified on the fire alarm equipment legend and as shown on associated electrical drawing. 2.3 COMPONENTS

EXISTING FIRE ALARM CONTROL PANEL (FACP)

A. FACP shall be as indicated model on the drawing or approved equivalent.

A. The fire alarm system as outlined on the drawings, shall be a fire life safety system as manufactured by the panel indicated on the drawing. It shall be complete with all necessary hardware, software and memory specifically tailored for this project. B. All equipment needed for a complete operable system, (whether specifically indicated or not) shall be included in this section. It shall be the installing contractor's responsibility for a complete and operable system upon completion of this project.

A. The fire alarm system operation subsequent to the alarm initiation via pull station, smoke detector, heat detector, sprinkler flow switch, etc., shall be as follows: 1. All audible alarm indicating devices shall sound the temporal signal code in synchronization with each other, until silenced at the control panel or at the remote annunciator.

2. All visual alarm indicating devices shall flash per NFPA requirements in synchronization with each other, until reset at the control panel or at the remote annunciator. 3. Alarm audible devices and alarm visual devices shall operate on the same circuit 4. The alarm signals shall be inhibited from being silenced for a period of at least 1 minute after commencing operation. this rate is to be field programmable for actual AHJ

5. Display type and location of alarm per point on the main control panel lcd display. 6. Display type and location of alarm per point on remote lcd annunciator.

7. List on printer the time, date, type, and user defined message for each event printed. 8. Graphically display on the fireworks station, school diagram showing whole school, with graphic scrolling thru system prompts, down to point of alarm activation. 9. Subsequent alarms are to report to the main control panel and fireworks, shall indicate to the operator that a subsequent alarm is present, and also indicate the number of

subsequent alarms. 10. Shut down all associated air handlers in alarm zone. 2.3Automatic supervisory operation A. All data, initiating, indicating and supervisory lines shall be constantly monitored for integrity. indicate opens, shorts, grounds, at main control panel and remote annunciator.

A. During the normal state, the normal led (green) shall flash. the first line of the lcd shall display the time in (hh: mm: ss) as well as the number of active points (ap) and the number of disabled points (dp) in the system

B. When the control panel goes into alarm condition, the normal led (green) extinguishes and the alarm led (red) shall light, the buzzer pulsates, and the lcd indicates the time, the number of messages waiting, the type of alarm, the point id number of devices, and the time that the alarm occurred the second line is dedicated to the user specified message. C. To silence the panel buzzer, the operator shall press the local silence button and the buzzer will silence. D. To silence the audible devices, the operator shall press the alarm silence button. a new alarm shall cause the audibles to resound.

E. During the trouble condition, the amber trouble led shall light, the normal led shall go out, and the buzzer shall pulsate. the display shall indicate the point id number of the device, the time the event occurred and up to a 40-character custom user description. F. During the monitor or supervisory condition, the appropriate led shall light, the normal led shall go out, and the buzzer shall pulsate. the display shall indicate the point id number of the device, the time the event occurred and up to a 40-character custom user description.

Fire Alarm Amplifier: 1. The intelligent fire alarm amplifier shall be as indicated model on the drawing or approved equivalent. The intelligent 50 or 70-watt amplifier is used to amplify the audio message for distribution throughout the facility. Since it is designed as a self-contained distributed amplifier it can be conveniently located near the area of protection to reduce wiring demands. 2. Each amplifier can produce 50 or 70 -watts of audio power. Up to four amplifiers can be used on the voice evacuation system. The amplifier has its own power supply with battery backup and four speaker circuits which can be expanded to eight speaker circuits. The amplifier is fully supervised by the main panel for trouble conditions.

B. Fire Alarm Power Module: 1. The intelligent fire alarm power module shall be as indicated model on the drawing or approved equivalent. It delivers 6 amps of notification appliance circuit power and built-in synchronization. Its switch mode power supply design is up to 50% more efficient than competitive linear mode power supplies. 2. The power supply is a 6-amp notification power expander that provides its own AC power connection, battery charging circuit, and backup battery for use with the same

manufacturer series fire alarm control panels (FACPs). The power supply is the cost-effective solution for powering notification appliances required by the Americans with Disabilities Act (ADA). It has built-in ANSI cadence pattern. The output circuits can be programmed as notification appliance circuits, or as auxiliary power (configurable for constant, resettable, or door holder power). C. Intelligent Photoelectric Smoke Detector

1. The intelligent photoelectric smoke detector shall be as indicated model on the drawing or approved equivalent and shall use the photoelectric (light-scattering) principal to measure smoke density and shall, on command from the control panel, send data to the panel representing the analog level of smoke density. D. Intelligent Thermal Detectors 1. The intelligent thermal detectors be as indicated model on the drawing or approved equivalent addressable devices rated at 135 degrees Fahrenheit (58 degrees Celsius) and have

a rate-of-rise element rated at 15 degrees F (9.4 degrees C) per minute. A high heat thermal detector rated at 190 degrees Fahrenheit shall also be available. The thermal detectors shall connect via two wires to the fire alarm control panel signaling line circuit. E. Control Relay Module: 1. The Control Relay is intended for use in intelligent, two-wire systems where the individual address of each module is selected using the built-in rotary switches. It allows a compatible control panel to switch discrete contacts by code command. The relay contains two isolated sets of Form-C contacts, which operate as a DPDT switch and are rated in accordance with

the table in the manual. Circuit connections to the relay contacts are not supervised by the module. The module also has a panel-controlled LED indicator. F. Intelligent Synchronized Monitor Module: 1. The addressable output supervised control module allows addressable fire alarm control panel to switch an external power supply, such as a DC supply or audio amplifier (up to 80 VRMS) to notification appliances. The notification appliance circuit can be wired either Class A (Style Z) or Class B (Style Y). It also supervises the wiring to the connected loads and reports their status to the panel as NORMAL, OPEN or SHORT CIRCUIT. The module contains a panel-controlled LED. The Series use a communication protocol that substantially increases the speed of communication between the SLC devices and certain addressable fire alarm control panels. These devices operate in a grouped fashion. If one of the devices in the group has a status change, the panel's microprocessor stops the group poll and concentrates on the single device. The net result is a superior response speed up to five times greater than the earlier designs. This module is designed for installation in the signaling line circuit of any addressable fire alarm control panel. The signaling line circuits of addressable

fire alarm control panels are designed to accommodate up to 159 modules per circuit. It is designed to mount in a 4" (10.16 cm) square junction box 2 1/8" (5.5 cm) deep. G. Intelligent Monitor Module: 1. The monitor module indicated on the drawing is an addressable monitor module for use with Honeywell Silent Knight Series fire alarm control panels (FACPs). The monitor module is intended for use in intelligent, two-wire systems, where individual address of each module is selected using the built-in rotary switches. 2. It supports Class A supervised or Class B supervised wiring to the load device. Conventional 4-wire smoke detectors can be monitored for alarm and trouble conditions.

H. Ceiling Mounted Strobe 1. The notification appliances shall be as indicated model or approved equivalent model as Visual Strobe appliances for ceiling-mount applications with a low-profile design or approved equals. The Strobes shall be listed for UL Standard 1971 (Emergency Devices for the Hearing-Impaired) for Indoor Fire Protection Service. 2. The Series shall be Restriction of Hazardous Substances (RoHS) compliant and contain no mercury or other hazardous substances.

3. All Series shall meet the requirements of FCC Part 15 and ICES-003. 4. All inputs shall be compatible with standard reverse polarity supervision of circuit wiring by a Fire Alarm Control Panel (FACP) with the ability to operate from 16 to 33 VDC. 5. The Strobe appliances shall produce a flash rate of one (1) flash per second over the Regulated Voltage Range and shall incorporate a Light Emitting Diode (LED) as the light source with a rugged Lexan® lens. The appliances shall be of low current design. The LED strobe flash duration shall be 20 ms. Where multi-candela appliances are specified, the strobe intensity shall have 4 field selectable settings at 15, 30, 75, 95 candela for ceiling-mount applications. The selector switch for selecting the candela shall be tamper resistant. Appliances with candela settings shall show the candela selection in a visible location at all times when installed.

6. The Strobe mounting options shall include Ceiling backboxes, 4" square, 1 1/2 or 2 1/8"deep and 4" Octagonal, 1 1/2" or 2 1/8"deep. Two wire appliance wiring shall be capable of directly connecting to the mounting base. Removal of an appliance shall result in a supervision fault condition by the Fire Alarm Control Panel (FACP). 7. All notification appliances shall be backwards compatible. 8. The ceiling models shall have a low-profile measuring.

9. When synchronization is required, the appliance shall be compatible with Sync Modules, PS Power Supplies, or other manufacturer's panels with built-in manufacturer Patented Sync Protocol. The strobes shall not drift out of synchronization at any time during operation. If the sync protocol fails to operate, the strobe shall revert to a non-synchronized flash-rate and still maintain (1) flash per second over its Regulated Voltage Range. The appliance shall also be designed so that the audible signal may be silenced while maintaining strobe activation when used with patented sync protocol. I. Combination Speaker Strobes

1. The Speaker Strobes are designed for high efficiency sound output for indoor applications. The product line features intelligible communications with crisp, clear voice messages and tone signaling, ideal for mass notification and voice evacuation. 2. Providing a sleek aesthetic appearance, the wall and ceiling appliances feature dual voltage (25/70 VRMS) capability and field-selectable taps from 1/8 to 2 watts. For faster and easier installation, the low-profile design incorporates a speaker mounting plate, and each model has a built-in level adjustment feature and Snap-On cover with no visible mounting screws.

3. For visible signaling to meet the hearing impaired, the E Speaker Strobe models incorporate the low current draw of the Strobes. 4. Ceiling mount models are available in multi-candela ceiling strobe with field selectable intensities of 15/30/75/95/110/115cd or the high intensity strobe with field selectable 5. The strobe portion of all Speaker Strobes may be synchronized when used in conjunction with the Sync Modules, Power Supplies or other manufacturers panels incorporating the manufacturer Patented Sync Protocol.

Synchronized strobes offer an easy way to comply with ADA recommendations concerning photosensitive epilepsy. 6. Speaker Strobes are UL Listed for indoor use under Standard 1971 (Signaling Devices for the Hearing-Impaired) and Standard 1480 (Speaker Appliances). All inputs employ IN/OUT wiring terminals for fast installation using #12 to #18 AWG wiring. 7. The speakers shall be UL Listed under UL 1480 for Fire Protective Service and speakers equipped with strobes shall be listed under UL 1971 for Emergency Devices for the

Hearing-Impaired. In addition, the strobes shall be certified to meet the requirements of FCC Part 15, Class A. 8. All models shall have listed sound output of up to 87 dB at 10 feet and a listed frequency response of 400 to 4000 Hz. The speaker shall also incorporate a sealed back construction. 9. The speaker and speaker strobe appliances shall be designed for indoor flush mounting. The speaker and speaker strobe shall incorporate a speaker mounting plate with a snap-on grille cover with no visible screws for a level, aesthetic finish and shall mount to standard electrical hardware. The finish of the Speaker Strobes shall be red. All speaker

and speaker strobe appliances shall be backward compatible. 10. When synchronization is required, the strobe portion of the appliance shall be compatible with sync modules or the Power Supplies with built-in Patented Sync Protocol. The strobes shall not drift out of synchronization at any time during operation. If the sync module or Power Supply fails to operate, (i.e., contacts remain closed), the strobe shall revert to a non-synchronized flash rate. Weatherproof Speaker

1. Weatherproof notification appliances shall be UL listed for outdoor use. The appliances shall be available for optional wall mounting or ceiling mounting to weatherproof backboxes using either exposed conduit, concealed conduit, or semi-flush mounting to a recessed electrical box in walls or ceilings using indicated manufacturer mounting accessories. 2. Wall-mount outdoor speakers can be used indoors or outdoors in wet or dry applications, and can provide reliable operation from −40°F to 151°F. These speakers provide a broad frequency response range, low harmonic distortion and maintain a high sound pressure level at all tap settings to provide accurate and intelligible broadcast of evacuation messages. 3. Field-selectable settings, including candela, speaker voltage and power settings, and automatic selection of 12- or 24-volt operation enable installers to easily adapt devices to meet

4. Weatherproof audibles shall be System sensor models or approved equals. The speaker devices shall be able to produce a continuous output or a temporal code-3 output that can

5. Speaker shall be listed to Underwriters Laboratories Standard S4048 for outdoor fire protective signaling systems. Speaker shall have a frequency range of 400 to 4,000 Hz and shall have an operating temperature from -40°F to 150.8°F. Speaker shall have power taps and wattage settings that are selected by rotary switches. The speaker must be installed with its weatherproof back box in order to remain outdoor approved per UL listing S4048. The speaker shall be suitable for use in air handling spaces and wet environments.

1. The battery shall have sufficient capacity to power the fire alarm system for no less than twenty-four hours plus 15 minutes of alarm upon a normal AC power failure. 2. The batteries are to be completely maintenance free. No liquids are required. Fluid level checks for refilling, spills, and leakage shall not be required. 3. If necessary, to meet standby requirements, external battery and charger systems may be used.

PART 3 EXECUTION 3.1 COORDINATION

A. Refer to the electrical and mechanical drawings and specifications to determine quantities and location of devices and required scope of work and coordinate work with mechanical and electrical installers. Provide function described under mechanical section Sequence of Control, for fire and/or emergency conditions. Submit proposed interconnection to elevator supplier. Submit conduit and pathing requirements to electrical installer. For self-contained door release, coordinate with door supplier.

A. Comply with all applicable paragraphs in Section 26 05 00: Common Work Results for Electrical, apply as though repeated herein. B. Install system(s) in accordance with manufacturer's instructions.

C. Include services of certified technicians to supervise installation, provide adjustments, provide final connections, system testing and system training to Owner Representative 3.3 INSTALLATION The complete system shall be installed by one (1) contractor and the installing contractor must be a certified dealer of the specified system. No subcontractors, to the awarded proposing contractor, will be allowed to install any portion of this system Including, but not limited to:

2. Field device installation 3. System programming FACP installation

5. Remote power supply installation

A. The installing contractor shall install the network fire alarm system in as instructed by the manufacturer's instructions.

B. Installation shall be in accordance with the 2022 CEC, NFPA 72, local and state codes, as shown on the drawings, and as recommended by the major equipment manufacturer. C. All conduit, junction boxes, conduit supports, and hangers shall be concealed in finished areas and may be exposed in unfinished areas. Smoke detectors shall not be installed prior to the system programming and test period. If construction is ongoing during this period, measures shall be taken to protect smoke detectors from contamination and physical damage. D. All fire detection and alarm system devices, control panels shall be flush mounted when located in finished areas and may be surface mounted when located in unfinished areas. E. Manual fire alarm boxes shall be suitable for surface mounting or semi-flush mounting as shown on the plans and shall be installed not less than 42 inches (1067 mm), nor more than 48 inches (122 mm) above the finished floor.

F. The fire alarm control panel shall be connected to a separate dedicated branch circuit, maximum 20 amperes. This circuit shall be labeled at the main power distribution panel as FIRE ALARM. Fire alarm control panel primary power wiring shall be 12 AWG. The control panel cabinet shall be grounded securely to either a cold-water pipe or grounding rod. The control panel enclosure shall feature a quick removal chassis to facilitate rapid replacement of the FACP electronics.

A. All equipment to be grounded by means of green ground wire to "U" contact of duplex receptacles and bonded to ground provided under 26 05 26: Grounding and Bonding of Electrical Systems. 3.5 INSPECTION

B. Closeouts: 1. It is the intent of these specifications and of the architect/engineer that a continued program of system maintenance be continued by the owner in compliance with NFPA Standard 72H. It is mandatory that the installing contractor provide such services and make available these services to the owner upon completion of the project. 2. As part of the closeout documents, fire alarm contractor will provide owner with AutoCAD as built drawings indicating locations of devices, routing of wiring, and panel information. All room numbers indicated on final close out documents and all panel settings shall be listed by actual building room numbers and not by room number indicated on

construction documents. CAD files shall be AutoCAD 2004 or later. Provide the owner with one Mylar plot of each drawing and two blue line prints of each drawing. Provide the

owner with electronic versions of the as-built CD's. 3. Locate next to building FACP and other fire alarm panels. 4. A building graphic shall be provided mounted in aluminum-extruded frame with plexi-glass front. Graphic shall locate all fire alarm devices, power supplies, and FACP.

5. State FML-005 certificate shall also be framed and mounted near the fire alarm panel. Fire alarm panel shall have white FM required installation sticker attached to it. C. Graphic shall include actual room numbers posted as part of the building graphics package, include as part of substantial completion requirement 3.6 LOCATION

A. Systems to meet all the requirements of the CSFM and IOR and AHJ and shall be approved thereby before installation and prior to final acceptance.

A. Before installation, verify exact location of control equipment and outlets. 3.7 WIRING

A. All fire alarm wiring shall be new. B. Furnish all conductors, equipment, terminal strips, etc., and labor to install a complete and operable system. All cable conductors shall be color coded and numbered for identification at all terminals. Green shall be for grounding conductor only. Use red insulation and or red jacketing on all fire alarm cables. C. All wiring shall be in accordance with NFPA 72, the California Electrical Code, Local Codes, and article 760 of NFPA Standard 70. All wiring sizes shall conform to recommendations of the equipment manufacturer, and as indicated on the engineered shop drawings. D. All wire shall be U.L. Listed FPL for limited energy (300V) and fire alarm applications and shall be installed in conduit. Limited energy FPLP or MPP wire may be run open in return air ceiling plenums provided such wire is U.L. Listed for such applications and is of the low smoke producing fluorocarbon type and complies with CEC Article 760 if so, approved by the

E. No A.C. wiring or any other wiring shall be run in the same conduit as fire alarm wiring. F. Wiring used for the multiplex communication circuit (SLC) shall be twisted and support a minimum wiring distance of 10,000 feet when sized at 12 AWG. The design of the system shall permit use of IDC and NAC wiring in the same conduit with the SLC communication circuit. Shielded wire shall not be required. G. The fire alarm control panel shall be capable of T-tapping NFPA Style 4 (Class B) Signaling Line Circuits (SLCs). Systems which do not allow or have restrictions in, for example, the number of T-taps, length of T-taps etc., is not acceptable. H. Contractor shall provide a service loop located above each device installed on the entire project. The service loop shall be a minimum of 5'.

I. Contractor shall provide a service loop located above each type of panel installed. The service loop shall be a minimum of 10', but shall have enough length to allow for the panel to be relocated to any wall within the room that panel is located in. J. All service loops shall be installed in the accessible ceiling that is nearest to each device and panel. No service loops shall be installed in open spaces or non-accessible spaces 3.8 TERMINAL BOXES, JUNCTION BOXES AND CABINETS: A. All boxes and cabinets shall be UL listed for their use and purpose.

3.9 CONDUIT / RACEWAY: A. All wire shall be installed in an approved conduit/raceway system (except where permitted by NEC and the local authority having jurisdiction). Maximum conduit "fill" shall not exceed B. Conduit and raceway system shall be installed as specified under the general electrical section of the specifications, and per CEC, local, and state requirements. C. Minimum conduit size shall be 3/4" (19.1 mm). Install conduit per engineered shop drawings.

D. Systems utilizing open wiring techniques with low smoke plenum cable shall provide conduit in all inaccessible locations, inside concealed walls, all mechanical/electrical rooms, or other areas where wiring might be exposed or subject to damage. E. All vertical wiring and all main trunk/riser wiring shall be installed in a complete raceway/conduit system. All riser boxes shall be adequately sized for the number of conductors traversing the respective box as well as the number of terminations required. F. Cable must be separated from any open conductors of power, or Class 1 circuits, and shall not be placed in any conduit, junction box or raceway containing these conductors, per

G. Wiring for 24-volt DC control, alarm notification, emergency communication and similar power-limited auxiliary functions may be run in the same conduit as initiating and signaling line circuits. All circuits shall be provided with transient suppression devices and the system shall be designed to permit simultaneous operation of all circuits without interference or loss of

I. All wiring associated with smoke control system shall be installed in conduit per current adopted codes regardless of voltages or ratings. 3.10 TESTING A. After all equipment specified herein for each system has been installed and is in operating condition, conduct performance tests to determine if the installation and components

H. Conduit shall not enter the fire alarm control panel or any other remotely mounted control panel equipment or back boxes, except where conduit entry is specified by the FACP

comply with these specifications. Furnish competent personnel, all test material and approved test instruments and conduct the tests under supervision of factory personnel, in the presence of the Engineer, the building and fire inspecting agencies: 1. The contractor's job foreman, in the presence of a representative of the manufacturer, a representative of the owner, and the fire department shall operate every installed device to verify proper operation and correct annunciation at the control panel. 2. At least on half of all tests shall be performed on battery standby power.

4. The signaling line circuits and notification appliance circuits shall be opened in at least two (2) locations to verify the presence of supervision. 5. When the testing has been completed to the satisfaction of the contractor representative IOR, representatives of the manufacturer and owner, a notarized letter co-signed by each attesting to the satisfactory completion of said testing shall be forwarded to the owner and the authority having jurisdiction. 6. The contractor shall leave the fire alarm system in proper working order, and, without additional expense to the owner, shall replace any defective materials or equipment provided

by him under this contract within two years from the date of final acceptance by the awarding authority. 7. The local responding fire department must be notified prior to the final test in accordance with local requirements and when requested, participate in system testing and evaluation. Intelligibility shall be tested according to NFPA 72 annex D.2 (speech intelligibility). C. DSA, Architect/ Engineer and Owner shall be notified a minimum of 48 hours prior to the final inspection and/or testing.

3.11 WALK TEST A. Notify Owner, Architect and Engineer when system is 100 percent operational. Schedule walk-through of the entire facility and verify that each initiating and each indicating device is operating properly.

B. Provide report at conclusion of walk through certifying all fire alarm devices are working. C. Walk test shall include a representative from owner maintenance department. D. Walk test to show in a printed report all AHU shutdown, strobes/horns, heat and smoke detectors. Report shall list all devices by approximate location to rooms, and device

3. Where application of heat would destroy any detector, it may be manually activated.

3.12 SOFTWARE A. Installer shall provide a backup copy of the installed program database (on CD) upon completion of the project. They shall also provide the current version of system software, for the panel provided, on CD.

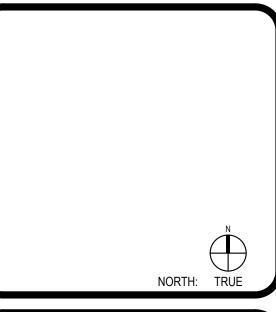
END OF SECTION 28 31 00

A. Prepare written report of final test results, signed by witnessing parties. Submit to the Engineer in triplicate for final approval.

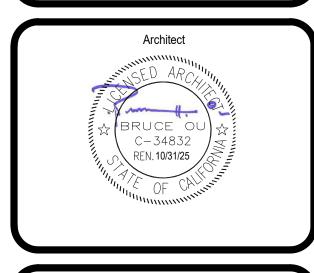


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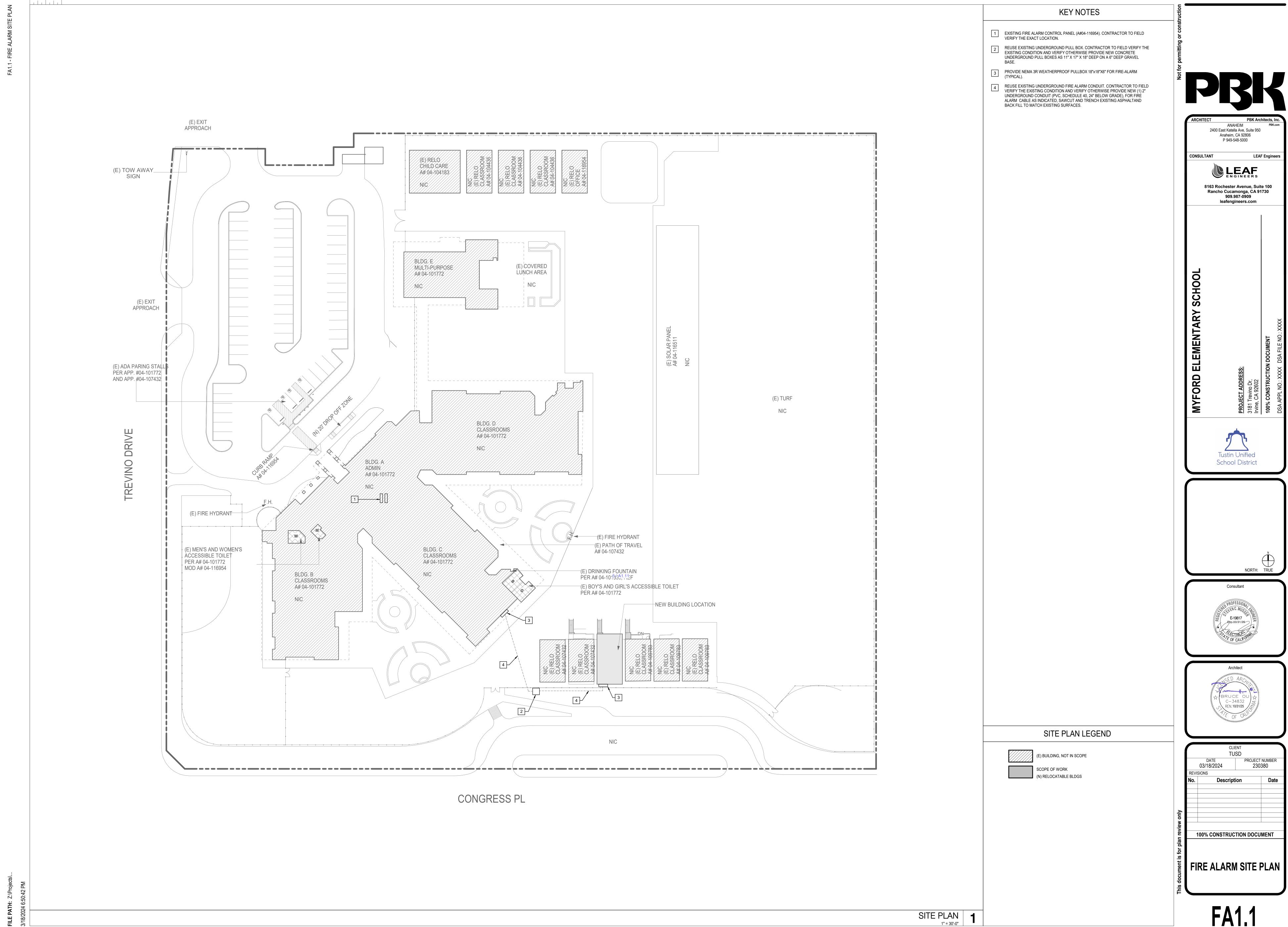








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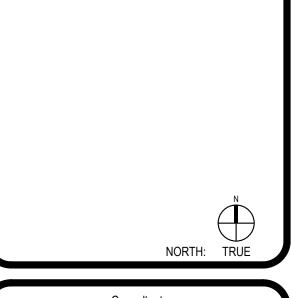
**KEY NOTES** 1 PROVIDE FIRE ALARM ADDRESSABLE SMOKE DETECTOR AS SHOWN (TYP). PROVIDE FIRE ALARM ADDRESSABLE ATTIC HEAT DETECTOR AS SHOWN (TYP). 3 PROVIDE FIRE ALARM CEILING MOUNTED SPEAKER STROBE AS SHOWN (TYP). 4 PROVIDE FIRE ALARM WALL MOUNTED WEATHERPROOF SPEAKER DEVICE AS SHOWN (TYP). 5 PROVIDE NEMA 3R WEATHERPROOF PULLBOX 18"x18"X6" FOR FIRE-ALARM. 6 PROVIDE NEW FIRE ALARM POWER SUPPLY PANEL AS SHOWN. LANDING PER CIVIL **GENERAL NOTES** RAILING PER RAILING PER 1. ALL SPEAKER TAP SETTING SHALL BE SET AT 1/2 WATT FOR INTERIOR SPEAKER AND 2 WATT DETAIL DETAIL FOR EXTERIOR SPEAKERS UNLESS NOTED OTHERWISE (U.N.O.) 2. RUN FIRE ALARM CABLES IN CONDUIT CONCEALED IN WALLS AND CEILING WHEN POSSIBLE. ` ^ <mark>'22</mark>`/ A1.10` <sup>^</sup> 22 / A1.10 EXPOSED CONDUITS ARE NOT ACCEPTABLE. 3. SMOKE ALARMS AND SMOKE DETECTORS SHALL NOT BE INSTALLED WITHIN 36 IN. (910 MM) HORIZONTAL PATH FROM THE SUPPLY REGISTERS OF A FORCED AIR HEATING OR COOLING RAMP PER —(N) RAMP PER CIVIL SYSTEM AND SHALL BE INSTALLED OUTSIDE OF THE DIRECT AIRFLOW FROM THOSE REGISTERS CIVIL PER CBC 907.2.11.8. 4. FOR ALL HEAT DETECTORS THAT ARE LOCATED ABOVE CEILING/ATTIC SPACES, CONTRACTOR SHALL PROVIDE STICKER AND LABEL "HD" AT THE REFLECTED CEILING DIRECTLY RAMP A#04-121419 BELOW THE DEVICE TO INDICATE LOCATION. 5. ELECTRICAL CONTRACTOR SHALL FURNISH ACCESS PANELS TO AREAS THAT REQUIRE ACCESS FOR ATTIC HEAT DETECTOR, SERVICING, TROUBLESHOOTING, ETC (IF REQUIRED). LANDING 6. PER 2022 CBC SECTION 1209.2 - AN ATTIC ACCESS OPENING NOT LESS THAN 20 INCHES BY 30 INCHES SHALL BE PROVIDED TO ANY ATTIC AREA HAVING A CLEAR HEIGHT OF OVER 30 PER CIVIL + 2% MAX + + TYP. IN ALL + DIRECTIONS CLASSROOM Z, 2S 100 — Z, 2S (E) BUILDING (E) BUILDING Z1-2 A# 04-122805 SRL#: C232651A C232651B Z, 2S,V CONNECTION WITH EXISTING FACP

2400 East Katella Ave, Suite 950 Anaheim, CA 92806 P 949-548-5000 LEAF Engineers

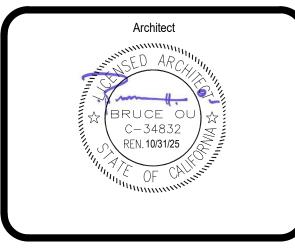
CONSULTANT 8163 Rochester Avenue, Suite 100 Rancho Cucamonga, CA 91730 909.987-0909 leafengineers.com

RD ELEMENTARY









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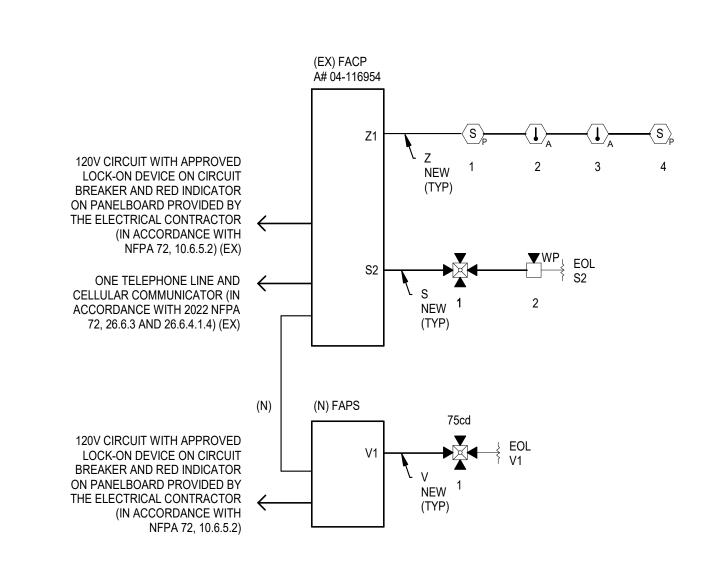
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1 /	ACF	FACP VOICE EVAC (EXISTING)	ILLI			
		LOCATION: ADMIN BLDG	TOTAL STANDBY	UNIT ALARM	TOTAL ALARM	
QU	ANTITY		CURRENT(A)	CURRENT(A)	CURRENT(A)	CURRENT(A)
EX	1	4-CPU	0.211000	0.211000	0.211000	0.211000
EX	1	4-NET-TP	0.032000	0.032000	0.032000	0.032000
EX	1	3-SSDC1	0.144000	0.144000	0.204000	0.204000
EX	1	3-SSDC1	0.264000	0.264000	0.336000	0.336000
EX	1	3-MODCOM	0.060000	0.060000	0.095000	0.095000
EX	1	4-LCDLE	0.040000	0.040000	0.093000	0.093000
EX	1	4-AUDTELS	0.085000	0.085000	0.101000	0.101000
EX	1	4-MIC	0.008000	0.008000	0.038000	0.038000
EX	160	SIGA-PD	0.000320	0.051200	0.000320	0.051200
EX	240	SIGA-HRD	0.000320	0.076800	0.000320	0.076800
EX	105	CO DETECTOR	0.000050	0.005250	0.000070	0.007350
EX	4	DUCT DETECTOR	0.000450	0.001800	0.000450	0.001800
EX	1	BEAM DETECTOR	0.011000	0.001584	0.015000	0.002720
EX	4	PULL STATION	0.000250	0.001890	0.000400	0.756000
EX	97	DUAL MONITOR MODULE	0.000400	0.000045	0.000680	0.018000
EX	130	SINGLE INPUT MODULE	0.000000	0.000250	0.000400	0.000400
EX	8	SINGLE RISER INPUT MODULE	0.000223	0.000128	0.000100	0.000128
EX	3	CONTROL RELAY	0.100000	0.000000	0.000000	0.130000
EX	1	HIGH VOLTAGE RELAY	0.000750	0.000000	0.000750	0.318000
EX	1	ZONED AMP	0.085000	0.000000	5.540000	1.421000
N	28	SMOKE DETECTOR	0.000032	0.000896	0.000032	0.000896
N	28	HEAT DETECTOR	0.000032	0.000896	0.000032	0.000896
		SUB TOTAL		0.985		4.814
		STANDBY CURRENT x 24 Hrs. (AH)		23.634	АН	
		ALARM CURRENT x 15 MINUTES (AH)		0.404	AH	
		TOTAL (AH)		24.038	АН	
		25% DERATING		6.010	АН	
		TOTAL DEMAND (AH)		30.048		
		BATTERY REQUIRED		50	АН	

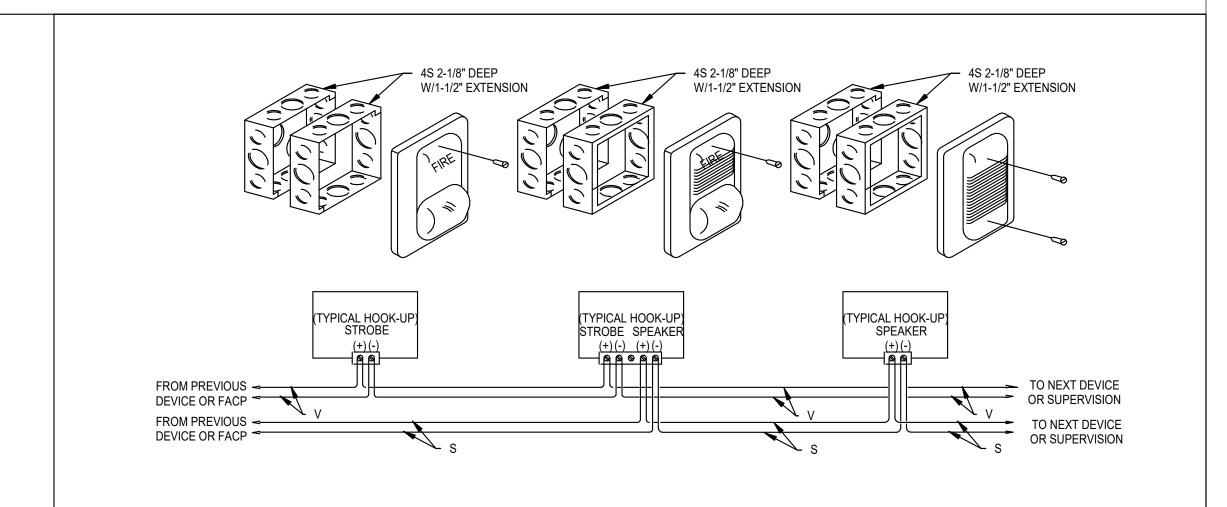
	BATTERY CAPACITY CALCUL	ATION SHE	ET		
	FAPS (N)	Unit	Total	Unit	Total
		Standby	Standby	Alarm	Alarm
QUANTITY	Description	Current(A)	Current(A)	Current(A)	Current(A)
1	NAC TRIP	0.070	0.070	0.270	0.27
8	15cd ceiling strobes	0.000	0.000	0.109	0.87
1	15cd ceiling speaker/strobe	0.000	0.000	0.109	0.10
10	30cd ceiling speaker/strobe	0.000	0.000	0.151	1.51
	Sub Total		0.070		2.76
	A - Battery Backup - Standby (Hour)	24			
	B - Battery Backup (minutes)	15			
	C - Allowable Error (%)	25			
	D - Total Standby Backup (Amp-Hour)	1.680			
	E - Total Alarm Backup (Amp-Hour)	0.690			
	F - Allowable Error (C x (D + E))	0.593			
	Total Amp-Hour Required (D + E + F)	2.963			
	Battery Submitted	7 Amp-Hour			

	STROBES WORST CASE VOLTAGE DROP												
			CEILING	STROBE		CE	EILING SPE	AKER/STRO	BE	TOTAL	TOTAL	TOTAL	TOTAL
PANEL	CIRCUIT	15cd	30cd	75cd	95cd	15cd	30cd	75cd	95cd	CURRENT	DISTANCE	VOLTAGE	DEVICES
NAME	NUMBER	0.109	0.151	0.281	0.318	0.109	0.151	0.281	0.318	(AMPS)	(FEET)	DROP (%)	
	V1	4			i !		i	4	i !	1.560	250	5.38%	8
FAPS (N)	V2	4						4		1.560	350	7.53%	8
FAPS (IV)	V3				! !	1		2		0.671	750	6.94%	3
	SPARE				i !			i !	i ! !	0.000	i !	0.00%	0
TO	TAL	8	0	0	0	1	0	10	0		! !	! ! !	

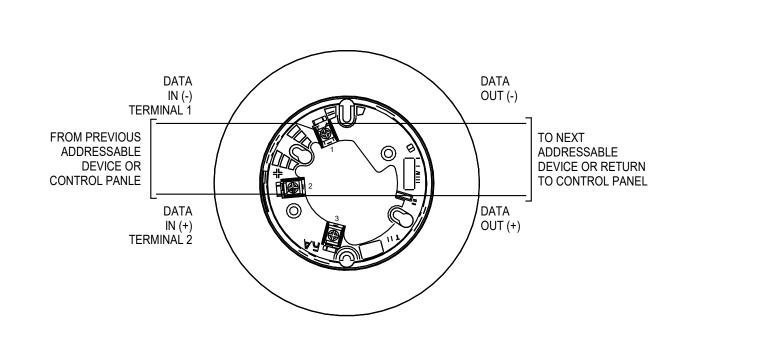
	SPEAKER CIRCUIT LOAD CALCULATION										MFG. REC.	MAXIMUM LOS	SS IS: -0.5dB
SPEA	KER CIRCUIT DESCRIPTION		WIRE	CIRCUIT	APP	LIANCES QUAN	TITIES / TAP VA	LUES	TOTAL	ESTIMATED		MAXIMUM	TOTAL
PANE			GAUGE	VOLTAGE	SPEAKER	SPEAKER	SPEAKER	SPEAKER	CIRCUIT	CIRCUIT	ACTUAL	ALLOWABLE	CIRCUIT
AMPLIFIER#	CIRCUIT LOCATION	CIRCUIT	(18, 16,14	(25 OR	TAPPED AT	TAPPED AT	TAPPED AT	TAPPED AT	LOAD	LENGTH	WIRE/LOSS	CKT, LENGTH	RESISTANO
		NUMBER	12)	70 VRMS)	0.25 WATTS	0.5 WATTS	1 WATTS	2 WATTS	(WATT)	(FEET)	(dB)	(FEET)	(OHMS)
FACD (EV)	PORTABLE IH	S1	14 AWG	70		9		5	14.50	1250	-0.17	2,300	6.44
FACP (EX)	BLDG C	S2	14 AWG	70		3			1.50	750	-0.01	35,000	3.86
	-							TOTAL	16.00				

4 FIRE ALARM VOLTAGE DROP AND BATTERY CALCULATIONS
NOT TO SCALE





3 SPEAKER/STROBE DETAIL NOT TO SCALE



FIRE ALARM PARTIAL RISER DIAGRAM

2 SMOKE/HEAT DETECTOR DETAIL NOT TO SCALE

100% CONSTRUCTION DOCUMENT

FIRE ALARM DETAILS

03/18/2024

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Tustin Unified School District

NORTH: TRUE

PROJECT NUMBER

230380

CONSULTANT

RD ELEMENTARY SCHOOL

TECHNOLOGY PLAN GENERAL NOTES INTERCOM SYSTEM'S GENERAL NOTES 1. ALL 120V POWER REQUIRED FOR THE FUNCTIONALITY OF THE TELECOMMUNICATION. 1. ALL 120V POWER REQUIRED FOR THE FUNCTIONALITY OF EACH SYSTEM SHALL BE A NETWORK, AND VIDEO EQUIPMENT SHALL BE A DEDICATED CIRCUIT AND 0N EMERGENCY DEDICATED CIRCUIT AND 0N EMERGENCY POWER WHEN AVAILABLE. THE INSTALLING POWER WHEN AVAILABLE. CONTRACTOR SHALL COORDINATE AND INSTALL ALL 120V POWER REQUIREMENTS CONTRACTOR OF EACH SYSTEM SHALL BE RESPONSIBLE FOR PROVIDING THEIR OWN 120V POWER REQUIREMENTS FOR ALL REMOTE POWER SUPPLIES. THE INSTALLING CONTRACTORS AND LOCATIONS AS REQUIRED FOR ALL EQUIPMENT (TYPICAL) LICENSED ELECTRICAL SUBCONTRACTOR SHALL COORDINATE ELECTRICAL PANEL LOCATIONS 2. CONTRACTOR SHALL COORDINATING WITH PBK TECHNOLOGY DEPARTMENT PRIOR TO THE AND AVAILABLE SPACE DEDICATED FOR THE CONTRACTOR'S SYSTEM REQUIREMENTS. INSTALLATION OF RACKS AND RACK EQUIPMENT. NO RACKS SHALL BE PERMANENTLY (TYPICAL). PROJECTS ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL POWER TO MAIN CONTROL PANELS AND ALL HEAD END EQUIPMENT. SYSTEM INSTALLERS SHALL INSTALLED WITHOUT WRITTEN APPROVAL OF THE PROPOSED LOCATIONS. COORDINATE LOCATION AND CONNECTION OF CONTROL PANEL AND HEAD END POWER WITH 3. THE PROJECTS ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONDUITS. BACK BOXES, AND THE PROJECTS ELECTRICAL CONTRACTOR. OTHER RACEWAY REQUIRED FOR DEVICES AND PATHWAYS SHOWN ON THE FLOOR PLANS AND DETAIL SHEETS. 2. THE PROJECTS ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL IN WALL ANY ADDITIONAL CONDUITS, SLEEVES, AND RACEWAY REQUIREMENTS FOR THE SCS SHALL BE THE RESPONSIBILITY OF THE SCS INSTALLER. CONDUITS, BELOW GRADE CONDUITS, BELOW SLAB CONDUITS, CONDUITS ACROSS OPEN AREAS BACK BOXES, SLEEVES, AND OTHER RACEWAY REQUIRED FOR DEVICES AND 4. THE SELECTED, INSTALLING CONTRACTOR MUST BE A CERTIFIED INTEGRATOR/INSTALLER PATHWAYS SHOWN ON THE FLOOR PLANS AND DETAIL SHEETS. ANY ADDITIONAL CONDUITS, AUTHORIZED BY THE SPECIFIED SYSTEM MANUFACTURER TO INSTALL THE CABLE PLANT AND SLEEVES, AND RACEWAY REQUIREMENTS FOR EACH SYSTEM SHALL BE THE RESPONSIBILITY CONNECTIVITY PRODUCTS. REFER TO SPECIFICATIONS FOR PRODUCT TYPE AND DESCRIPTION. OF EACH SYSTEM INSTALLER. 5. SYSTEM WIRING AND EQUIPMENT INSTALLATION SHALL BE IN ACCORDANCE WITH ENGINEERING BEST 3. ALL EXPOSED SYSTEM'S WIRING OR WIRING ROUTING ACROSS NON ACCESSIBLE CEILINGS PRACTICES AS ESTABLISHED BY ANSI/EIA/TIA, BICSI, AND THE CEC. SHALL BE ROUTED IN CONDUIT. SIZE CONDUIT AS REQUIRED TO ROUTE SYSTEMS WITH 40% CABLE FILL RATIO. MINIMUM CONDUIT SIZE SHALL BE 3/4". 6. ALL WIRING SHALL MEET ALL STATE AND LOCAL ELECTRICAL CODES. 4. CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING ALL EXTERIOR WALL PENETRATIONS 7. ALL TELECOMMUNICATIONS SYSTEMS EQUIPMENT AND MOUNTING LOCATIONS SHALL BE IN ARE PROPERLY SEALED TO PREVENT ANY MOISTURE FROM ENTERING BUILDING. COMPLIANCE WITH ADA ACCESSIBILITY STANDARDS. 5. NO CONDUITS SHALL BE INSTALLED ON THE EXTERIOR OF THE BUILDING. IF EXTERIOR 8. ALL INDUSTRY STANDARD CATEGORY 6A CABLING PRACTICES MUST BE FOLLOWED FOR ALL DATA CABLING. CONDUITS ARE REQUIRED FOR A COMPLETE INSTALLATION. EACH SYSTEM CONTRACTOR SHALL COORDINATE WITH THE PROJECTS CONSULTANT PRIOR TO ANY ROUGH-IN. 9. ALL DATA CABLES ARE TO BE INSTALLED WITH A MINIMUM OF 12 INCHES OF SEPARATION FROM AC 6. EACH SYSTEM CONTRACTOR SHALL PROVIDE AND INSTALL PROTECTIVE BUSHINGS ON ALL POWER CABLES, INTERCOM, FIRE ALARM, SECURITY CABLES IN ANY PARALLEL OPEN WIRE RUN. CONDUIT STUB OUTS AND SLEEVES TO PREVENT CABLE DAMAGE. BUSHING TO BE INSTALLED 10.ALWAYS CROSS OTHER SYSTEM CABLES AT A 90 DEGREE ANGLE PRIOR O CABLE INSTALLATION. CUTTING BUSHING AND INSTALLING AFTER CABLE IS INSTALLED WILL NOT BE EXCEPTED. 11.ALL CABLES AND TERMINATION COMPONENTS SHALL BE MACHINE LABELED AT BOTH ENDS. LABEL ALL CABLES PER TS DRAWINGS AND/OR SPECIFICATIONS. FINAL CABLE/OUTLET 7. ALL CABLE SHALL BE ROUTED DOWN CORRIDORS, PARALLEL AND PERPENDICULAR TO THE IDENTIFICATION LABELS SHALL BE COORDINATED WITH THE OWNER AND PBK. BUILDING WALLS AND STRUCTURE. CABLE TO EACH DEVICE SHALL BRANCH OFF OF A MAIN CORRIDOR TRUNK. ROUTING CABLES THROUGH CLASSROOMS, OFFICES, STORAGE ROOMS, 12. CONTRACTOR TO PROVIDE LIGHTNING PROTECTION ON ALL COMMUNICATION CABLE RESTROOMS OR ANY TYPE OF ROOM OTHER THAN A CORRIDOR WILL NOT BE ACCEPTED. ENTER ALL ROOMS ABOVE THE ASSOCIATED ROOM DOORWAY. BETWEEN BUILDINGS. 13.ALL EXPOSED CABLING ROUTED IN PLENUM SHALL BE PLENUM-RATED. ALL NON 8. THE SYSTEM INSTALLER SHALL PROPERLY SUPPORT ALL INSTALLED SYSTEM CABLING FROM PLENUM-RATED CABLING INSTALLED IN PLENUM SPACES SHALL BE INSTALLED IN CONDUIT. AN APPROVED CABLE SUPPORT SYSTEM AS DETAILED IN SPECIFICATIONS. NO CABLING SHALL BE ROUTED AND TIED DIRECTLY TO BUILDING STEEL, CEILING GRID SUPPORT, CONDUIT, 14.NO TERMINATION OR SPLICES SHALL BE INSTALLED IN OR ABOVE CEILINGS UNLESS NOTED PIPING, OR DUCTWORK. THE CABLE SUPPORT SYSTEM SHALL BE DIRECTLY CONNECTED TO THE BUILDING'S STEEL JOIST. AT LOCATIONS WHERE THE BOTTOM OF THE JOIST IS MORE THAN 5' ABOVE THE CEILING, THE SYSTEM INSTALLER SHALL PROVIDE AND INSTALL 15.TECHNOLOGY CONTRACTOR SHALL PROVIDE AND INSTALL ALL SLEEVES REQUIRED TO INSTALL THREADED ROD AND ALL REQUIRED MATERIALS TO CONNECT THE THREADED ROD TO THE COMMUNICATION CABLING THROUGH ALL CMU AND RATED WALLS. ALL TECHNOLOGY SYSTEM CONDUIT BUILDING STEEL AND THE CABLE SUPPORT SYSTEM TO THE THREADED ROD. CABLE PATHWAY SLEEVES SHALL HAVE PROTECTIVE BUSHING ON BOTH ENDS, BE DEDICATED FOR TECHNOLOGY SYSTEMS SHALL NOT BE HIGHER THAN 5' ABOVE THE CEILING AT ANY LOCATIONS. ONLY AND SHALL NOT SHARE WITH OTHER BUILDING TRADES. 9. ALL INTERCOM CABLING FOR CLASSROOMS, OFFICES, CONFERENCE ROOMS, WORK ROOMS, 16. CONTRACTOR SHALL MAINTAIN WALL RATING WITH PROPER FIRE BLOCKING METHODS. AND LOUNGES SHALL BE HOME RUNS TO HEAD END EQUIPMENT TO ALLOW ZONING TO BE 17. CONTRACTOR SHALL ROUTE ALL FIBER/VOICE/DATA AND CATV CABLING DOWN CORRIDORS AND PERPENDICULAR OR PARALLEL TO BUILDING WALLS ENTER INTO ALL ROOMS ABOVE THE MAIN 10.ALL EXTERIOR AND WALL MOUNTED SPEAKERS SHALL BE MOUNTED AT 10'-0" UNLESS 18.ALL COMMUNICATION CABLE INSTALLED SHALL ROUTE TO THE CENTER OF THE ROOM IN 11.EXTERIOR SPEAKERS SHALL NOT BE GROUPED WITH INTERIOR SPEAKERS. WHICH IT SERVES AND THEN TO THE OUTLET LOCATION IT IS INTENDED FOR. EACH CABLE SHALL HAVE A 10' SERVICE LOOP AT THE CENTER OF EACH ROOM AND A 3' SERVICE LOOP 12.ALL SPEAKERS SHALL BE CONNECTED TO A STANDARD PUNCH DOWN BLOCK LOCATED NEAR ABOVE EACH OUTLET LOCATION. HEAD END EQUIPMENT AND THEN CONNECTED TO HEAD END EQUIPMENT. 19.THE SYSTEM INSTALLER SHALL PROPERLY SUPPORT ALL INSTALLED SYSTEM CABLING FROM A PANDUIT J-13.ALL CEILING MOUNTED SPEAKERS SHALL BE INSTALLED UTILIZING A TILE BRIDGE SUPPORT MOD CABLE SUPPORT SYSTEMS AS DETAILED IN SPECIFICATIONS. NO CABLING SHALL BE ROUTED AND TIED SYSTEM. AT NO POINT SHOULD THE WEIGHT OF A CEILING MOUNTED SPEAKER BE DIRECTLY TO BUILDING STEEL, CEILING GRID SUPPORT, CONDUIT, PIPING, OR DUCTWORK. PANDUIT J-MOD SUPPORTED BY A CEILING TILE ONLY. SUPPORT SYSTEM SHALL BE DIRECTLY CONNECTED TO THE BUILDING'S STEEL JOIST. IN LOCATION WHERE 14.ALL WALL MOUNTED CALL INITIATING DEVICES SHALL BE INSTALLED AT +42" ABOVE THE THE BOTTOM OF THE JOIST IS MORE THAN 5' ABOVE THE CEILING, THE SYSTEM INSTALLER SHALL PROVIDE AND INSTALL THREADED ROD AND ALL REQUIRED MATERIALS TO CONNECT THE THREADED ROD. TO THE BUILDING STEEL AND THE CABLE SUPPORT SYSTEM TO THE THREADED ROD. CABLE PATHWAY SHALL NOT BE HIGHER THAN 5' ABOVE THE CEILING AT ANY LOCATIONS. 20. CONTRACTOR TO PROVIDE AND INSTALL ALL REQUIRED CABLING AND COMPONENTS TO FURNISH TWO (2) ANALOG TELEPHONE CABLES TO THE FIRE ALARM SYSTEM. CONTRACTOR TO COORDINATE WITH THE SYSTEM INSTALLER FOR EXACT LOCATIONS AND TERMINATION INSTRUCTIONS PRIOR TO INSTALLATION. 21.ALL EXPOSED CABLING OR CABLING ROUTING ACROSS NON ACCESSIBLE CEILINGS SHALL BE INSTALLED IN CONDUIT. CONDUIT SHALL BE PROPERLY SIZED TO MAINTAIN THE 40% FILL RATIO. 22.ALL CONDUIT STUB OUTS AND SLEEVES SHALL HAVE PROTECTIVE BUSHINGS TO PREVENT CABLE DAMAGE. BUSHING TO BE INSTALLED PRIOR TO CABLE INSTALLATION. CUTTING BUSHING AND INSTALLING AFTER CABLE IS INSTALLED WILL NOT BE EXCEPTED. CONTRACTOR TO MAINTAIN A 40% MAXIMUM FILL RATION ON ALL SLEEVES INSTALLED. TECHNOLOGY SCOPE OF WORK AUDIO & VIDEO GENERAL NOTES 1. ALL 120V POWER REQUIRED FOR THE FUNCTIONALITY OF EACH SYSTEM SHALL BE A DEDICATED CIRCUIT AND 0N EMERGENCY POWER WHEN AVAILABLE. THE INSTALLING CONTRACTOR OF EACH SYSTEM SHALL BE RESPONSIBLE FOR PROVIDING THEIR OWN 120V POWER 1. PROVIDE COMPLETE TECHNOLOGY SYSTEMS EQUIPMENT WITH INSTALLATION AS REQUIRED FOR A COMPLETE WORKING SYSTEM PER DESIGN DRAWINGS AND SPECIFICATIONS FOR COMMUNICATIONS ROOM 109, AND OTHER SPACES REQUIRED REQUIREMENTS FOR ALL REMOTE POWER SUPPLIES. THE INSTALLING CONTRACTORS LICENSED ELECTRICAL SUBCONTRACTOR SHALL COORDINATE ELECTRICAL PANEL LOCATIONS AND AVAILABLE SPACE DEDICATED FOR THE CONTRACTOR'S SYSTEM REQUIREMENTS TECHNOLOGY CONNECTIONS IN FBO BUILDING AND SITE PER THE DESIGN DRAWINGS. (TYPICAL). PROJECTS ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL POWER TO MAIN CONTROL PANELS AND ALL HEAD END EQUIPMENT. SYSTEM INSTALLERS SHALL COORDINATE LOCATION AND CONNECTION OF CONTROL PANEL AND HEAD END POWER 2. PROVIDE NEW CONDUITS, J-HOOKS ABOVE ACCESSIBLE CEILING SPACES TO SUPPORT NEW TECHNOLOGY WIRING AS WITH THE PROJECTS ELECTRICAL CONTRACTOR. REQUIRED BETWEEN END DEVICES AND TECHNOLOGY HEADEND EQUIPMENT. THE CONTRACTOR IS RESPONSIBLE TO PROVIDE ALL WIRING WITH TERMINATION AND TESTING AS REQUIRED FOR A COMPLETE WORKING SYSTEM. 2. THE PROJECTS ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL IN WALL CONDUITS. BELOW GRADE CONDUITS. BELOW SLAB CONDUITS, CONDUITS ACROSS OPEN AREAS BACK BOXES, SLEEVES, AND OTHER RACEWAY REQUIRED FOR DEVICES AND PATHWAYS 3. PROVIDE NEW EMPTY UNDERGROUND CONDUITS CAP IN-PLACE FOR FUTURE USE BETWEEN THE NEW COMMUNICATION SHOWN ON THE FLOOR PLANS AND DETAIL SHEETS. ANY ADDITIONAL CONDUITS, SLEEVES, AND RACEWAY REQUIREMENTS FOR EACH ROOM 109 IN FBO BUILDING TO FUTURE TERMINAL EXPANSION, AND HANGAR. REFER TO SITE PLAN T1.01 FOR NUMBER AND SYSTEM SHALL BE THE RESPONSIBILITY OF EACH SYSTEM INSTALLER. 3. THE SECURITY CAMERA SYSTEM INSTALLER SHALL BE RESPONSIBLE FOR CONNECTING ALL APPLICABLE SYSTEM EQUIPMENT TO THE 4. PROVIDE COMPLETE INFRASTRUCTURE INCLUDING WIRING TO ALL SECURITY DEVICES PER PLANS. 5. THE CONTRACTOR SHALL PROVIDE CONDUITS, UNDERGROUND PULL BOXES, AND WIRING AS REQUIRED FOR CONNECTIONS 4. ALL EXPOSED SYSTEM'S WIRING OR WIRING ROUTING ACROSS NON ACCESSIBLE CEILINGS SHALL BE ROUTED IN CONDUIT. SIZE CONDUIT TO ALL SITE DEVICES. AS REQUIRED TO ROUTE SYSTEMS WITH 40% CABLE FILL RATIO. MINIMUM CONDUIT SIZE SHALL BE 3/4". 6. THE CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE TECHNOLOGY EQUIPMENT/DEVICES MOUNTING AS NOTED PER THE 5. CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING ALL EXTERIOR WALL PENETRATIONS ARE PROPERLY SEALED TO PREVENT ANY DESIGN DRAWINGS. MOISTURE FROM ENTERING BUILDING. 7. THE CONTRACTOR SHALL PROVIDE NEW UNDERGROUND CONDUITS FOR NEW UTILITY SERVICE PROVIDER CONNECTION. 6. NO CONDUITS SHALL BE INSTALLED ON THE EXTERIOR OF THE BUILDING. IF EXTERIOR CONDUITS ARE REQUIRED FOR A COMPLETE AND COORDINATE WITH UTILITY SERVICE PROVIDER COMPANY FOR FINAL POINT OF CONNECTION PRIOR TO INSTALLATION. INSTALLATION, EACH SYSTEM CONTRACTOR SHALL COORDINATE WITH THE PROJECTS CONSULTANT PRIOR TO ANY ROUGH-IN. 8. PROVIDE ACCESS CONTROL SYSTEM TO INCLUDE ACCESS CONTROL PANEL, POWER SUPPLY AND CARD READERS PER 7. EACH SYSTEM CONTRACTOR SHALL PROVIDE AND INSTALL PROTECTIVE BUSHINGS ON ALL CONDUIT STUB OUTS AND SLEEVES TO SPECIFICATIONS. PREVENT CABLE DAMAGE. BUSHING TO BE INSTALLED PRIOR TO CABLE INSTALLATION. CUTTING BUSHING AND INSTALLING AFTER CABLE IS INSTALLED WILL NOT BE EXCEPTED. 9. PROVIDE VIDEO SURVEILLANCE SYSTEM AND SECURITY CAMERAS WITH REQUIRED LICENSING FOR A COMPLETE WORKING SYSTEM INCLUDING INTEGRATION WITH ACCESS CONTROL SYSTEM. 8. ALL CABLE SHALL BE ROUTED DOWN CORRIDORS, PARALLEL AND PERPENDICULAR TO THE BUILDING WALLS AND STRUCTURE. CABLE TO EACH DEVICE SHALL BRANCH OFF OF A MAIN CORRIDOR TRUNK. ROUTING CABLES THROUGH CLASSROOMS, OFFICES, STORAGE ROOMS, RESTROOMS OR ANY TYPE OF ROOM OTHER THAN A CORRIDOR WILL NOT BE ACCEPTED. ENTER ALL ROOMS ABOVE THE ASSOCIATED 9. THE SYSTEM INSTALLER SHALL PROPERLY SUPPORT ALL INSTALLED SYSTEM CABLING FROM A PANDUIT J-MOD CABLE SUPPORT SYSTEMS AS DETAILED IN SPECIFICATIONS. NO CABLING SHALL BE ROUTED AND TIED DIRECTLY TO BUILDING STEEL, CEILING GRID SUPPORT, CONDUIT, PIPING, OR DUCTWORK. PANDUIT J-MOD SUPPORT SYSTEM SHALL BE DIRECTLY CONNECTED TO THE BUILDING'S STEEL JOIST. AT LOCATIONS WHERE THE BOTTOM OF THE JOIST IS MORE THAN 5' ABOVE THE CEILING, THE SYSTEM INSTALLER SHALL PROVIDE AND INSTALL THREADED ROD AND ALL REQUIRED MATERIALS TO CONNECT THE THREADED ROD TO THE BUILDING STEEL AND THE CABLE SUPPORT SYSTEM TO THE THREADED ROD. CABLE PATHWAY SHALL NOT BE HIGHER THAN 5' ABOVE THE CEILING AT ANY 10. SECURITY CAMERA SYSTEM INSTALLER SHALL PROVIDE A CEILING MOUNTED INSTALLATION KIT RECOMMENDED BY THE MANUFACTURER OF THE CAMERA. EACH CEILING MOUNTED CAMERA KIT SHALL HAVE A SUPPORT WIRE ATTACHED TO THE BUILDING'S STRUCTURE TO PREVENT THE CAMERA FROM DROPPING TO THE FLOOR AT ANY TIME. AT NO POINT SHALL THE WEIGHT OF THE CEILING MOUNTED SECURITY CAMERA BE SUPPORTED BY THE CEILING GRID SYSTEM OR CEILING TILES. ALL CEILING MOUNTED CAMERAS SHALL BE FLUSH MOUNTED. 11. ALL EXTERIOR AND WALL MOUNTED CAMERA LOCATIONS MUST BE COORDINATED WITH THE OWNER PRIOR TO ROUGH-IN. ALL CAMERAS TO BE MOUNTED AT 12'-0" AFG. COORDINATION MEETINGS SHALL BE SCHEDULED THROUGH THE ARCHITECTS PROJECT MANAGER. 12. ALL SECURITY CAMERAS SHOWN TO WATCH EXTERIOR DOORS SHALL BE MOUNTED AT 40' FROM DOOR AT ALL LOCATIONS POSSIBLE. NO CAMERA SHALL BE INSTALLED MORE THAN 40' FROM DOOR.

DRAWING INDEX TECHNOLOGY SYMBOL LIST NOTE: SYMBOL: DESCRIPTION: <u>SHEET</u> **DESCRIPTION** WIRELESS ACCESS POINT DEVICE/ENCLOSURE (CEILING) TECHNOLOGY SYMBOLS, LEGENDS & GENERAL NOTES T0.00 T0.01 TECHNOLOGY SPECS T0.02 **TECHNOLOGY SPECS INFORMATION OUTLET (WALL)** T0.03 TECHNOLOGY SPECS T1.01 TECHNOLOGY SITE PLAN PUBLIC ADDRESS SPEAKER (CEILING) TYPE 1 T1.02 TECHNOLOGY ENLARGED SITE PLAN T5.01 TECHNOLOGY RISER DIAGRAM AND SCHEDULES T6.01 TECHNOLOGY DETAILS UNDERGROUND PULL BOX TYPE1 UPB2 UNDERGROUND PULL BOX TYPE2 CONDUIT (CONCEALED IN OR ABOVE \_\_\_\_ CEILING/HORIZONTAL SURFACE) UNDERGROUND/FLOOR CONDUIT O CONDUIT UP CONDUIT DOWN CONDUIT WITH CONTINUATION CONDUIT SLEEVE FIRE RATED PATHWAY SLEEVE SYSTEM TECHNOLOGY ABBREVIATION KEY ABBR: DESCRIPTION: AFF ABOVE FINISHED FLOOR **GENERAL NOTES:** BFC BELOW FINISHED CEILING ALL SYMBOLS LISTED ABOVE ARE FOR REFERENCE ONLY. REFER TO PLANS AND LINE TYPE KEY FOR NEW, EXISTING TO REMAIN AND TO BE REMOVED ITEMS FOR ADDITIONAL C CONDUIT INFORMATION. REFER TO GENERAL TECHNOLOGY EQUIPMENT SCHEDULE AND SPECIFICATIONS FOR FULL DETAILS. C.M. CONSTRUCTION MANAGER DESCRIPTIONS AND MANUFACTURERS OF ALL DEVICES E.C. ELECTRICAL CONTRACTOR

#### **TECHNOLOGY SYMBOL LIST NOTES:**

- "#" INDICATES INFORMATION OUTLET FACEPLATE CONFIGURATION. SYMBOL SUBSCRIPT INDICATES DEVICE TYPE. INFORMATION OUTLET INSTALLED IN E.C. PROVIDED FLOOR BOX. "#" INDICATES DATA OUTLET FACEPLATE CONFIGURATION. REFER TO THE ELECTRICAL FLOOR PLANS FOR
- ADDITIONAL INFORMATION. EQUIPMENT/DEVICE HEIGHT AS INDICATED ON PLANS. REFER TO SPECIFICATION - EXTERIOR COMMUNICATION PATHWAYS AND DETAIL 6/T6.02
- FOR UNDERGROUND COMMUNICATIONS PULL BOX. REFER TO SPECIFICATION - EXTERIOR COMMUNICATION PATHWAYS FOR
- UNDERGROUND COMMUNICATIONS HANDHOLE. PROVIDE AV OUTLET WITH (2) HDMI CONNECTORS AND CABLES. REFER TO FLOOR PLAN

G.C. GENERAL CONTRACTOR J-BOX JUNCTION BOX

MPOE MIMIMUM POINT OF ENTRY MC MAIN CROSS-CONNECT

S.C. SECURITY CONTRACTOR

SIM SIMILAR

T.C. TECHNOLOGY CONTRACTOR

TR-# TELECOMMUNICATIONS ROOM

TYP TYPICAL

UNO UNLESS NOTED OTHERWISE

+# MOUNTING HEIGHT ABOVE FINISHED FLOOR

#### APPLICABLE CODES

PARTIAL LIST OF APPLICABLE CODES AS OF JANUARY 1, 2022 2022 CALIFORNIA ADMINISTRATIVE CODE (CAC), PART 1, TITLE 24 CCR 2022 CALIFORNIA BUILDING CODE (CBC), PART 2, TITLE 24 CCR 2022 CALIFORNIA ELECTRICAL CODE (CEC), PART 3, TITLE 24 CCR 2022 CALIFORNIA MECHANICAL CODE (CMC), PART 4, TITLE 24 CCR 2022 CALIFORNIA PLUMBING CODE (CPC), PART 5, TITLE 24 CCR 2022 CALIFORNIA ENERGY CODE (CEC), PART 6, TITLE 24 CCR 2022 CALIFORNIA FIRE CODE (CFC), PART 9, TITLE 24 CCR 2022 CALIFORNIA EXISTING BUILDING CODE (CEBC), PART 10, TITLE 24 CCR

2022 CALIFORNIA GREEN BUILDING STANDARDS CODE (CALGREEN), PART 11, TITLE 24 CCR 2022 CALIFORNIA REFERENCED STANDARDS CODE, PART 12, TITLE 24 CCR TITLE 19 CCR, PUBLIC SAFETY, STATE FIRE MARSHAL REGULATIONS PARTIAL LIST OF APPLICABLE STANDARDS NEPA 72 NATIONAL FIRE ALARM AND SIGNALING CODE (CA AMENDED): 2016 EDITION

NFPA 720 STANDARD FOR THE INSTALLATION OF CARBON MONOXIDE DETECTION AND WARNING EQUIPMENT; NFPA 80 STANDARD FOR FIRE DOORS AND OTHER OPENING PROTECTIVES; 2016 EDITION UL 464 AUDIBLE SIGNALING DEVICES FOR FIRE ALARM AND SIGNALING SYSTEMS, INCLUDING ACCESSORIES; 2003 EDITION

UL 521 STANDARD FOR HEAT DETECTORS FOR FIRE PROTECTIVE SIGNALING SYSTEMS; 1999 EDITION UL 1971 STANDARD FOR SIGNALING DEVICES FOR THE HEARING IMPAIRED; 2002 EDITION (R2010) ICC 300 STANDARD FOR BLEACHERS, FOLDING AND TELESCOPING SEATING AND GRANDSTANDS; 2017 EDITION

FOR A COMPLETE LIST OF APPLICABLE NFPA STANDARDS REFER TO 2022 CBC (SFM) CHAPTER 35 AND CALIFORNIA FIRE CODE CHAPTER 80. SEE CALIFORNIA BUILDING CODE, CHAPTER 35, FOR STATE OF CALIFORNIA AMENDMENTS TO THE

24" MAX TOP OF BOX OF SWITCH, DEVICE, OUTLET FA TOP OF BOX OF MICROPHONE SWITCH, DEVICE,  $X \le Y$ OUTLET FA MICROPHONE 48" MAX 46" MAX SIDE APPROACH, 44" MAX FRONT APPROACH WITH KNEE AND TOE 34" MAX **BOTTOM OF** CLEARANCE THE BOX FINISHED FLOOR 15" MIN 2022 CBC 2022 CBC 2022 CBC 11B-308.2.2 11B-308.3.2 11B-308.2.1 NOTE: THIS DETAIL APPLIES TO MOUNTING OF ANY MECHANICAL AND ELECTRICAL DEVICE WHICH CONTAINS AN OPERABLE PART THAT IS ADJUSTABLE BY THE OCCUPANT. THIS DOES NOT APPLY TO SENSORS OR CONTROLS THAT ARE ONLY ADJUSTABLE THROUGH THE BUILDING AUTOMATION SYSTEM (IE:

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School District

Consultant

NORTH: TRUE

PROJECT NUMBER

230380

LEAF Engineer

**CONSULTANT** 

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15. ALL NEW EXTERIOR CAMERAS COVERING DOORS EQUIPPED WITH SOUNDERS SHALL BE AXIS MODEL #F4005E. PROVIDE ALL REQUIRED AXIS HARDWARE FOR FULLY FUNCTIONAL SYSYTEMS AT ALL #F4005E CAMERA LOCATIONS, INTERIOR AND EXTERIOR. 16. PROVIDE LICENSES FOR ALL CAMERAS AS REQUIRED TO PROVIDE A TURNKEY SYSTEM. SALIENT SYSTEMS LICENSES FOR EXISTING ANALOG AND IP CAMERAS ARE TRANSFERABLE TO NEW IP CAMERAS. PROVIDE LICENSES ONLY FOR NEW CAMERAS THAT ARE NOT

13. CONDUIT, BACK BOX AND CABLING REQUIREMENTS FOR IP SECURITY CAMERAS: EACH IP CAMERA SHALL BE EQUIPPED WITH (1) CAT6 CABLE BY CABLING CONTRACTOR. CONTRACTOR SHALL MOUNT THIS OUTLET AT +12" ABOVE THE CEILING IN A PLENUM RATED JACK AND COORDINATE ALL FINAL LOCATIONS WITH OTHER TRADES ON THE PROJECT TO VERIEY THAT THE LOCATION OF THE OUTLIET MAINTAINS

FROM THE BUILDING STRUCTURE TO A SINGLE GANG BACK BOX MOUNTED AT 5' OR LESS ABOVE THE FINISHED CEILING. SECURE

14. VIDEO SURVEILLANCE CONTRACTOR SHALL PROVIDE ONE (1) ADDITIONAL OMNICAST LICENSE FOR EACH DOOR EQUIPPED WITH AN

INTERIOR CARD READER AND SOUNDER TO ENABLE THE LOCAL CAMERA VIEW TO BE DISPLAYED ON THE LCD MONITOR IN THE

CONDUIT AND BACK BOX TO INSURE MINIMAL SWAY MOVEMENT.

12" OF CLEARANCE FROM THE FRONT OF THE FACEPLATE FOR OWNER ACCESS. ELECTRICAL CONTRACTOR SHALL ROUTE (1) 1" CONDUIT

FOR DETAILS.

TEMPERATURE AND HUMIDITY SENSORS).

2. FOR 24" REACH TO CONTROLS, OUTLETS OR SWITCHES ON THE WALL AT THE ACCESSIBLE WORK SURFACE WITH KNEE/TOE SPACE, AN ADDITIONAL 7" MUST BE ADDED TO THE KNEE SPACE.

X≤ 20"

48" MIN.

**TECHNOLOGY** SYMBOLS, LEGENDS & **GENERAL NOTES** 

**REVISIONS** 

Description

#### 1.7 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings 1. Submit all shop drawings in accordance with the general requirements of the construction documents. Submit shop drawings a minimum of two (2) weeks prior to commencement of
- Division-27 work for A/E review and action. Shop drawings shall include evidence of grounding and bonding components are coordinated with field conditions and the work of other trades This submittal may have a written component and a visual, drawn component for review and action by the A/E prior to installation.

#### B. Certificates: 1. Submit management and installation team reference documentation verifying: a. The project manager is a RCDD in good standing with BICSI and is qualified to

- manage the scope of work described in the contract documents and has five (5) years of experience managing similar projects in size and scope. The documentation shall include the RCDD registration number. b. The field supervisor is a BICSI trained technician that is qualified to perform and oversee the work described in the contract documents.
- C. Qualification Statements: The contractor shall submit documentation that within the past 12 months, a minimum of 75% of all installation personnel have been trained or certified by the manufacturer of the products they are installing.

#### 1.8 CLOSEOUT SUBMITTALS

A. As-Built Drawings: Submit all as-built drawings in accordance with the general requirements of the construction documents. Submit as-built drawings a minimum of two (2) weeks after completion of all Division-

27 work for A/E and Owner reference:

#### 1.9 QUALITY ASSURANCE

- A. Qualifications Manufacture Component manufactures shall be ISO 9001:2000 and offer products that are RoHS compliant.
- B. Qualifications Installer:
  - 1. At a minimum, seventy-five percent (75%) of the onsite contractor provided field technicians shall be factory certified within 12 months by the manufacturer of the

Hangers and Supports for Communications Systems

- National Electric Codes National Electrical Code (2017) ANSI/NFPA 70-2017, National Electrical Code© (NEC©) ANSI/IEEE C2-207. National Electrical Safety Code®
- National Electrical Code (NEC) (NFPA 70) OSHA Standards and Regulations – all applicable Local Codes and Standards – all applicable
- Telecommunications Distribution Methods Manual, 13th Edition BICSI 004-2012, Information Technology Systems Design and Implementation Best Practices for Healthcare Institutions and Facilities Information Technology Systems Installation Methods Manual (ITSIMM), 6th
- ANSI/BICSI 002-2014, Data Center Design and Implementation Best Practices Network Systems and Commissioning (NSC) reference, 1st Edition
- ANSI/NECA/BICSI 568-2006, Standard for Installing Commercial Building Telecommunications Cabling NECA/BICSI 607-2011, Standard for Telecommunications Bonding and
- Grounding Planning and Installation Methods for Commercial Buildings h. ANSI/BICSI 001-2009, Information Transport Systems Design Standard for K-12 Educational Institutions
- AV Design Reference Manual, 1st Edition Network Design Reference Manual, 7th Edition
- Outside Plant Design Reference Manual, 5th Edition Wireless Design Reference Manual, 3rd Edition
- n. Electronic Safety and Security Design Reference Manual, 3rd Edition. Anywhere cabling Standards conflict with electrical or safety Codes, Contractor shall defer to NEC and any applicable local codes or ordinances, or default to the most
- stringent requirements listed by either. Knowledge and execution of applicable codes is the sole responsibility of the
- Any code violations committed at the time of installation shall be remedied at the Contractor's expense.

#### 1.5 ADMINISTRATIVE REQUIREMENTS

- A. Coordination Install and coordinate the telecommunications cabling work in cooperation with other trades installing interrelated work. Before installation, make proper provisions to avoid interference in a manner accepted by the architect. Any repairs or changes made necessary in the contract work, caused by the contractor's neglect, shall be made by the contractor at their own expense.
- Contract Documents and the overall construction schedule must be carefully reviewed to determine all required interfacing and timing of the work. All such documents shall be available through the General Contractor or Construction Manager.

#### 1.6 ACTION SUBMITTALS

**SECTION 27 10 00 - STRUCTURED CABLING** 

All mounting hardware

All mounting brackets

All fiber and copper patch cords

A. NEMA – National Electrical Manufacturer's Association

B. ANSI – American National Standards Institute

D. RSEF – Relevant State Electrical and Fire Codes

E. IEEE – Institute of Electrical and Electronic Engineers

C. NEC – National Electric Code

F. UL – Underwriters Laboratories, Inc.

Section 26 05 00: Common Work Results for Electrical

G. ANSI/TIA – 568-C.0, Generic Telecommunications Cabling for Customer

H. ANSI/TIA – 568-C.1, Commercial Building Telecommunications Cabling Standard

ANSI/TIA - C-2, Balanced Twisted-Pair Telecommunications Cabling and Components

Cabling, providing the accuracy requirements for Level III field testers; Category 6

M. ANSI/TIA – 606 The Administration Standard for the Telecommunications Pathways and

ANSI/TIA - C.2-1, Transmission Performance Specifications for 4-pair 100 ohm Category 6

ANSI/TIA – 569A Commercial Building Standard for Telecommunications Pathways and

Section 27 41 16.51: Classroom AV Pole Vault

All power cords

C. Related Sections

1.2 REFERENCES

**PART 1 GENERAL** 

1.1 SUMMARY

- A. Product Data: For each product indicated. Submit all product data in accordance with general requirements of the construction
- documents. Submit product cut sheets and a detailed list of components a minimum of six (2) weeks prior to commencement of Division-27 work for A/E review and action. Alternate and "Or Equal" designated products must be submitted for review and judgment to the A/E prior to installation. The contractor-proposed alternate products or

Conduits and Boxes for Communications Systems 27 05 33 - 3

A. This section describes the structured cabling system which shall include permanently installed

B. Products Installed Under this Section: Only new equipment and material, produced by

Underwriters Laboratory shall be used as specified in this Section or on the Drawings.

Section 27 41 16: Multi-Purpose Room /Library Audio Visual System

backbone and horizontal pathway cabling, outlet assemblies, hardware for terminating and

manufacturers that are recognized nationally by the technology industry and approved by

#### selected telecommunications system components being installed. Proof of certification shall be available on site for review at all times for each field technician.

#### 1.10 WARRANTY

- 1. Contractor shall provide a 25-year System Warranty on all copper and fiber permanent cabling links. This is a system performance warranty guaranteeing for 25 years from acceptance that the installed system shall support all data link protocols for which that copper Category or fiber OM/OS designation is engineered to support according to IEEE and
- TIA standards. 3. The System Warranty may be invoked only if the cabling channel links are comprised of approved cable infrastructure connectivity and approved cable. Patch cords must be manufactured by same approved cable and/or connectivity system.
- 4. Upon acceptance of Warranty, manufacturer will mail a notification letter to the installer and a notification letter and warranty certificate to A/E.

#### PART 2 PRODUCTS

#### 2.1 NON-CONTINUOUS CABLE SUPPORTS

- A. Basis-of-Design Product: Subject to compliance with requirements: Erico – Caddy CableCat Support System
  - Copper/BLine Cable Hook System CEAS Attachments – Stiffy Series Panduit – Jmod Cable Support System
- Or approved equal B. Product Options: 1. The indicated manufacturers shall be the basis of the design and each component

environments and/or air handling (plenum) spaces.

review the substitute product.

construction documents.

27 work for A/E review and action.

and action by the A/E prior to installation.

27 work for A/E and Owner reference:

1.7 INFORMATIONAL SUBMITTALS

A. Coordination Drawings

1.8 CLOSEOUT SUBMITTALS

A. As-Built Drawings

2.1 CONDUIT AND BACKBOXES

B. PVC conduit

C. Pull boxes

D. Back Boxes

Wheatland Tube

Or approved equal

Or approved equal

Thomas & Betts

Hubbell Raco

Telecommunications

Definitions.

A. Main Distribution Frame (MDF)

B. Intermediate Distribution Frame (IDF)

1.3 DEFINITIONS

1.4 SUBMITTALS

O. ANSI/TIA – 598 Color Coding of Optical Fiber Cables

Hoffman Engineering Co

2.2 TELECOMMUNICATIONS CONDUIT AND BACKBOXES

Crouse-Hinds

Or approved equal.

Appleton

JM Eagle

PART 2 PRODUCTS

- selected shall address the particular infrastructure requirement Stiffy Series 200 with comfort cradle Low Voltage supports Four-inch (0'4") Cat214z34, two-inch (0'2") J-Hook Supports Cat324z34
- 1. Non-continuous cable supports shall be available in multiple sizes, styles and materials. Rigid supports shall be equipped with flared edges and pre-configured
- bend radius controls 2. Provide drop wire supports and threaded rod assemblies in areas where structural mounting surfaces are non-functional or inaccessible. 3. Support assemblies shall provide a bearing surface of sufficient width to comply with
- required bend radii of high-performance UTP and optical fiber cables. 4. Non-continuous cable supports sized 1 5/16" and larger shall have a cable retainer strap to provide containment of cables within the hanger. The cable retainer strap shall
- 5. Select approved non-continuous cable supports suitable for specific installation

#### PART 3 EXECUTION

#### 3.1 EXAMINATION

A. Check actual site conditions prior to start of any work. Ensure all preceding trade work

Hangers and Supports for Communications Systems 27 05 28 - 5

components must be verified by two (2) independent sources within the past 6 months.

This request shall include the two (2) independent sources, the original Product's

specification sheet, the proposed substitute product cut sheet, and a written request to

later than fourteen (14) calendar days after release of the original telecommunications

3. Any request of an alternate or substitution must be submitted to the A/E for action no

Submit all shop drawings in accordance with the general requirements of the

3. Shop drawings shall include evidence of grounding and bonding components are

1. Submit all as-built drawings in accordance with the general requirements of the

Submit as-built drawings a minimum of two (2) weeks after completion of all Division-

Conduit Pull box Pull box Pull box Pull box Width Increase

Conduits and Boxes for Communications Systems

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N. ANSI/TIA - 607 Commercial Building Grounding and Bonding Requirements for

Manufacturer's recommendations and installation guidelines

R. All publications referred to in this document shall be the latest publicized edition 1.03

Q. All cabling shall comply with all appropriate requirements of NEC Articles 770 and 800 and

shall comply with the State Fire Codes as interpreted by the State Fire Marshall's Department.

A physical concentration or central location for terminating backbone cables to

interconnect with local exchange carrier (LEC) equipment at the activity minimum point

of presence. The MDF generally includes vendor specific components to support voice

and data circuits, building surge protector assemblies, main cross connect blocks,

equipment support frames, and plywood backboard (if MDF is wall mounted).

Depending upon local site conditions, the MDF and IDF may be identical.

Contractor shall hold and maintain manufacturer's certification for the Structured

systems have performed satisfactorily for not less than 18 months

The contractor must be certified with the manufacturer for the Structured Cabling

4. At minimum, the contractor's qualifications for manufacturer's certification shall include:

5. Provide BICSI Registered Communications Distribution Designer (RCDD) approved

6. Provide specific experience in installing and testing structured cabling distribution

7. Contractor shall furnish documentation providing proof of calibration and latest software

Structured Cabling

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3. The Contractor shall provide proof of manufacturer's certification to the District.

Installers shall be CommScope Systimax certified or TE/AMP ND&I certified, or

For moves, and changes to existing installed structured communications cable

drawings complete with wiring diagrams and details required to prove that the distribution system shall properly support connectivity from the MDF to the IDF to the

systems using fiber optic and Category 5e & 6 or higher, cabling systems. Provide

systems, contractor shall be certified by same manufacturer as existing system.

District approved equal for copper horizontal cabling and Corning certified or

District approved equal for Fiber. Include written certification from users that

P. BICSI – Building Industry Consulting Service International publications:

Telecommunications Distribution Methods Manual

Telecommunications Cabling Installation Manual

Customer Owned Outside Plant Design Manual

within another structure separate from the MDF.

System for at least twelve (12) months prior to bid.

current certification for installing technicians.

LAN and Internetworking Design Manual

coordinated with field conditions and the work of other trades.

2. Submit shop drawings a minimum of six (2) weeks prior to commencement of Division-

4. This submittal may have a written component and a visual, drawn component for review

#### associated with the telecommunications system is accurate and complete before proceeding with installation or use of products specified in this section.

#### 3.2 INSTALLATION

- Follow manufacturer's instructions and recommended industry standards and The installed non-continuous support system must be an independent support structure for the voice/data communication system
- 3. Draping cables over other structures in the ceiling is unacceptable. Water pipes. ceiling grid, sprinkler system, electrical supports, air ducts or any other in-ceiling structure may not be used for cable support.
- 4. Contractor installed supports shall be used to supplement the main cable support system when any cabling leaves the main support system or is unsupported for more than three and one-half feet (3'-5'-0") feet 5. Non-continuous supports shall be installed with rod stock or threaded rod secured to

the slab above to support the telecommunications cable infrastructure parallel to the

- slab throughout the cable plant unless site conditions dictate a non-parallel 6. Cable must be routed to follow existing corridors and parallel or 90-degree angles from all walls and the cable tray whenever possible. All pathways shall avoid electromagnetic interference (EMI). Cable that is distributed
- in partially-enclosed metallic pathways shall be routed with the following minimum clearances: Four (4) feet from motors or transformers. One (1) foot from conduit and cables used for electrical power and distribution.

#### 3.3 RE-INSTALLATION

A. No additional burden to the owner regarding costs, network down-time, and end user interruption shall result from the re-installation of specified components. Scheduling for reinstallation work shall be coordinated, in writing, with the owner prior to beginning any re-

Five (5) inches from fluorescent lighting.

#### 3.4 CLOSEOUT ACTIVITIES

- A. Contractor shall provide documentation of all telecommunications system components under this section utilized throughout the site for review and reference by the Owner and A/E team.
- B. Contractor to submit all as-built drawings and any test documentation required prior to acceptance by the Owner.

#### END OF SECTION 27 05 28

Hangers and Supports for Communications Systems

# 4 15 60 8

- A. Electrical Metallic Galvanized Tubing and Fittings with natural finish for all conduits not exposed: ANSI C80.3 with compression-type fittings.
- B. Indoor Pull boxes: Galvanized steel, screw cover pull box. Grey polyester powder coat finish inside and out. NEMA Type 1. Pull boxes to be sized per NEC code to accommodate the number of EMT conduits as shown on Telecom drawings with adequate clearances, access
- Supporting devices: U channel trapeze assemblies, 1/2" Threaded rods, clamps, conduit straps, C-clamps and retainers.
- Fasteners: 3/4" Carbon steel expansion anchors with 2 1/2" embed into concrete slab for pull box U-channel support attachment to concrete slab. The anchors must be tested and approved under dual load conditions: Hilti Kwikbolt 3, Ramset/Redhead Trubolt. Or equal.
- E. U-channel systems: 16 gauge steel channels. Provide fittings and accessories that match with the U-channel of the same manufacturer.

#### PART 3 EXECUTION

#### 3.1 EXAMINATION

A. Check actual site conditions prior to start of any work. Ensure all preceding trade work associated with the telecommunications system is accurate and complete before proceeding with installation or use of products specified in this section.

#### 3.2 INSTALLATION

- Install Pull boxes in easily accessible locations.
  - A pull box should not be used in lieu of a bend. Conduits that enter the pull box from opposite ends with each other should be aligned. For direct access to a box located above inaccessible ceilings provide a suitable,

Install Horizontal cabling boxes immediately above suspended ceilings.

- marked, hinged access panel (or equivalent) in the ceiling. This access panel can also serve as the cover for the box. 6. Back Boxes: Provide 4-11/16" H X 4-11/16" W X 2-1/8" D outlet back boxes at all telecom outlet locations shown on drawings. Provide (1) 1-1/4" conduit from back box to telecom room or pull box except as otherwise noted. All connectors and couplings
- shall be zinc-plated steel set screw type. Die cast zinc fittings are not to be used. Provide bushing on ends of all conduits. Provide pull string in all conduits. Provide single gang plaster ring on all communications outlet back boxes, unless indicated otherwise.

Conduits and Boxes for Communications Systems 27 05 33 - 5

## version of all test equipment Provide a complete and detailed test plan for the structured cabling system including a

complete list of test equipment for the Category 5e, Category 6, and fiber optic cable

components and accessories. Include procedures for validation, and testing. Provide

- current certification for testing technicians. a. Furnish factory reel tests for fiber optic cables. Cabling shall be fully terminated from end to end (installed in faceplates and installed into patch panels NEMA rated wall boxes and/or raceway). Prior to finalized testing, pretests will not be accepted as the final report.
- Provide certification of staff to utilize listed testing equipment. Furnish factory test results for patch cords.
- e. Include specific experience in installing and testing structured cabling distribution systems using fiber optic, Category 5e, and Category 6 cabling systems.
- B. Qualification Statements Provide Contractor's experience and qualifications, which shall include three (3) years of projects of similar complexity. Include names and locations of two projects successfully completed using an instructional classroom technology. Provide documentation indicating Contractor has been in the telecommunications
- contracting business for a minimum of five (5) years under the same name and is located within two hundred (200) miles of the Distric Prior to installation, submit data of installer's experience and qualifications, which shall include 3 years on projects of similar complexity. Include names and locations of two projects successfully completed using fiber optic and copper communications cabling
- systems in similar environments. 4. Installers shall be CommScope Systimax certified or CommScope Uniprise certified for copper systems and Corning NPI certified or CommScope certified for fiber systems. Include written certification from users that systems have performed satisfactorily for not less than 18 months.
- 5. Include specific experience in installing and testing structured telecommunications distribution systems using fiber optic and Category 5e and Category 6 cabling systems

#### C. Refer to Section 01 33 00 for additional requirements. 1.5 CLOSEOUT SUBMITTALS

Representative.

- A. Documentation to be submitted upon completion of system are: Upon completion of installation, the contractor shall prepare "as-built" drawings of the system. As-builts shall be minimum size of 30" by 42" reproducible drawings of each floor plan indicating exact device locations, panels, cable routes and wire numbers as
- Provide Electronic copy of "as-built" drawings in AutoCAD and PDF formats. Maintenance required and maintenance schedule. For each campus, provide one (1) plastic laminated schematic of structured cabling system showing cabling, IDFs, MDFs, and equipment rooms. Drawings shall depict the
- a. Shop and As-Built drawings shall depict District approved structured cabling system identifications and administration labeling scheme. b. As-Built drawings shall depict all final structured cabling configurations, including locations, cable counts and IDF locations after completion of structured cable
- Electronic copies of Certification Test Results shall be provided in native and PDF format to the District Representative within ten days of cable installation completion. 25 Year Warranty of Structured Cabling System shall be provided to the District Representative within ten days of final Test Results. Coordinate with District

#### Structured Cabling 27 10 00 - 3

## SECTION 27 05 33 - CONDUITS AND BOXES FOR COMMUNICATIONS SYSTEMS

#### 1.1 SUMMARY

**PART 1 GENERAL** 

A. Section Includes: Provides specifications for conduit pathways, back boxes and pull box enclosures utilized for the distribution and housing of telecommunications cabling and components: Telecom EMT conduit and boxes

- 1.2 RELATED DOCUMENTS A. All divisions of the specification and general provisions of the Construction Documents.
- B. Architectural, mechanical, electrical, and all technology drawings.
- Refer to Structural Seismic Requirement design documents Specifications, if available, for Non-Structural Components for all structural bracing and support of telecommunications

#### 1.3 REFERENCES

Abbreviations and Acronyms Architect / Engineer (designer) A/E:

2016 California Electrical Code

2016 California Building Code

ANSI: American National Standards Institute Authority Having Jurisdiction BICSI: **Building Industry Consulting Service International** Electronics Industry Alliance EIA: TDMM: Telecommunications Distribution Methods Manual

Underwriters Laboratory

B. Codes and Regulations: (Note: Reference Division One for specific code versions governing the work in addition to the information noted below. National Electric Safety Code (NESC) - 2017 National Fire Protection Association (NFPA)

Telecommunications Industry Association

#### Local Municipal Codes 1.4 APPLICABLE REGULATORY REFERENCES

- Contractor is responsible for knowledge and application of current versions of all applicable Standards and Codes. In cases where listed Standards and Codes have been updated, Contractor shall adhere to the most recent revisions, including all relevant changes or addenda at the time of installation.
  - ANSI/TIA: a. TIA-526-7 (OFSTP-7) (July 2015) Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant
  - b. TIA-526-14-B (April 2015) (OFSTP-14) Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant ANSI/TIA/EIA-598-C (July 2014) Optical Fiber Cable Color Coding ANSI/TIA-568-C.0 (December 2015) Generic Telecommunications Cabling for Customer

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## Provide bonding to cable tray pathways.

- Conduit support and bracing: Coordinate layout and installation of conduits and pull boxes with other trade conditions to ensure adequate clearances, access and cable management. Install and provide support for EMT conduits and pull boxes in accordance with the latest edition of the NEC code, as well as all state and local codes and requirements.
- Representative approval before installing conduits and pull boxes where the location need to deviate from the contract documents. Install conduits above ceilings at height to provide access to pull. Install conduits and pull boxes level and square and at proper elevations. Ensure adequate clearances,

Coordinate installation and location with existing conditions. Notify and get the Owners

- access and cable management. Use fittings and support devices compatible with conduits and pull boxes and suitable for use and location. Strength of each support shall be adequate to carry present and future load multiplied by a safety factor of at least four 5. Install individual and multiple trapeze hangers and riser clamps as necessary to
- support the conduits. Provide U-bolts, clamp attachments and other necessary hardware for hanger assemblies and for securing hanger rods and conduits. Space supports for conduits on maximum 10-foot centers. Provide and install expansion or deflection fittings for conduits runs at all instances at seismic or expansion joints to allow for movement in any direction.

#### C. Conduit routing, bends and radius guidelines: If the conduit has an internal diameter of 2 inches or less the bend radius must be at

- least 6 times the internal conduit diameter If the conduit has an internal diameter of more than 2 inches the bend radius must be at least 10 times the internal conduit diameter. Conduit bends should be smooth, even, and free of kinks or other discontinuities that
- may have detrimental effects on pulling tension or cable integrity during or after 4. If a conduit run requires more than two 90 degree bends then provide a pull box between sections with two bends or less 5. If a conduit run requires a reverse bend (between 100 degrees and 180 degrees) then
- insert a pull point or pull box at each bend having an angle from 100 degrees to 180

Withstand the environment to which they will be exposed.

- Consider an offset as equivalent to a 90 degree bend. A pullbox shall not be used as a 90 degree bend. Achieve the best direct route with no bend greater than 90 degrees or an aggregate of
- bends in excess of 180 degrees between pull points or pull boxes. Contain no continuous sections longer than 100 ft. ). For runs that total more than 100 ft. in length, pull points or pull boxes should be inserted so that no segment between points/boxes exceeds the 100 ft. limit.
- Conduits should not be routed through areas in which flammable material may be stored or over or adjacent to boilers, incinerators, hot-water lines and steam lines. 13. Keep conduits at least 6' away from parallel runs of steam, hot water pipes or mechanical ductwork. Conduit Terminations
- Join conduits with fittings designed and approved for the purpose. Make the joints tight without protruding lips that can snag cable pulling inside the conduits. Where conduits are terminated with locknuts and bushings align the conduit to enter
- squarely and install the locknuts with dished part against the box. Use two locknuts, one inside and one outside the box.

3. Ream all conduit ends and fit them with an insulated bushing to eliminate sharp edges

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applicable requirements as defined by TIA.

#### B. Refer to Section 01 77 00 for additional requirements.

- 1.6 DELIVERY, STORAGE, AND HANDLING Store materials protected from exposure to harmful environmental conditions and at
- temperature and humidity conditions recommended by the manufacturer.

#### B. Repair or replace damaged components before Substantial Completion of the project. 1.7 WARRANTY

- A. The installation must be certified to meet the latest available manufacturer system warranty program requirements for an extended warranty of twenty five (25) years minimum duration. The performance warranty shall warrant the installed horizontal and backbone copper portion of the system and, as applicable, the installed horizontal and backbone fiber optic portions of the system. All such links and segments shall be warranted in accordance with the latest
- The Contractor shall warrant the workmanship and installation of the system for one (1) year. All major component failures must be replaced within a four-hour period. Amajor component
- D. The contractor must provide a four-hour response time to problem calls. Response time is defined as on-site presence of authorized maintenance personnel equipped with appropriate spare parts and diagnostic tools.

shall be considered any component that affects fifty or more user devices.

E. During the warranty period, the Contractor shall maintain adequate stock of potential replacement parts to service the system should component failure occur. PART 2 PRODUCTS

### 2.1 SYSTEM DESCRIPTION

- A. All new fiber optic cable and fiber optic patch cords, hardware and termination equipment shall be manufactured by Corning, or District approved equal.
- B. All new horizontal cabling, patch cords, hardware and terminating equipment shall be manufactured by CommScope Systimax, CommScope Uniprise, or District approved equal to best match existing manufacturer.
- All existing fiber optic cable, patch cords, hardware and termination equipment to be re-used shall be pulled back, bagged and protected in place. Testing parameters shall be followed according to Section 3.05 Testing. D. The horizontal and backbone cabling system includes the interconnecting cabling and sleeves

between rooms, terminal hardware for connectivity between the MDF and/or IDFs and the

E. The backbone system shall be wired in a star topology with the MDF at the center or hub of

Structured Cabling

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Hardware and terminating equipment shall consist of UL approved; Category 6 patch panels, jacks, and fiber optic terminating equipment.

Cabling Standards TIA-568-C.1-2 (November 2014) Commercial Building Telecommunications

Customer Premises-Addendum 1, Updated Reference for Balanced Twisted-Pair

- e. ANSI/TIA-568-C.1 (February 2012) Commercial Building Telecommunications Cabling Standard, Addendum 2 General Updates
- ANSI/TIA-568-C.2 (June 2016) Balanced Twisted Pair Communications Cabling and Components Standards

d. TIA-568-C.0-1 (September 2012) Generic Telecommunications Cabling for

- ANSI/TIA-568-C.3 (June 2011) Optical Fiber Cabling Components Standard ANSI/TIA-568-C.3-1 (December 2011) Optical Fiber Cabling Component Standard- Addendum 1, Addition of OM4 Cabled Optical Fiber and array
- ANSI/TIA-1183 (August 2012) Test Fixtures for Balun-Less Measurements of Balanced Components and Systems ANSI/TIA-1183-1 (January 2016) Test Fixtures for Balun-Less Measurements of Balanced Components and Systems, Addendum 1 - Extending Frequency Capabilities to 2 GHz.
- ANSI/TIA-568-C.4 (July 2011) Broadband Coaxial Cabling Components m. ANSI/TIA-942-A (August 2012) Telecommunications Infrastructure Standard for Data Centers ANSI/TIA-942-A-1 (March 2013) Telecommunications Infrastructure Standard for
- Data Centers, Addendum 1 Cabling Guidelines for Data Center Fabrics TIA-569-D (April 2015) Telecommunications Pathways and Spaces TIA-569-D-1 (October 2016) Telecommunications Pathways and Spaces Addendum 1- Revised Temperature and Humidity Requirements for Telecommunications Spaces
- g. ANSI/TIA-606-B (December 2015) Administration Standard for Telecommunications Infrastructure r. TIA-607-B (November 2015) Generic Telecommunications Grounding (Earthing) and Bonding for Customer Premises s. TIA-607-B-1 (January 2017) Generic Telecommunications Grounding (Earthing)
- and Bonding for Customer Premises External Grounding Addendum TIA-758-B (April 2012) Customer-Owned Outside Plant Telecommunication Infrastructure Standard
- u. TIA-1152 (November 2016) Requirements for Field Test Instruments and Measurements for Balanced Twisted-Pair Cabling v. ANSI/TIA-862-B (February 2016) Structured Cabling Infrastructure Standard for Intelligent Building Systems.

w. TIA-570-C (August 2012) Residential Telecommunications Infrastructure

x. TIA-1005-A (June 2012) Industrial Telecommunications Infrastructure Standard for Manufacturing, Process & Refining ANSI/TIA-1005 (January 2015) Telecommunications Infrastructure Standard for Industrial Premises aa. TIA-1005-1 (May 2012) Telecommunications Infrastructure Standard for

Industrial Premises; Addendum 1 - Industrial Pathways and Spaces

bb. TIA-1179 (July 2010) Healthcare Facility Telecommunications Infrastructure

Standard. ISO/IEC a. ISO 11801 (November 2010) - Generic Cabling for Customer Premises b. ISO/IEC TR 14763-2-1:2012 - Information technology -- Implementation and operation of customer premises cabling -- Part 2-1: Planning and installation -

> Identifiers within administration system. Conduits and Boxes for Communications Systems

> > 27 05 33 - 2

that can damage cables during installation or service. Conduits that enter a telecom room should terminate near the corners to allow for

Terminate conduits that protrude through the structural floor 3 inches above the surface.

deterioration at completion. Repair damage to galvanized finishes with zinc-rich paint

E. Provide grounding and bonding for conduits and pull boxes as indicated by NEC code and instructed by manufacturer. F. Conduits shall be clearly labeled at both ends designating the opposite locations(s) served. The numbering scheme shall be room number plus a suffix to guarantee uniqueness, e.g.,

Maintain the integrity of all fire stop barriers for all floor or wall penetrations.

143-1. Labeling must be machine generated. G. Conduit Protection: Remove burrs, dirt and construction debris from conduits and pull boxes. Conduits should be left capped for protection. Provide final protection and maintain conditions in a manner acceptable to the Owners Representative to ensure that coatings, finishes and pull boxes are without damage or

#### recommended by the manufacturer. 3.3 ACCEPTANCE

proper cable racking.

- A. All specified conduits and pull boxes indicated on the drawings and specifications shall be
- B. Specified shop drawings and product submittals shall have been submitted for review and all review comments and deficiencies shall have been resolved. Final shop drawings and product submittals shall have been submitted, reviewed and found to meet the requirements of the specifications.
- C. Issues and deficiencies identified in field reports and punch lists shall have been resolved. Final as-built drawings shall have been submitted, reviewed and found to meet the requirements of the specifications.

D. Contractor shall provide written notice of final completion of the telecom infrastructure. Upon

receipt, the Owner's Representative will review/observe the completed installation. Once the

#### Owner's Representative is satisfied that all work is in accordance with the Contract Documents, the Contractor will be notified in writing.

3.4 RE-INSTALLATION

A. No additional burden to the owner regarding costs, network down-time, and end user interruption shall result from the re-installation of specified components. Scheduling for reinstallation work shall be coordinated, in writing, with the owner prior to beginning any reinstallation work.

#### 3.5 CLOSEOUT ACTIVITIES Contractor shall provide documentation of all telecommunications system components under

this section utilized throughout the site for review and reference by the Owner and A/E team. B. Contractor to submit all as-built drawings and any test documentation required prior to

#### acceptance by the Owner. END OF SECTION 27 05 33

Conduits and Boxes for Communications Systems 27 05 33 - 7

G. Backbone cable shall consist of indoor/outdoor plenum-rated, armored tight-buffered multimode fiber optic cable. Fiber optic cable shall be OMI 62.5/125µm. All fiber optic backbone shall not exceed a maximum distance of 275 meters (902 feet). All indoor/outdoor

rated fiber optic cable shall be U.L. listed. H. Backbone cable over 275 meters shall consist of armored indoor/outdoor plenum-rated. Fiber optic cable requirements over 275 meters shall be based on SFP Port Cabling Specification

Modal

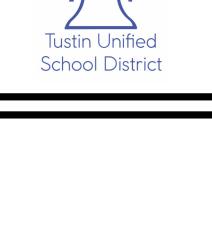
	(nm)	Type	Size (µm)	Bandwidth (MHz Km)	(m)
1000BASE- SX	850	MMF	62.5	160 (FDDI- grade)	220 (722 ft)
			62.5	200 (OM1)	275 (902 ft)
			50	400 (400/400)	500 (1,640 ft)
			50	500 (OM2)	550 (1,804 ft)
			50	2000 (OM3)	1000 (3281 ft)
1000BASE- LX/LH	1310	MMF	62.5	500	550 (1,804 ft)
			50	400	550 (1,804 ft)
			50	500	550 (1,804 ft)
		SMF	-"	-	10,000 (32,821 ft)
1000BASE- EX	1310	SMF	_**	-	40,000 (131,234 ft)
1000BASE- ZX	1550	SMF	-	-	Approximately 70 km depending on link loss
1000BASE- BX-U	1310	SMF	_**	-	10,000 (32,821 ft)
1000BASE-	1490	SMF	-**	-	10,000 (32,821 ft)

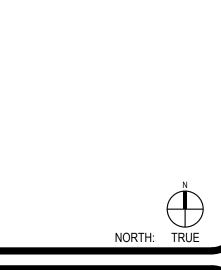
Structured Cabling 27 10 00 - 5

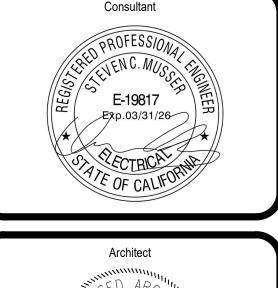
2400 East Katella Ave, Suite 950 Anaheim, CA 92806 P 949-548-5000

CONSULTANT LEAF Engineer ENGINEERS 8163 Rochester Avenue, Suite 100 Rancho Cucamonga, CA 91730 909.987-0909 leafengineers.com

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REN. 10/31/25

**TUSD** PROJECT NUMBER 230380 **REVISIONS** Description Date

**TECHNOLOGY SPECS** 

Structured Cabling

27 10 00 - 1

K. ANSI/TIA – C.3, Optical Fiber Cabling Components Standard

GLC-BX40- D-I	1550	SMF	_**	-	40,000 (131,234 ft)
GLC-BX40- DA-I	1490	SMF	_**	-	40,000 (131,234 ft)
GLC-BX40- U-I	1310	SMF	_**	-	40,000 (131,234 ft)
GLC-BX80- D-I	1570	SMF	-**	-	80,000 (262,467 ft)
GLC-BX80- U-I	1490	SMF	_**	-	80,000 (262,467 ft)
GLC-GE- DR-LX	1310	SMF	-**	-	10,000 (32,821 ft)

#### 2.2 STRUCTURED CABLING

A. Cabling shall be UL listed for the application and shall comply with TIA/EIA-568 (most current) standards and NFPA 70. Provide a labeling system for cabling as required by TIA-606 (most current) standards and District Standards. Cabling manufactured more than 12 months prior to date of installation shall not be used.

#### B. Horizontal Cabling

Shall consist of Category 6A UTP four pair cables. Shall match criteria and performance ratings of the existing horizontal cables.

Shall be plenum rated or OSP rated when installed in underground conduits. The maximum distance between the telecommunications outlet and the horizontal cross connect shall be no more than 90 meters. The maximum total length of all patch cords and jumpers in the telecommunications closet and at the work area shall be no more

than 10 meters. 5. Shall comply with NFPA 70 and performance characteristics in TIA-568 (most current) standards, four-pair ohm. 6. All jumpers, patch cords, equipment cords, connecting hardware and connectors shall

meet all applicable standards as specified in ANSI/TIA 568-C.2 and C.3. 7. Category 6 rated cable for local area networks shall exceed ANSI/TIA-568 (most

8. Cable jacket shall be Blue (Systimax, CommScope Uniprise, or District approved equal) for Structured Cabling System. 9. Cable jacket shall be Aqua (Belden, Hubbell or District approved equal) Category 6 for Intercom and Clock system

10. Yellow (Systimax, CommScope Uniprise, or District approved equal) Category 6A for Camera system. 11. Each jack, where it is a spare or intended to serve a telephone or analog line, should be fed by four-pair, Category 6A cable, solid annealed copper conductor.

Fiber Optic Multimode Backbone Cabling 1. Shall be indoor/outdoor (plenum rated only where required by code), loose tube 12 strands minimum, OM1 62.5/125µm.

> Structured Cabling 27 10 00 - 6

Y. Each campus MDF shall include two, free standing equipment server cabinets...

Manufacturer: Tripplite SR2400or District approved equal.

AA. Contractor shall be responsible for proper grounding of the cabinets per the most current 607 Rack / Cabinet vertical busbar Hubbell # HGRKTVC or equal.

Device ground kit Hubbell # HGRKD##N (## - length in inches) or equal per device 3. Ground conductor Kit Hubbell # HGRKTDA##DA (## - length in inches) or equal for

abinet grounding to electrical service panel or building stee 4. Ground conductor Kit Hubbell # HGRKTDA##DA (## - length in inches) or equal for cabinet busbar grounding to electrical service panel or building steel.

#### 2.8 MDF / IDF OPEN 4 POST EQUIPMENT RACK(S) FREE STANDING

A. The unit shall conform to EIA-310 Standard for Cabinets, Racks, Panels and Associated Equipment and accommodate industry standard 19" rack mount equipment.

B. The unit shall be designed with four (4) vertical posts to allow rack mount equipment

installation utilizing four (4) vertical mounting rails. C. The unit shall provide a minimum of 45 Rack Units of equipment vertical mounting space

(1U=1.75" or 44.45mm). D. The unit shall include at least 60 sets of mounting screws, caged nuts, bolts and cup washers,

and caged nut installation tool for the mounting of equipment inside the unit. Baying brackets shall be provided where mounting multiple cabinets are to be mounted

F. Unit shall have base dimension of 84 inches in height by 20.25 inches in width by 30 inches

G. Units shall be black in color.

H. Cabinets shall be seismic/earthquake braced and anchored to floor.

All weight bearing components shall be constructed from steel no less than 0.9mm (20

All metal parts shall be painted using a powder coat paint process.

Plastic materials shall comply with Underwriters Laboratory Specification 94 with V-1 rating (UL94 V-1) or better

Provisions shall be provided for all rack-mounted equipment to be earthed or grounded directly to the frame.

M. Unit shall include a grounding kit and all associated hardware. N. Manufacturers: Hoffman, Chatsworth, or District approved equal.

O. Contractor shall be responsible for proper grounding of the cabinets per the most current 607

Structured Cabling 27 10 00 - 11

#### 2.15 FIRESTOPPING MATERIAL

Contractor shall provide all necessary fire stopping of openings through which cable is installed under this specification, in accordance with NFPA 70 and all local codes. This includes installation in conduits, raceways, or bare penetrations. Provide and install UL 1479 approved (Fire Barrier Caulk) firestop material. Manufacturer: 3M, STI or District approved equal.

#### 2.16 POWER STRIP(S)

Install 6 outlet, 15A 120v horizontal rackmount Surge Protector at every equipment rack / cabinet in IDF/MDF. Legrand Perma Power #JT06BOB or District approved equal.

#### PART 3 EXECUTION

3.1 EXAMINATION

#### Coordinate layout and installation of voice, data, and video communication cabling with the

District Representative, other contractors, and equipment suppliers.

B. Structured Cable Contractor shall attend weekly project meetings.

and space requirements of voice and LAN equipment.

Meet jointly with other contractors, equipment suppliers, the District Representative in order to exchange information and agree on details of equipment arrangements and installation

D. Record agreements reached in meetings and distribute to other participants in a timely

E. Adjust arrangements and locations of distribution frames, cross-connect and patch panels in equipment rooms and/or MDF/IDF rooms to accommodate and/or optimize the arrangement

#### 3.2 INSTALLATION

Structured cabling systems, including the horizontal and backbone cable, outlet/connector assemblies, and associated hardware shall be installed in accordance with TIA/EIA-568 (most current) standard, TIA/EIA-569-A, NFPA 70, and UL standards as applicable.

If MDF and/or IDF do not have adequate capacity to support additional cable and termination hardware, Contractor shall provide and install new MDF/IDF cabinet/rack or add to existing IDF equipment.

C. Contractor shall provide all necessary tools and materials not specified, (Velcro wraps, "d" rings, screws, consumables, hardware, etc.) and equipment, (ladders, hydraulic lifts, storage containers, etc.) necessary to provide a complete and operating system.

D. The designated District Representative shall be provided progress reports.

E. Periodic on-site inspections will be done during the course of installation.

F. Screw terminals shall not be used except where specifically indicated on plans.

G. Do not untwist Category 6 UTP cables more than 1/4 inch from the point of termination to

27 10 00 - 16

maintain cable geometry. Structured Cabling  D. Fiber Optic Cabling All armored indoor/outdoor rated tight-buffered fiber optic cable shall be plenum rated

All Multimode fiber optic backbone cable shall not exceed a maximum distance of 275 New fiber optic backbone cable shall consist of armored indoor/outdoor plenum rated Multimode OM1 62.5/125µm fiber optic cable.

Backbone cable over 275 meters (902 feet) shall consist of armored indoor/outdoor, plenum rated cable. Fiber optic backbone cable requirements over 275 meters shall be based on Section 2.01.H, SFP Port Cabling Specification Table. E. Category 6A Patch Cables

UTP Patch Cables. Patch cables for unshielded twisted pair cable shall be Category 6A and shall be same manufacturer as horizontal cabling and shall be equipped with factory-attached connectors to interconnect equipment mounted on the racks of the distribution frame and to connect computer stations to outlet locations. Quantity of patch cords required for 100% port population at both ends with 15% spare.

Patch cord footage shall be determined by the Contractor and verified with the District Representative. Unless otherwise stated, the Structured Cable Contractor shall deliver: MDF/IDF Patch Cords

Blue in color for Structured Cabling (Category 6A)

Yellow in color for CCTV (Category 6A) Aqua in color for Intercom/clock (Category 6A) White in color for Wireless access points (Category 6A) All new cables to match existing colors if existing cables are to remain Workstations – Category 6, blue in color, 20 foot length. CCTV– footage determined by contractor, Category 6, yellow in color.

Wireless Access Points – 2 feet in length Category 6, white in color

Intercom/Clock – footage determined by contractor, Category 6, Aqua in color.

F. Fiber Optic Patch Cables Fiber Optic Patch Cables shall be multimode patch cords pre-made to connect fiber optic equipment with fiber optic cross connects, interconnects and outlets.

Shall be manufactured by Corning or CommScope. The patch cords (jumpers) shall be impact-resistant, duplex fiber cables with LC to SC connectors, of the same performance characteristics as the multimode fiber backbone being connected. Fiber patch cords footage shall be determined by the contractor and verified with the

provide connection between the Active LAN devices and the Fiber Optic patch panel. Quantities for 100% fiber strand population at both ends plus 15% spares. 6. Unless otherwise stated the Structured Cable Contractor shall deliver: a. IDF Patch Cords – LC - SC connectorized, multimode, duplex, fiber optic patch

These fiber optic patch panel connections shall provide 0.4 dB or less insertion loss and

b. MDF Patch Cords – LC - SC connectorized, multimode, duplex, fiber optic patch

#### 2.3 PATCH PANELS

District Representative

 A. Copper Patch Panels Patch panels shall be rack mounted, rated to exceed TIA Standard for Category 6 modular patch panels, each wired to terminate modular jacks per the TIA T568B

2. Quantities of jacks are based on the number of Category 6 cables originating at wall

Structured Cabling

27 10 00 - 7

Rack / Cabinet vertical busbar Hubbell # HGRKTVC or equal.

Device ground kit Hubbell # HGRKD##N (## - length in inches) or equal per device Ground conductor Kit Hubbell # HGRKTDA##DA (## - length in inches) or equal for

cabinet grounding to electrical service panel or building steel. Ground conductor Kit Hubbell # HGRKTDA##DA (## - length in inches) or equal for cabinet busbar grounding to electrical service panel or building steel.

#### 2.9 MDF EQUIPMENT CABINET POWER DISTRIBUTION STRIP

Each equipment cabinet shall come equipped with two 5-foot power distribution strips with (10) 20 amp (NEMA 5-20R) receptacles mounted 6 inches on center.

 B. MDF Cabinet Mounted LCD Monitor/Keyboard Drawer Contractor shall provide and install one rack-mounted LCD monitor/keyboard drawer at MDF cabinet location designated by District Representative. Unit shall include full Size Keyboard, Energy Saver, adjustable mounting depth, Integrated Trackball, Low Cooling Requirements, Low Power Consumption, On-Screen Display (OSD) adjustments, PC mouse/keyboard/video support, PS/2 terminations, and

Standard VGA termination. Characteristics: LCD monitor/keyboard shall be: a. Rack mounted LCD monitor/keyboard drawers shall only 1U (1.75") of rack

1024 X 768 Resolution, 15" TFT active matrix screen. Unit shall include cable management arm, mounting hardware, Qty 1 - IEC to IEC 320 Power Cord, Qty 1 - IEC to NEMA 5-15P Power Cord.

Nominal input voltage shall be 100, 120, 208, 230, 240 V. Input frequency (Hz) shall be 50/60 Hz. Input Connection Type shall be NEMA 5-15P, IEC-320 C14.

Unit shall be equipped with power cord 6 feet in length (1.83 meters). Manufacture: APC or District approved equal MDF Cabinet Sliding Equipment Shelves

Contractor shall provide and install two rail-mounted sliding equipment shelves within every cabinet installed.

Shall occupy 1U of rack space Shall be equipped to slide out. Net Width 16.20 inches.

Net Depth 37.40 inches. Color shall be black. Manufacturer: Hoffman Net Series or District approved equal.

MDF Cable Runway Cable runway shall be installed in MDF Rooms. Size: 12 inch wide, plus side channel, as needed.

Classified by Underwriters Laboratories (UL) as suitable for equipment

Cable runway shall be used for voice and, or data and video communications cabling only. No electrical wiring shall be placed in cable runway with voice and

Wall angle supports shall be steel angles. Ends to be smooth without hooks or projections. Brackets shall be able to support an end load of 600 lb. with a safety Elbows, Tee's, 90-degree bends and crosses: All horizontal and vertical 90-

degree elbows, tees, 90-degree bends and crosses shall be made with right angle couplings, which clamp to the runway without the need for drilling or At all horizontal 90-degree bends, tees, and crosses, provide adjustable junction Structured Cabling

Do not exceed manufacturers' cable pull tensions for copper and fiber optic cables. Provide a

J. Use only lubricants approved by cable manufacturer for outside rated cable. Lubricants for

L. For Category 6 UTP cable, bend radii shall not be less than four times the cable diameter.

copper cables.

Do not chafe or damage outer jacket materials.

K. Do not over cinch cables, or crush cables with staples.

Pull rope shall be secured at each end.

submitted for District Representative approval.

and related patch panel port number.

M. Contractor shall install new ¼" pull rope in all conduits at MDF/IDF.

placed as a single continuous length in every new conduit.

A. The labeling shall be in accordance with the TIA/EIA-606 (most current) standard.

C. The ink and label shall be water and smear-proof for both indoor and outdoor use.

B. The labeling shall be computer software generated and printed with readable fonts and black

D. Samples of each type of media showing label type, labeling format, font size and ink shall be

A. The data systems labeling shall include all related equipment, cables, racks and work area

B. Label all cables no more than 6" from each end of the cable designating the rack and room

D. The labeling shall be computer software generated and printed with readable fonts and black

1. Patch Panels will be provided with a factory lettering located above the ports with port

The patch panel port labels will identify the room station end room number and outlet

Outlets will be provided with factory labels identifying MDF or IDF and its room number,

C. The labeling shall be delineated on any riser diagrams, floor plans and test reports.

number and factory installed field labels installed below the ports.

Structured Cabling 27 10 00 - 1

inside rated cable not approved.

3.3 DATA SYSTEMS LABELING PROCEDURES

3.4 DATA SYSTEMS LABELING

E. Patch Panels

device to monitor cable pull tensions. Do not exceed 25 pounds pull tension for four pair

Pull rope shall be new 1/4" polypropylene over polyester rope with a minimum 1700 lb.

Pull rope shall be new material that is free of knots, kinks, and abrasions and shall be

B. Unless otherwise indicated, raceway shall be three channel, Wiremold 5500 or District approved equal with all necessary brackets, adapters, connectors, hardware and equipment to install Systimax, CommScope Uniprise, or district approved equal, certified Structured Cabling systems as described above.

outlets and terminating at the patch panel plus 15% spares.

district specifies otherwise.

each fiber optic and UTP patch panel.

or cross-connect cables and/or wires in place.

2.4 CABLE MANAGEMENT

2.5 FIBER OPTIC PATCH PANELS

connector.

E. Each cable must be properly dressed.

will provide room to terminate additional optics.

patch panels shall be determined at site walks

J. Fiber Optic Patch Panel Manufacturer: Corning or CommScope

splice kits for large radius cable bends.

A. Jacks shall comply with FCC Part 68.5, and TIA/EIA-568 (most current) Standards.

communications equipment racks.

of high impact rated thermoplastic housing rated for 6 service.

contained in TIA/EIA-568 (most current) Standard.

Blue in color for structured cabling.

H. All unused faceplate openings shall have blanks installed.

Agua in color for Intercom/Clock

Yellow in color for CCTV.

right top to bottom order

2.11 NON-METALLIC SURFACE MOUNTED RACEWAY

Black baked enamel finish

5500 raceway or District approved equal.

2.10 OUTLET/CONNECTOR ASSEMBLIES

E. Jacks shall be

Seismically supported by end wall supports, angular wall supports and

Manufacturer: Chatsworth Products (12") or District approved equal.

Jacks shall accommodate Category6 or fiber optic cable and work in concert with Wiremold

C. UTPjacks shall be RJ-45 designation T568B type, UL 1863 listed, eight position, constructed

F. Telecommunications face plates shall comply with UL 514C, and TIA/EIA-568 (most current)

Stenciled lettering for voice and data circuits shall be provided using thermal ink transfer

Jacks shall be orientated on the patch panel staring at the top left and proceeding in a left to

standard; flush design constructed of high impact thermoplastic material.

available in 2-port, 4-port and 6-port single-gang configurations.

G. Structured cabling faceplate colors shall be ivory. Structured cabling faceplates shall be

D. Jacks for data shall be 6 hardware and shall comply with the attenuation requirements

connectors and couplers will be type SC.

Patch panels shall be black in color

each fiber optic patch panel and Category 6A patch panel.

rails, they shall be securely mounted to equipment rack frame rails.

3. 48-port patch panels need to be equipped with label windows above each patch panel

6. Copper Patch Panel Manufacturer: CommScope Systimax, or CommScope Uniprise.

4. All patch panels shall be 48-port capacity unless there is insufficient rack space or

A. All equipment cabinets shall be equipped with horizontal cable management organizers for

B. Horizontal cable managers shall be designed to extend past the frame to allow placement of

C. All equipment cabinets shall be equipped with horizontal cable management organizers for

E. Horizontal Cable Manager Manufacturer: CommScope Systimax, or CommScope Uniprise.

B. Patch panels shall be constructed of 0.125-inch minimum aluminum and shall have connectors

D. Rack-mounted fiber patch panels shall be equipped to terminate or splice the incoming inter-

These patch panels will terminate the fiber optic cables, provide a place for jumper cables and

G. Patch panels shall provide capacity for minimum of 12 fiber optic strands. Larger capacity

H. Patch panels shall be 100% populated with type SC couplers and adapter plates. All

Structured Cabling

27 10 00 - 8

I. The fiber optic patch panel connections shall provide 0.4 dB or less insertion loss.

C. Patch panels shall be equipped with engraved laminated plastic nameplates above each

which interface the inside plant fiber optic jumper cable with the outside plant fiber optic cable.

A. Provide Patch Panels for maintenance and cross connecting of fiber optic cables.

building fiber and any required backbone or interconnect cables.

equipment in any position within the rack. When mounted between equipment rack frame

Horizontal cable managers shall be single-sided with black finish and be 2 rack units (2U) in

height. Horizontal cable equipment shall have cable pass-through, removable hinged cover

and evenly spaced "fingers" designed to maintain and allow the entry and exit of jumper, patch

C. Raceway shall be ivory in color or as noted on drawings.

A. Conceal cable sleeves within walls whenever possible.

D. Notching or modifications of raceway will not be permitted.

E. Proper screws and anchors shall be used to mount raceway.

F. Manufacturer: Wiremold or District approved equal.

Structured Cabline 27 10 00 - 13

3.5 TESTING

 A. Structured Cabling Testing Perform structured cabling inspection, verification, and performance tests in

accordance with TIA/EIA-568 (most current) standard.

Permanent link testing shall be performed on all cabling. All testing personnel shall be trained on testing equipment tools to assure that complete and accurate testing results are obtained/provided. 4. All test equipment shall be calibrated no more than 12 months prior to cable test date. Test equipment shall have the latest software update/release from the test equipment manufacturer.

Visually inspect cabling jacket materials for UL or third party certification markings. Visually inspect plenum rated Category 6 UTP cable and Indoor/Outdoor plenum rated fiber optic cable jacket materials for UL or third party certification markings. 3. Inspect cabling terminations in MDF/IDF rooms and at workstations to confirm color code for tip and ring pin assignments and inspect cabling connections to confirm

compliance with TIA/EIA-568 (most current) standard. 4. Visually confirm Category 6 marking of outlets, cover plates, jacks, and patch panels. C. Verification Tests Perform 100MHz for Cat. 5e and 250 MHz for Cat.6, near end cross talk (NEXT) and

attenuation tests systems installations Perform fiber optic end-to-end attenuation tests using a power meter light source and manufacturer's recommended test procedures. Perform tests in accordance with EIA/TIA-526-14. Method B for horizontal, multimode fiber. Perform verification acceptance tests and factory reel tests.

 D. Performance Tests Category 5e and 6 cable tests Category 5e or 6 Perform UTP Permanent link tests in accordance with TIA/EIA-568 (most current) standard.

meter after installation is complete.

Fiber Optic cable tests. Perform an OTDR reel test and submit reports to the district representative before installation of the cable. Perform a Certified bi-directional attenuation tests with a light source and power

to the certified attenuation test. E. Final Verification Tests 1. Perform verification tests for Category 5e. 6 and fiber optic cable systems after the complete structured cabling and workstation jacks are installed.

4. Perform a bi-directional OTDR test on all fiber optic cables exceeding 90m in addition

Provide District Representative with electronic and written final tests results within 10 days of completion of installation. Final test results shall include summary pages for each IDF/MDF as required. 4. Test results shall be provided in both hard and soft copy.

END OF SECTION 27 10 00

Structured Cabling

2.6 WALL MOUNTED EQUIPMENT SUPPORT CABINET

A. Cabinet shall be fully enclosed lockable, modular type steel construction and treated to resist

B. Cabinet shall have a minimum weight capacity of 300 lbs

C. IDF cabinets shall be wall mount/swing out type and provide 19" rack mounting.

D. Rack shall be designed to allow for left or right-hand swing. Dimensions shall be a minimum of 36"H X 23" W X 30" D.

E. In selected cases, a 48" high cabinet will be used. Larger cabinet size will be determined on a project-by-project basis.

F. Cabinet shall be mounted on plywood backboard in location to be determined.

G. Contractor shall be responsible for determining correct cabinet mounting and anchoring methods that will safely support the combined weight of the cabinet and data network components including UPS and battery systems that will occupy the cabinet. UPS to be

H. Cabinet mounting and anchoring methods shall comply with the District Representative and State building and safety codes.

I. When wall mounted cabinets are installed in classrooms, the contractor shall responsible for providing and installing Acoustical Absorber foam material on inside, back of cabinet.

Hinged Wall-Mount Cabinet or District approved equal.

J. Drywall screws shall not be used for mounting of cabinets. K. Contractor shall be responsible for ensuring that cabinet mounting and anchoring methods are per manufacturers recommendations. Manufacturer: Hoffman Access Plus II Type 1 Double-

Acoustical Absorber shall be flexible, ½" thick, polyurethane, adhesive backed foam.

L. Contractor shall be responsible for proper grounding of the cabinets per the most current 607

Rack / Cabinet horizontal busbar Hubbell # HGRKTHC or District approved equal. Device ground kit Hubbell # HGRKD##N (## - length in inches) or equal per device 3. Ground conductor Kit Hubbell # HGRKTDA##DA (## - length in inches) or equal for

#### 2.7 MDF EQUIPMENT CABINETS/FREE STANDING

A. The unit shall be designed to provide a secure, managed environment for computer and networking equipment.

cabinet grounding to electrical service panel or building steel.

B. The unit shall conform to EIA-310D Standard for Cabinets, Racks, Panels and Associated Equipment and accommodate industry standard 19" rack mount equipment.

C. The unit shall be designed with four (4) vertical posts to allow rack mount equipment installation utilizing four (4) vertical mounting rails.

> Structured Cabling 27 10 00 - 9

2.12 NON-CONTINUOUS CABLE SUPPORT

A. Material Contractor shall provide and install all non-continuous cable supporting hardware.

C. Non-continuous cable supporting hardware consists of J-hooks, multi-function clips, beam

clamps, etc. Bridle rings or zip ties are not permitted. D. Non-continuous cable supports shall provide a load bearing surface of sufficient width to comply with required bend radii of high-performance cables; UL Listed. Bridle rings are not

E. Non-continuous cable supports shall have flared edges to prevent damage while installing F. Non-continuous cable supports sized 1 5/16" and larger shall have a cable retainer strap to

provide containment of cables within the hanger. The cable retainer strap shall be removable and reusable and be suitable for use in air handling spaces G. Non-continuous cable supports shall have an electro-galvanized or G60 finish and shall be

H. Multi-tiered non-continuous cable support assemblies shall be used where separate cabling

compartments are required. Assemblies may be factory assembled or assembled from prepackaged kits. Assemblies shall consist of a steel angled hanger bracket holding up to six non-continuous cable supports, rated for indoor use in non-corrosive environments; UL Listed.

rated for indoor use in non-corrosive environments.

specialty fasteners including beam clamps, flange clips, C and Z purlin clips, etc. Tee-bar support bracket with one non-continuous cable support, factory or jobsite assembled; rated for indoor use in non-corrosive environments.

I. If required, the multi-tier support bracket may be assembled to manufacturer recommended

K. Fastener to wire/rod with one non-continuous cable support, factory or jobsite assembled; rated for indoor use in non-corrosive environments.

L. Fastener to beam or flange with one non-continuous cable support, factory or jobsite assembled; rated for indoor use in non-corrosive environments. M. Fastener to C or Z purlin with one non-continuous cable support, factory or jobsite assembled;

rated for indoor use in non-corrosive environments. N. Fastener to wall, concrete, or joist with one non-continuous cable support, factory or jobsite

assembled; rated for indoor use in non-corrosive environments. O. Fastener to threaded rod with one non-continuous cable support, factory or jobsite assembled,

rated for indoor use in non-corrosive environments. P. The multi-tiered support bracket shall have a static load limit of 300 lbs.

Q. U-hooks and double J-hooks shall attach directly to threaded rod using standard nuts.

Structured Cabling 27 10 00 - 14

R. Manufacturer: Copper B-Line, Erico Caddy, Doc's J-Hooks or District approved equal.

E. The vertical mounting rails shall be adjustable to allow different mounting depths.

D. The unit shall provide 42U of equipment vertical mounting space (1U=1.75" or 44.45mm).

F. The unit shall include at least 60 sets of mounting screws, caged nuts, bolts and cup washers, and caged nut installation tool for the mounting of equipment inside the unit.

Both front and rear doors shall consist of quick release hinges allowing for quick and easy detachment without the use of tools.

H. The front and rear doors shall open a minimum of 180 degrees to allow easy access to the

I. The front and rear doors shall be reversible so that it opens from either side.

J. The base unit shall include removable side panels that are removed without tools using easy

finger latches for fast access to cabling and equipment. K. All weight bearing components shall be constructed from steel no less than 0.9mm (20

M. Plastic materials shall comply with Underwriters Laboratory Specification 94 with V-1 rating (UL94 V-1) or better.

L. All metal parts shall be painted using a powder coat paint process.

N. Provisions shall be provided for all enclosure panels and rack-mounted equipment to be earthed or grounded directly to the frame.

Units shall be equipped with vertical wire management rings, not to exceed 12"between rings,

O. Unit shall include a grounding kit containing terminated green/yellow jumper wires and

installed at both the front and rear of the cabinet. Q. Each cabinet installed shall have one (19"Wx3"Dx3"H) horizontal wire manager installed at top/rear portion of the cabinet.

R. Units shall be equipped with perforated front and rear doors, perforated top and solid side

Baying brackets shall be provided where mounting multiple cabinets are to be mounted

T. Cabinet Frame with front and rear mesh doors.

U. "Side Panels" required. V. Unit shall have base dimension of 84 inches in height by 31.50 inches in width by 41.86 inches

W. Units shall be black in color.

X. Cabinets shall be seismic/earthquake braced and anchored to floor.

Structured Cabling 27 10 00 - 10

2.13 BACKBOARDS

A. Provide fire rated plywood 3/4 inch thick A/C Grade 36"H X 24" W for mounting of wall mounted

Backboards shall be free of voids; fill and sand prior to painting. C. Cabinet shall be mounted on plywood backboard in location to be determined.

Contractor shall be responsible for determining correct backboard mounting and anchoring methods that will safely support the combined weight of the backboard, cabinet and data network components that will occupy the backboard.

F. Contractor shall be responsible for ensuring that cabinet mounting and anchoring methods

2.14 GROUNDING AND BONDING PRODUCTS

A. Comply with UL 467, ANSI/J-STD--607 (most current) standard, and NFPA 70. Components shall be identified as required by TIA/EIA-606 (most current) standard.

All MDF Racks shall be installed with a Grounding Busbar (TGB)

attachment points.

All IDFs shall be installed with a grounding busbar (TGB) the TGB shall be installed in accordance with ANSI/J-STD--607 (most current) standard. The TGB shall be grounded to the nearest building ground with a #6 AWG insulated conductor. 2. Building ground is identified as main building electrical ground, building structural steel,

location shall be approved by District Representative prior to installation.

a. Ground conductors are not to exceed 40'. If building ground connection is beyond 40', contractor is to install a new ground round at the nearest outside location. Ground rod location shall be approved by District Representative prior to b. Provide ohms testing for ground. Ground connections shall not exceed 5 ohms.

> Structured Cabling 27 10 00 - 15

Backboards shall be painted with a light color, nonconductive fire-resistant overcoat.

E. Backboard mounting and anchoring methods shall comply with the District Representative and State building and safety codes.

that comply with manufacturers recommendations. G. Drywall screws shall not be used to mount plywood backboards.

Manufacturer: Hubbell or district approved equal.

The TGB shall be installed in accordance with ANSI/J-STD--607 (most current) The TGB shall be grounded to the nearest access to the building ground with a #6 AWG insulated conducto

2. Building ground is identified as main building electrical ground, building structural steel, or ground rod. Water pipes, gas pipes and electrical conduits are not acceptable ground Ground conductors are not to exceed 40'. If building ground connection is beyond 40', contractor is to install a new ground round at the nearest outside location. Ground rod

4. Provide ohms testing for ground. Ground connections shall not exceed 5 ohms.

or ground rod. Water pipes, gas pipes and electrical conduits are not acceptable ground attachment points.

2400 East Katella Ave, Suite 950 Anaheim, CA 92806 P 949-548-5000 LEAF Engineer CONSULTANT

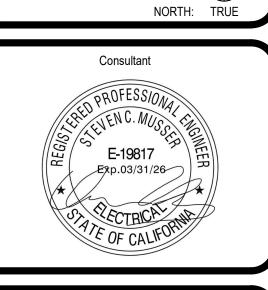
8163 Rochester Avenue, Suite 100 Rancho Cucamonga, CA 91730 909.987-0909 leafengineers.com

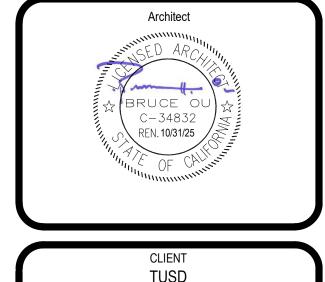
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lustin Unified

School District





PROJECT NUMBER 230380 **REVISIONS** Description Date **TECHNOLOGY SPECS** 

#### SECTION 27 05 00 - REQUIREMENTS FOR COMMUNICATION INSTALL

#### **PART 1 GENERAL**

#### 1.1 SUMMARY

 A. Section Includes 1. Provide a standard defining the structured communications cabling systems to be installed within customer facility. The goal is to accomplish this in the most economic and systematic fashion possible, and in a manner compliant with the latest codes, cabling standards and industry best practices.

Contractor Qualifications. Warranty.

Scope of Work Compliance.

#### Working Conditions.

1.2 GENERAL TERMS AND CONDITIONS

A. General Contractor is responsible for all required Division 27 scope of work and shall ensure all communication sub-tier contractors adhere to the qualifications set forth in all project Division 27 specifications including project experience and certifications.

B. Prices quoted shall be all-inclusive and represent a complete fully-engineered system installation at the Project site as contemplated by and detailed in the drawing package and in accompanying specifications.

C. Omissions in the specification of any provision herein described shall not be construed as to relieve the contractor of any responsibility or obligation requisite to the complete and satisfactory delivery, installation, operation and support of any and all systems, equipment or services. Correction of any omission on the part of the Contractor, either due to misinterpretation of this specification or any other conditions of the project, shall be the responsibility of the Contractor and shall not result in any contract modification or additional

D. Where conflicts and/or irregularities occur between project documents, specifications, drawings, and/or applicable codes, rules, regulations, ordinances, standards, guidelines and practices, the more stringent requirement shall apply as reasonably determined by Owner or government agency inspector.

E. This specification represents the design intent for the project communicated by way of narrative descriptions of intended functionality and single line or detail drawings indicating likely equipment connectivity to achieve that functionality. The designs in this specification do not represent fully engineered technical solutions. Contractors are required to review the designs presented in the project documents closely, submit any questions and clarifications regarding the design intent through the RFI process and develop their own engineered solutions representing a fully functional turn-key solution in their bid responses.

F. The scope of this project includes the complete system engineering, procurement, fabrication, installation, programming, testing, training and warranty.

G. Proposed solutions shall be based on the designs communicated in the specifications, but shall include any additional equipment, materials, software, licenses and/or labor required for the contractor to deliver a fully functional turn-key system solution that meets intended operational performance requirements.

> Requirements for Communication Install 27 05 00 - 1

vaults and/or pull boxes. Cable bundles shall be labeled wherever it is accessible including origin/destination and system information 9. Audio Visual Contractor shall install all new AV network equipment components with as indicated on drawings including but not limited to, projector mounts, switchers, control panels, speakers, and projector.

This specification defines quality standards and practices common to all network cabling for Long Beach Unified School District project. In addition, said project will have equests for Proposals (RFP), associated drawings and requirements pertaining their specific environments. Such collateral will be referred to in this document as Project Specific Documentation" or simply "Construction Documents". Voice and Data Networks encompass a broad spectrum of technologies and are distributed into project internal spaces. Installed cables will be used for Ethernet, high and low speed data applications, used in analog and digital voice, not to exclude other future Voice/Data technologies. This specification will include indoor/outdoor cable

equipment hardware as well as routing and support infrastructure. 3. It is the responsibility of the installing contractor to evaluate these general ecommendations and adapt them effectively to actual projects. Contractor is responsible for identifying and bringing to the attention of any design directions that may be in conflict or otherwise improved. All such conflict resolutions shall be in writing from A/E or owner. 4. Note that while many portions of this global specification are addressed to "The

installations, and backbone cabling, telecommunications closet and equipment cabling.

Contractor", these requirements apply equally to anyone doing the network cabling and infrastructure work within, whether those persons are outside contractors or persons directly employed by the owner. 5. Contractor shall be solely responsible for all parts, labor, testing, documentation and all

other associated processes and physical apparatus necessary to turn-over the completed system fully warranted and operational for acceptance by A/E. This specification includes structured cabling design considerations, product specifications and installation guidelines for low-voltage network systems and

associated infrastructure including, but not limited to: Cabling Sub-system 1 – Horizontal Category 6 cable

Work area (equipment outlet) appliances and configuration Horizontal Pathways Copper Patching/Cross-Connecting Fiber Backbone Cabling

Fiber Patching Telecommunications Spaces Telecommunications Room Requirements Racks and Cabinets Overhead Pathways

Communications Grounding Systems Communications Labeling and Administration

Interbuilding backbone

Contract Documents and the overall construction schedule must be carefully reviewed to determine all required interfacing and timing of the work. All such documents shall be available through the General Contractor or Construction Manager. a. New project schedule will include, but are not limited to, the following task

sequence: IDF relocations where indicated on drawings. b. Conduit infrastructure; including pullboxes install and conduit duct banks.

> Requirements for Communication Install 27 05 00 - 6

in nature rather than exhaustive. All stated quantities are subject to validation by ICT contractor. ICT contractor is reminded that differences between estimated quantities and those reasonably derived based from the Contract Documents (as well as through bidconferences, job walks, addendums, and other distribution of information) shall be the responsibility of the ICT contractor. There shall be no additional cost incurred by Long Beach Unified School District for not complying with the specifications and requirements of the Contract Documents.

B. Any variance from those components identified on the drawings and/or below shall be submitted to Long Beach Unified School District project representatives for approval prior to ordering and installation: the risk for all costs incurred by the ICT contractor for materials ordered prior to such written approval shall be borne entirely by the ICT contractor. Nonetheless, it is imperative that the ICT Contractor determine the availability of necessary materials and propose equivalent substitutes as necessary to meet all installation milestones Delays in ICT installations due to lack of product availability are unacceptable. As catalog numbers change frequently, the ICT contractor must verify all part numbers prior to ordering materials. Clarifications will be issued in response to written Requests for Information (RFI).

C. Throughout this specification, Systimax, Panduit, General, Hoffman and other manufacturers are cited. These citations are for the purpose of establishing quality, performance and warranty

#### 1.14 DELIVERY AND STORAGE

ICT Contractor shall provide a materials schedule prior to the start date of cable installation. Material schedule shall specify all material quantities and their delivery date for this project.

B. ICT Contractor shall provide protection from weather, moisture, dirt, dust and other

#### 1.15 INFORMATIONAL SUBMITTALS

A. Coordination Drawings:

Submit shop drawings a minimum of two (2) weeks prior to commencement of Division-27 work for A/E review and action.

This submittal may have a written component and a visual, drawn component for review

Submit management and installation team reference documentation verifying: The project manager is a RCDD in good standing with BICSI and is qualified to manage the scope of work described in the contract documents and has five (5) years of experience managing similar projects in size and scope. The

oversee the work described in the contract documents. C. Qualification Statements:

of the products they are installing.

Requirements for Communication Install

H. It is the responsibility of the Contractor awarded this project to ensure that all quantities, materials, labor, licenses, permits, sales taxes and any and all other costs to provide a turnkey project are included in their bid.

Floor plans, drawings, elevation drawings, and other drawings received by the Contractor as part of the construction process are hereby incorporated into this document by reference. It is the responsibility of the Contractor to ensure that amounts and lengths of cabling and pathways are correct, and that all materials and labor are included to install the system per the drawings and these specifications.

Permits, licenses, applicable sales taxes, insurance requirements, payment/performance bond costs, and other miscellaneous costs are the responsibility of the Contractor and must be included in the contract price and this scope of work. Such items are to be listed separately on pricing sheets, if provided. Copies of all required permits, licenses, insurance requirements and bond(s) are to be delivered to Owner prior to commencement of any work.

Installation Schedule and Coordination: Contractor must take the fast-track nature of this project and potential requirement for installation/work schedule adjustments and quick turnarounds into consideration in constructing this project as Owner will NOT entertain or agree to added-cost change orders associated with scheduling changes.

Work will need to be closely coordinated with architect, District Personnel, GC, MEP contractors, structural contractor and all low-voltage contractors and each of their respective

M. This will be a turnkey Project. Any item of the equipment or material not specifically addressed on the drawings, specifications or elsewhere in Division 27 specifications documents, but required to provide complete and functional systems as contemplated and/or specified herein. shall be provided at no additional charge to owner in a quantity and quality consistent with

N. Coordination with Project Design Team: The build contractor will be responsible for

coordinating all communications cabling infrastructure requirements, including review of existing site conditions, review and coordination of electrical power and grounding requirements, conduits and back boxes, structural support requirements, and coordination. Assembly: The contractor shall procure and assemble all hardware and equipment and any additional materials as required to deliver the completely functioning communications cabling

system and/or Audio Visual System.

build integrator's approved engineered designs.

Installation: The contractor shall install all equipment, inter-rack and intra-rack cable, wiring of

equipment, connectors, panels, plates, and other material at the Project site. Q. Testing and Adjustment: The contractor shall perform all tests and adjustments, furnish all test equipment necessary and perform all work required to properly configure the systems and to verify their performance in accordance with the information in this document and the design-

Warranty: The contractor shall warrant the installed system in accordance with the terms of this document and accompanying contractual documents.

#### 1.3 RELATED DOCUMENTS

A. All divisions of the specification and general provisions of the Construction Documents. Requirements for Communication Install

27 05 00 - 2

Individual Building Pathway Installation. Building Category and AV Cable installations; includes install, termination, labeling, testing, as-built and warranty documentation. e. Audio Equipment installation.

#### 1.7 CONTRACTOR QUALIFICATIONS

1. Contractor shall have at least 5 years of experience installing and testing structured 2. Contractor shall employ at least one BICSI Registered Communication Distribution Designer (RCDD), and the RCDD shall sign-off on all designs offered, including

stamping the design with their current BICSI/RCDD stamp. 3. Contractor shall have the responsibility to obtain any of the necessary permits, licenses, and inspections required for the performance of data, voice, and fiber optic cable 4. Contactor shall be a current manufacturer Certified Installer certificate. A copy of corporate certificate must be included with quote.

Contractor shall have service facilities within 50 miles of project location. At least 75 percent of the technicians on the job must have a current manufacturer Certified Copper Technicians certificate to install manufacturer Copper Distribution 7. At least 75 percent of the technicians installing any Fiber Distribution Systems must have a current manufacturer Certified Fiber Technicians certificate to install Fiber

Distribution Systems. 8. The Telecommunications contractor must provide a project manager to serve as the single point of contact to manage the installation, speak for the contractor and provide the following functions: a. Initiate and coordinate tasks with the Construction Manager and others as

specified by the project schedule. Provide day to day direction and on-site supervision of Contractor personnel. Ensure conformance with all contract and warranty provisions. Participate in weekly site project meetings. This individual will remain project manager for the duration of the project. The

contractor may change Project Manager only with the written approval of A/E.

1. Communications Contractor shall provide with bid a list of three reference accounts where similar Data, Voice, Fiber Optic Cable, and related migration/cutover equipment installation work was performed within the last year or twelve-month period.

Insurance Requirements: Contractor must be insured and shall provide with bid a Certificate of Indemnification, organization pertaining to data, voice and fiber optic cable installation.

Certificate of Insurance, and meet all required insurance and licensing policies as specified by A/E Risk Management Division and any Federal, State, and local 2. Contractor's vehicles brought onto project properties, shall comply with all requirements of all Federal, State, and local agencies. Vehicles shall meet current DOT, state and local, safety inspections where required.

D. Termination of Services: Owner or A/E reserves the right to terminate the Communication Contractor's services if at any time the A/E determines the Communication Contractor is not fulfilling their responsibilities as defined within this document. Contractor's appearance and work ethics shall be of a professional manner, dress shall be commensurate with work being

> Requirements for Communication Install 27 05 00 - 7

Architectural, mechanical, electrical, and all technology drawings including but not limited to elecommunication Drawings

C. Refer to Structural Seismic Requirement design documents Specifications, if available, for Non-Structural Components for all structural bracing and support of telecommunications

#### 1.4 REFERENCES

Abbreviations and Acronyms Architect / Engineer (designer) **Building Industry Consulting Service International** BICSI: Electronics Industry Alliance Equal Level far End Cross Talk Foiled Twisted Pair Intermediate Distribution Facility ILEC/LEC: Incumbent Local Exchange Carrier

ISP: Inside Plant Information Technology MDF: Main Distribution Facility MPOE: Minimum Point of Entry NEXT Near End Cross Talk OSP: PSELFEXT: Power Sum Equal Level far End Cross Talk PSNEXT: Power Sum Near End Cross Talk RCDD: Registered Communications Distribution Designer To Be Determined TCIM: Telecommunication Cabling Installation Manual Telecommunications Distribution Methods Manual Telecommunications Industry Association 20. TIA:

Unshielded Twisted Pair

Wireless Access Point. 1.5 APPLICABLE REGULATORY REFERENCES

> A. Contractor is responsible for knowledge and application of current versions of all applicable Standards and Codes. In cases where listed Standards and Codes have been updated, Contractor shall adhere to the most recent revisions, including all relevant changes or addenda at the time of installation. ANSI/TIA:

> > a. TIA-526-7 (OFSTP-7) (July 2015) Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant TIA-526-14-B (April 2015) (OFSTP-14) Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant

> > ANSI/TIA/EIA-598-C (July 2014) Optical Fiber Cable Color Coding ANSI/TIA-568-C.0 (December 2015) Generic Telecommunications Cabling for Customer Premises TIA-568-C.0-1 (September 2012) Generic Telecommunications Cabling for

> > Customer Premises-Addendum 1, Updated Reference for Balanced Twisted-Pair ANSI/TIA-568-C.1 (February 2012) Commercial Building Telecommunications Cabling Standards TIA-568-C.1-2 (November 2014) Commercial Building

lecommunications Cabling Standard, Addendum 2 General Updates ANSI/TIA-568-C.2 (June 2016) Balanced Twisted Pair Communications Cabling and Components Standards

> Requirements for Communication Install 27 05 00 - 3

Dress displaying lewd or controversial innuendos will strictly be prohibited. Conduct on project property will be professional in nature.

Any person in the Contractor's employ working on a project considered by to be incompetent or disorderly, or for any other reason unsatisfactory or undesirable, such person shall be removed from work on the project. The Communications Contractor shall be restricted from the premises and compensated for the percentage of work completed satisfactorily.

 E. Other Contractor Responsibilities Contractor is responsible for the removal and disposal of all installation and construction debris created in the process of the job. All work areas will be cleaned at the conclusion of the workday and no tools or materials shall be left in a manner as to pose a safety Contractor must remove all abandoned cable per Article 800 of the National Electrical

Code and per TIA and BICSI standards, recycling these materials where possible. This is mandatory; Contractors must consider this when placing bids. Contractor shall abide by the regulations set by A/E or Owner Security Department pertaining to access to and conduct while on project property and shall obey speed limits and parking regulations.

#### 1.8 SYSTEM PERFORMANCE WARRANTY

Contractor shall provide a manufacturer System Warranty on all copper and fiber permanent cabling links. This is a system performance warranty guaranteeing for a minimum of 20 years from acceptance that the installed system shall support all data link protocols for which that copper Category or fiber OS designation is engineered to support according to IEEE and TIA standards.

The manufacturer System Warranty may be invoked only if the cabling channel links are comprised of manufacturer connectivity and approved by the manufacturer. Patch cords must be same manufacturer of cable. Upon acceptance of Warranty, manufacturer will mail a notification letter to the installer

and a notification letter and warranty certificate to A/E. B. Contractor Warranty Obligations

Installation firm must be a current manufacturer Certified Installer in good standing and shall include a copy of the company certification with the bid. Contractor shall name a supervisor to serve on site as a liaison responsible to inspect and assure all terminations are compliant to factory methods taught in manufacturer Technician Certification Training and according to all Standards cited in the Regulatory

References section of this document. Contractor liaison shall have a current, up-to-date manufacturer Certified Technician certificate in both copper and fiber. Copies of the copper and fiber certificates of the manufacturer liaison shall be submitted with the bid. Contractor agrees all components comprising active links shall be of the same copper

Category or fiber OS/OM designation as the system being installed. Contractor shall under no circumstances mix different Categories or OS/OM classes of cable or termination devices (connectors) within the same link or system. Contractor shall install all racking and support structures according to cited TIA Standards in such fashion as to maintain both Standards and Manufacturer recommendations for uniform support and protection, segregation of different cable types, maintenance of maximum pulling tensions, minimum bend radius, approved termination methods as well as adhering to industry accepted practices of good

Provides specifications for non-continuous cable support components utilized to

provide pathways support to telecommunications cables traveling outside cable trays,

Requirements for Communication Instal

SECTION 27 05 28 - HANGER AND SUPPORTS FOR COMMUNICATIONS SYSTEMS

conduits, or other continuous cable supports.

B. Architectural, mechanical, electrical, and all technology drawings.

Architect / Engineer (designer)

Authority Having Jurisdiction

Electronics Industry Alliance

Underwriters Laboratory

the work in addition to the information noted below.

Customer Premises

National Electric Safety Code (NESC) - 2017

National Fire Protection Association (NFPA)

A. All divisions of the specification and general provisions of the Construction Documents.

C. Refer to Structural Seismic Requirement design documents Specifications, if available, for

Building Industry Consulting Service International

Telecommunications Distribution Methods Manual

B. Codes and Regulations: (Note: Reference Division One for specific code versions governing

Telecommunications Industry Association

Non-Structural Components for all structural bracing and support of telecommunications

Non-continuous cable supports.

PART 1 GENERAL

1.2 RELATED DOCUMENTS

1.3 REFERENCES

1.1 SUMMARY

27 05 00 - 8

All cable installations must be pre-approved by the Construction Manager to ensure

that the necessary arrangements have been made for proper access to project sites. 2. A twenty-four-hour prior notice shall be submitted to the Construction Manager for any work schedule changes. 3. Communications contractor shall display badges or passes as mandated by project property Security Department Rules and Regulations.

Cabling Standards

1. Coordination of site surveys and the issue of project owner owned materials and equipment will be the responsibility of the Construction Manager. Once said equipment and materials are in the contractor's possession, it is the contractor's responsibility to safeguard the material and equipment from damage or theft 2. Information required by the Contractor to price and complete a defined scope of work

will be furnished to the Communications Contractor by the A/E Project Manager in a Scope of Work document and at the time of the site survey (if necessary) and will be maintained by the Communications Contractor until the completion of the job.lt is the Contractor's responsibility to begin work promptly according to the Start Dates and to complete work by the Proposed Completion Date listed on the Cable Run Request

TIA-568-C.0-1 (September 2012) Generic Telecommunications Cabling for

ANSI/TIA-568-C.1 (February 2012) Commercial Building Telecommunications

TIA-568-C.1-2 (November 2014) Commercial Building Telecommunications

ANSI/TIA-568-C.2 (June 2016) Balanced Twisted Pair Communications

ANSI/TIA-568-C.3 (June 2011) Optical Fiber Cabling Components Standard

ANSI/TIA-568-C.3-1 (December 2011) Optical Fiber Cabling Component

Standard- Addendum 1, Addition of OM4 Cabled Optical Fiber and array

ANSI/TIA-1183 (August 2012) Test Fixtures for Balun-Less Measurements of

Customer Premises-Addendum 1, Updated Reference for Balanced Twisted-

ANSI/TIA-568-C.3 (June 2011) Optical Fiber Cabling Components Standard

ANSI/TIA-568-C.3-1 (December 2011) Optical Fiber Cabling Componen

Standard- Addendum 1, Addition of OM4 Cabled Optical Fiber and array

ANSI/TIA-1183 (August 2012) Test Fixtures for Balun-Less Measurements of

ANSI/TIA-1183-1 (January 2016) Test Fixtures for Balun-Less Measurements of

Balanced Components and Systems, Addendum 1 - Extending Frequency

ANSI/TIA-568-C.4 (July 2011) Broadband Coaxial Cabling Components

ANSI/TIA-942-A (August 2012) Telecommunications Infrastructure Standard for

ANSI/TIA-942-A-1 (March 2013) Telecommunications Infrastructure Standard for

TIA-569-D-1 (October 2016) Telecommunications Pathways and Spaces

ANSI/TIA-606-B (December 2015) Administration Standard for

TIA-607-B (November 2015) Generic Telecommunications Grounding (Earthing)

TIA-607-B-1 (January 2017) Generic Telecommunications Grounding (Earthing)

TIA-758-B (April 2012) Customer-Owned Outside Plant Telecommunication

TIA-1152 (November 2016) Requirements for Field Test Instruments and

ANSI/TIA-862-B (February 2016) Structured Cabling Infrastructure Standard for

TIA-570-C (August 2012) Residential Telecommunications Infrastructure

TIA-1005-A (June 2012) Industrial Telecommunications Infrastructure Standard

ANSI/TIA-1005 (January 2015) Telecommunications Infrastructure Standard for

ISO/IEC TR 14763-2-1:2012 - Information technology -- Implementation and

operation of customer premises cabling -- Part 2-1: Planning and installation -

aa. TIA-1005-1 (May 2012) Telecommunications Infrastructure Standard for

bb. TIA-1179 (July 2010) Healthcare Facility Telecommunications Infrastructure

Industrial Premises; Addendum 1 - Industrial Pathways and Spaces

a. ISO 11801 (November 2010) - Generic Cabling for Customer Premises

ANSI/NFPA 70-2017, National Electrical Code® (NEC®)

Telecommunications Distribution Methods Manual, 13th Edition

6. Contractor is responsible for understanding and submitting to manufacturer all

are not limited to the project information form and SCS warranty agreement.

test reports and drawings of floor plans showing locations of links tested

list of approved testers, test leads and latest operating systems.

written confirmation of Warranty from manufacturer.

immediately to the Construction Manager.

7. Contractor is responsible for understanding and submitting to manufacturer all

8. Test results shall be delivered in the tester native format (not Excel) and represent the

The Communications Contractor will correct any problems and malfunctions that are

documents required prior to project start to apply for this warranty. These include but

documents required at project end. These include completed warranty forms, passing

full test report. Summaries shall not be accepted. Contact manufacturer for a current

warranty-related issues without additional charge for the entire warranty period. The

All cabling work being performed on project property or under contract to Technology

Department must comply with Rules for safe operations, any state or local safety

regulations and meet the requirements of OSHA Safety and Health Standards. The

contractor Project Manager will maintain a copy of Rules for Safe Operations for

reference. It is the responsibility of the Communications Contractor to immediately

correct any unsafe working practices on the part of contractor personnel. Unsafe

working environments or conditions created by contractor personnel will be reported

conditions of the job site (as pertaining to the materials and equipment specified),

representative or engineer may be construed as a review or approval of the adequacy

2. Any liability for correction of conditions created by the contractor's personnel rests with

3. The Communications Contractor shall be solely and completely responsible for

4. No act, service, drawing review or construction observance by any employee,

including safety of persons and property during performance of work.

of the Contractor(s) safety measures, in, on, or near the construction site.

warranty period shall commence following the acceptance of the project by A/E and

ANSI/IEEE C2-207, National Electrical Safety Code®

Requirements for Communication Install

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and Bonding for Customer Premises - External Grounding Addendum

Addendum 1- Revised Temperature and Humidity Requirements for

Data Centers, Addendum 1 - Cabling Guidelines for Data Center Fabrics

TIA-569-D (April 2015) Telecommunications Pathways and Spaces

**Balanced Components and Systems** 

Telecommunications Spaces

Infrastructure Standard

Industrial Premises

Standard.

National Electric Codes

ISO/IEC

1.9 SAFETY

A. General

1.10 WORKING CONDITIONS

A. Site Access

Intelligent Building Systems.

for Manufacturing, Process & Refining

Identifiers within administration system.

National Electrical Code (NEC) (NFPA 70)

National Electrical Code (2017)

4. OSHA Standards and Regulations – all applicable

Local Codes and Standards – all applicable

elecommunications Infrastructure

and Bonding for Customer Premises

Measurements for Balanced Twisted-Pair Cabling

Requirements for Communication Install 27 05 00 - 9

Cabling Standard, Addendum 2 General Updates

Cabling and Components Standards

**Balanced Components and Systems** 

b. BICSI 004-2012, Information Technology Systems Design and Implementation Best Practices for Healthcare Institutions and Facilities c. Information Technology Systems Installation Methods Manual (ITSIMM), 6th

d. ANSI/BICSI 002-2014, Data Center Design and Implementation Best Practices Network Systems and Commissioning (NSC) reference, 1st Edition ANSI/NECA/BICSI 568-2006, Standard for Installing Commercial Building

Telecommunications Cabling g. NECA/BICSI 607-2011, Standard for Telecommunications Bonding and Grounding Planning and Installation Methods for Commercial Buildings

h. ANSI/BICSI 001-2009, Information Transport Systems Design Standard for K-12 **Educational Institutions** AV Design Reference Manual, 1st Edition Network Design Reference Manual, 7th Edition Outside Plant Design Reference Manual, 5th Edition

Electronic Safety and Security Design Reference Manual, 3rd Edition. Anywhere cabling Standards conflict with electrical or safety Codes, Contractor shall defer to NEC and any applicable local codes or ordinances, or default to the most stringent requirements listed by either. 8. Knowledge and execution of applicable codes is the sole responsibility of the

Wireless Design Reference Manual, 3rd Edition

9. Any code violations committed at the time of installation shall be remedied at the Contractor's expense.

#### 1.6 SCOPE OF WORK

A. General project information: These Specifications and associated drawings are the governing document for the installation of the telecommunications infrastructure and includes project descriptions specified and recommended products, installation and project management methods, the scope of work and elevation drawing specifications. Through this division specification document, Long Beach Unified School District will be referred to as the owner.

3. Owner wishes to contract with a General Contractor, who will sub-tier the supplier/contractor ("ICT-Information and Communication Technology and AV-Audio Visual") to provide, install, test and warranty a complete turn-key Cable Infrastructure System and Audio-Visual System for Owner's HVAC Upgrade, the "Project" per the scope of work and specifications stated herein. This inquiry implies no obligation or the part of Owner. Contractor shall bear all costs and expenses incurred in preparing a response a Request for Proposal ("RFP") and subsequent award of project, it being understood and agreed that Owner accepts no responsibility for any costs and/or expenses incurred by winning contractor in preparing and submitting such response. 4. The Owner is upgrading campus wide a new HVAC system. The HVAC Upgrade will be including rework of existing communication cable infrastructure, and a new Audio-Visual projector system. Contractor shall reconfigure each building IDF as shown on drawings. Administration Building will consist of a Main MDF and an IDF in each building and/or additional floor. Station cable pathway will consist of surface mount pathway in main corridors, J-hook in accessible ceilings areas or conduit to accessible ceiling areas. Where hard-lid

(gypsum board) ceiling areas, pathway way shall be j-hook, sized appropriately with ceiling hatch for access. 7. Installation of Copper UTP Category 6 cabling as indicated on drawings. Contractor shall provide/install fire caulk in all conduits with cable as required, UL listed rated fire system where applicable.

8. Contractor shall label all new cable at both termination points, within all communication

Requirements for Communication Install

27 05 00 - 5

The Contractor must notify the Construction Manager in writing of any delays; at that time, they shall come up with a mutually agreeable project schedule. 4. The Communications contractor will coordinate with the Construction Manager working

hours and job site access issues. The Communications contractor will coordinate with the Construction Manager to minimize outages to the existing systems. Any service interruption required by the Communications contractor must be requested in writing, and scheduled with the Construction Manager. 7. The Communications contractor shall not proceed with the requested service

interruption until written approval is granted by the Construction Manage

8. All problems, and questions relating to a particular job, will be referred to the

Construction Manager and no changes shall be made without his/her written approval.

C. Harmony Clause Contractor shall coordinate and work in harmony with other trades on the project as well as with A/E personnel.

#### 1.11 COORDINATION

A. Coordinate layout and installation of voice, data, and video communication cabling with other Long Beach Unified School District contractors and equipment suppliers. Meet jointly with other contractors, equipment suppliers, and Long Beach Unified School District representatives to exchange information and agree on details of equipment arrangements and installation interfaces.

Record agreements reached in meetings and distribute to other participants. 3. Adjust arrangements and locations of distribution frames, cross-connect and patch panels in equipment rooms and telecommunications rooms to accommodate and optimize arrangement and space requirements of voice and LAN equipment. 4. When indicated on drawings, contractor shall reuse existing copper and fiber optic backbone cables. 5. Provide weekly progress reports and crew schedules to project representatives by 5:00

#### PM, Thursday of each project work week. 1.12 ACTION SUBMITTALS

A. Product Data: For each product indicated. 1. Submit all product data in accordance with general requirements of the construction

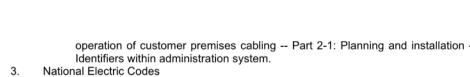
Submit product cut sheets and a detailed list of components a minimum of two (2) weeks prior to commencement of Division-27 work for A/E review and action. Alternate and "Or Equal" designated products must be submitted for review and judgment to the A/E prior to installation. The contractor-proposed alternate products or components must be verified by two (2) independent sources within the past 6 months. This request shall include the two (2) independent sources, the original Product's

specification sheet, the proposed substitute product cut sheet, and a written request to review the substitute product. 4. Any request of an alternate or substitution must be submitted to the A/E for action no later than fourteen (14) calendar days after release of the original telecommunications bid documents.

#### 1.13 INFORMATION & COMMUNICATION TECHNOLOGY (ICT) COMPONENTS

A. The Contract Documents generally outline industry standard components to be installed as part of the project ICT installation requirements. Such identification is intended to be general

Requirements for Communication Install 27 05 00 - 10



National Electrical Code (2017) ANSI/NFPA 70-2017, National Electrical Code© (NEC©) ANSI/IEEE C2-207, National Electrical Safety Code® National Electrical Code (NEC) (NFPA 70) OSHA Standards and Regulations - all applicable Local Codes and Standards – all applicable

BICSI a. Telecommunications Distribution Methods Manual, 13th Edition BICSI 004-2012, Information Technology Systems Design and Implementation Best Practices for Healthcare Institutions and Facilities c. Information Transport Systems Installation Methods Manual (ITSIMM), 6th

d. ANSI/BICSI 002-2011, Data Center Design and Implementation Best Practices Network Systems and Commissioning (NSC) reference, 1st Edition ANSI/NECA/BICSI 568-2006, Standard for Installing Commercial Building Telecommunications Cabling NECA/BICSI 607-2011, Standard for Telecommunications Bonding and Grounding Planning and Installation Methods for Commercial Buildings h. ANSI/BICSI 001-2009, Information Transport Systems Design Standard for K-

Anywhere cabling Standards conflict with electrical or safety Codes, Contractor shall

8. Knowledge and execution of applicable codes is the sole responsibility of the

defer to NEC and any applicable local codes or ordinances, or default to the most

12 Educational Institutions AV Design Reference Manual, 1st Edition Network Design Reference Manual, 7th Edition Outside Plant Design Reference Manual, 5th Edition Wireless Design Reference Manual, 3rd Edition Electronic Safety and Security Design Reference Manual, 3rd Edition.

#### 9. Any code violations committed at the time of installation shall be remedied at the Contractor's expense.

stringent requirements listed by either

Install and coordinate the telecommunications cabling work in cooperation with other trades installing interrelated work. Before installation, make proper provisions to avoid interference in a manner accepted by the architect. Any repairs or changes made necessary in the contract work, caused by the contractor's neglect, shall be made by

1. Contract Documents and the overall construction schedule must be carefully reviewed to determine all required interfacing and timing of the work. All such documents shall be available through the General Contractor or Construction Manager.

 A. Product Data: For each product indicated. 1. Submit all product data in accordance with general requirements of the construction 2. Submit product cut sheets and a detailed list of components a minimum of two (2)

27 05 28 - 3

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Anaheim, CA 92806

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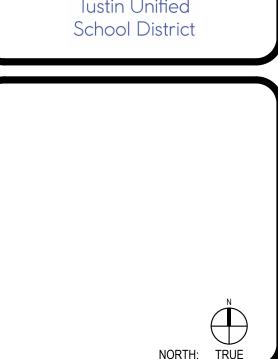
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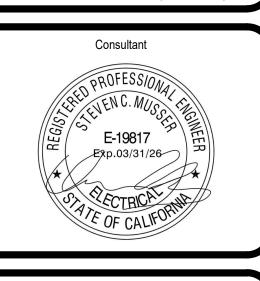
Rancho Cucamonga, CA 91730

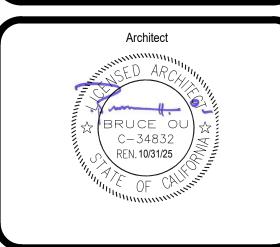
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1.16 CLOSEOUT SUBMITTALS

27 05 00 - 11

certification criteria.

contaminants for telecommunications cabling and pathway equipment placed in storage.

Submit all shop drawings in accordance with the general requirements of the construction documents. 3. Shop drawings shall include evidence of grounding and bonding components are

coordinated with field conditions and the work of other trades. and action by the A/E prior to installation.

documentation shall include the RCDD registration number. b. The field supervisor is a BICSI trained technician that is qualified to perform and

The contractor shall submit documentation that within the past 12 months, a minimum of 75% of all installation personnel have been trained or certified by the manufacturer

. Submit all as-built drawings in accordance with the general requirements of the construction documents. Submit as-built drawings a minimum of two (2) weeks after completion of all Division-27 work for A/E and Owner reference. Communication contractor to print, frame and mount approved as-built drawings in MPOE. Coordinate location with A/E.

A. As-Built Drawings:

1.17 QUALITY ASSURANCE 1. Component manufactures shall be ISO 9001:2000 and offer products that are RoHS

compliant. Qualifications – Installer: . At a minimum, seventy-five percent (75%) of the onsite contractor provided field technicians shall be factory certified within 12 months by the manufacturer of the selected telecommunications system components being installed. Proof of certification

shall be available on site for review at all times for each field technician.

### PART 2 PRODUCTS (NOT APPLICABLE)

### PART 3 EXECUTION

3.1 EXAMINATION A. Check actual site conditions prior to start of any work. Ensure all preceding trade work associated with the telecommunications system is accurate and complete before proceeding

#### on or use of products specified in this section 3.2 RE-INSTALLATION

A. No additional burden to the owner regarding costs, network down-time, and end user interruption shall result from the re-installation of specified components. Scheduling for reinstallation work shall be coordinated, in writing, with the owner prior to beginning any reinstallation work.

this section utilized throughout the site for review and reference by the Owner and A/E team.

Requirements for Communication Install

27 05 00 - 12

3.3 CLOSEOUT ACTIVITIES A. Contractor shall provide documentation of all telecommunications system components under

B. Contractor to submit all as-built drawings and any test documentation required prior to

acceptance by the Owner. addenda at the time of installation. END OF SECTION 27 05 00

2016 California Electrical Code 2016 California Building Code Local Municipal Codes

1.4 APPLICABLE REGULATORY REFERENCES

Abbreviations and Acronyms:

TIA:

A. Contractor is responsible for knowledge and application of current versions of all applicable Standards and Codes, In cases where listed Standards and Codes have been updated. Contractor shall adhere to the most recent revisions, including all relevant changes or a. TIA-526-7 (OFSTP-7) (July 2015) Measurement of Optical Power Loss of

Hangers and Supports for Communications Systems

27 05 28 - 1

Installed Single-Mode Fiber Cable Plant b. TIA-526-14-B (April 2015) (OFSTP-14) Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant ANSI/TIA/EIA-598-C (July 2014) Optical Fiber Cable Color Coding d. ANSI/TIA-568-C.0 (December 2015) Generic Telecommunications Cabling for

ANSI/TIA-1183-1 (January 2016) Test Fixtures for Balun-Less Measurements of Balanced Components and Systems, Addendum 1 - Extending Frequency Capabilities to 2 GHz. m. ANSI/TIA-568-C.4 (July 2011) Broadband Coaxial Cabling Components ANSI/TIA-942-A (August 2012) Telecommunications Infrastructure Standard for ANSI/TIA-942-A-1 (March 2013) Telecommunications Infrastructure Standard for Data Centers, Addendum 1 - Cabling Guidelines for Data Center Fabrics TIA-569-D (April 2015) Telecommunications Pathways and Spaces TIA-569-D-1 (October 2016) Telecommunications Pathways and Spaces Addendum 1- Revised Temperature and Humidity Requirements for Telecommunications Spaces ANSI/TIA-606-B (December 2015) Administration Standard for Telecommunications Infrastructure TIA-607-B (November 2015) Generic Telecommunications Grounding (Earthing) and Bonding for Customer Premises TIA-607-B-1 (January 2017) Generic Telecommunications Grounding (Earthing) and Bonding for Customer Premises - External Grounding u. TIA-758-B (April 2012) Customer-Owned Outside Plant Telecommunication Infrastructure Standard TIA-1152 (November 2016) Requirements for Field Test Instruments and Measurements for Balanced Twisted-Pair Cabling ANSI/TIA-862-B (February 2016) Structured Cabling Infrastructure Standard for Intelligent Building Systems. TIA-570-C (August 2012) Residential Telecommunications Infrastructure

TIA-1005-A (June 2012) Industrial Telecommunications Infrastructure Standard

ANSI/TIA-1005 (January 2015) Telecommunications Infrastructure Standard for Industrial Premises aa. TIA-1005-1 (May 2012) Telecommunications Infrastructure Standard for Industrial Premises; Addendum 1 - Industrial Pathways and Spaces bb. TIA-1179 (July 2010) Healthcare Facility Telecommunications Infrastructure Standard.

for Manufacturing, Process & Refining

a. ISO 11801 (November 2010) - Generic Cabling for Customer Premises b. ISO/IEC TR 14763-2-1:2011 - Information technology -- Implementation and Hangers and Supports for Communications Systems 27 05 28 - 2

1.5 ADMINISTRATIVE REQUIREMENTS A. Coordination:

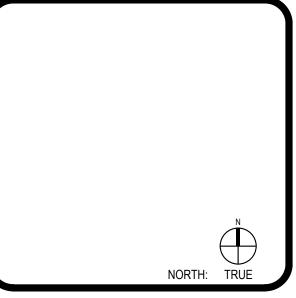
the contractor at their own expense.

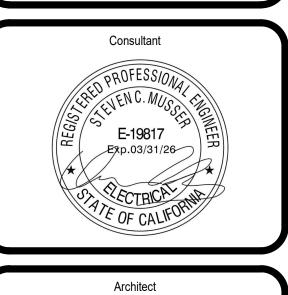
## 1.6 ACTION SUBMITTALS

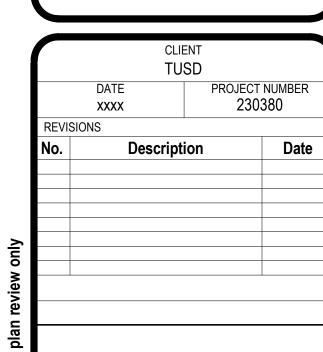
Hangers and Supports for Communications Systems

**GENERAL NOTES** 

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**ENLARGED SITE PLAN** 

ELECTRICAL ENTRANCE INTERSYSTEM BONDING **FIRST LEVEL** TELECOM 109 GROUNDING ELECTRODE CONDUCTOR BY OTHERS ELECTRICAL GROUNDING-ELECTRODE SYSTEM NOTES:

1. THIS RISER IS DIAGRAMMATIC AND MAY NOT SHOW ACTUAL ROUTING OR QUANTITIES OF MATERIALS. THIS RISER IS SHOWN FOR CLARIFICATION OF CONNECTION LOCATIONS AND BONDING CONDUCTOR SIZING SCHEDULE CONDUCTOR TYPE. ALL CONNECTIONS AND SYSTEM DEVICES SHOWN ARE TYPICAL AND NOT REPRESENTATIVE OF ACTUAL PROJECT QUANTITIES. REFER TO FLOOR PLANS AND ENLARGED MINIMUM ACCEPTABLE CONDUCTOR FLOOR PLANS FOR ACTUAL QUANTITIES AND LOCATIONS OF DEVICES AND MORE SPECIFIC SIZE - AWG **LENGTH IN FEET** ROUTING INFORMATION. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS. 2. ALL CONDUCTORS IN THE TECHNOLOGY BONDING SYSTEM SHALL BE MINIMUM SIZE OF 3/0 AWG LESS THAN 13' PLENUM RATED COPPER (GREEN OR MARKED WITH A DISTINCTIVE GREEN COLOR) UNLESS CONDUCTOR LENGTH IS LESS THAN 66 FEET. REFER TO BONDING CONDUCTOR SIZING SCHEDULE FOR SIZING CRITERIA FOR CONDUCTORS LESS THAN 66 FEET IN LENGTH. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS. 3. ALL BONDING CONDUCTORS AND BONDING JUMPERS SHALL BE CONNECTED BY COMPRESSION LUGS, EXOTHERMIC WELDING, OR IRREVERSIBLE COMPRESSION CONNECTORS. SOLDER IS NOT AN ACCEPTABLE MEANS OF CONNECTION. SHEET METAL SCREWS SHALL NOT BE USED TO 53' - 66' CONNECT COMMUNICATIONS BONDING CONDUCTORS TO EQUIPMENT. WHERE NECESSARY, REMOVE PAINT AND/OR USE PAINT-PIERCING WASHERS TO PROVIDE PROPER ELECTRICAL BOND GREATER THAN 66' 4. REFER TO [5/T5.00] FOR TYPICAL TELECOM ROOM BONDING FLOW DIAGRAM. KEYNOTES:

1. BONDING CONDUCTOR FOR TELECOMMUNICATIONS (BCT). BCT SHALL BE THE SAME SIZE AS THE TBB OR LARGER. REFER TO BONDING CONDUCTOR SIZING SCHEDULE FOR SIZING REQUIREMENTS. TECHNOLOGY BONDING RISER DIAGRAM • TELECOMMUNICATIONS CABINET IDF 6 INCOMING 12SM FIBER OPTIC CABLE NOTES: 1. THIS RISER IS DIAGRAMMATIC AND MAY NOT SHOW ACTUAL ROUTING OR QUANTITIES OF MATERIALS SHOWN. THIS RISER IS SHOWN FOR CLARIFICATION OF CONNECTION(S), LOCATIONS AND CABLE TYPE. ALL INFORMATION OUTLETS ARE TYPICAL OF THE OUTLETS IN THE AREA SHOWN. REFER TO FLOOR PLANS FOR MORE SPECIFIC ROUTING INFORMATION. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS. 2. REFER TO FLOOR PLANS FOR QUANTITY OF CABLES AND JACKS TO BE INSTALLED AT EACH INFORMATION OUTLET. KEYNOTES: # 1. D# INDICATES VOICE/DATA FACEPLATE CONFIGURATION. REFER TO FLOOR PLANS FOR ADDITIONAL INFORMATION. 2. (WAP) WIRELESS ACCESS POINT. REFER TO FLOOR PLANS FOR ADDITIONAL INFORMATION. 3. RACK OR CABINET AS DEFINED ON THE TELECOM ROOM LAYOUT. REFER TO THE TELECOM ROOM REFERENCES MATRIX ON THE COVERPAGE FOR LOCATION. 4. OPTICAL FIBER PATCH CABLES. 5. RJ-45 TO RJ45 CATEGORY 6A UTP PATCH CORDS, REFER TO SPECIFIATIONS FOR PATCH CORD 6. REFER TO COVERPAGE AND FLOOR PLANS FOR TELECOMMUNICATIONS ROOM LOCATIONS. 2 FIBER OPTIC AND COPPER RISER DIAGRAM

PBK

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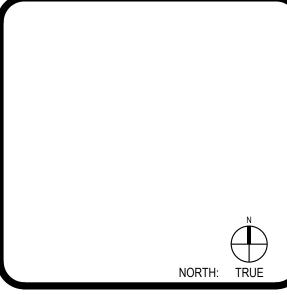
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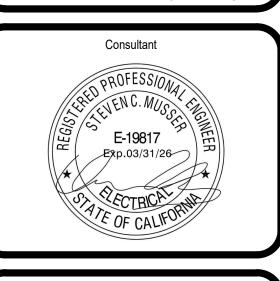
Rancho Cucamonga, CA 91730 909.987-0909

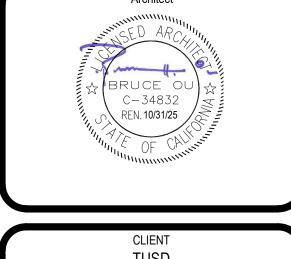
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FORD ELEMENTARY SCHOOL SET ADDRESS:



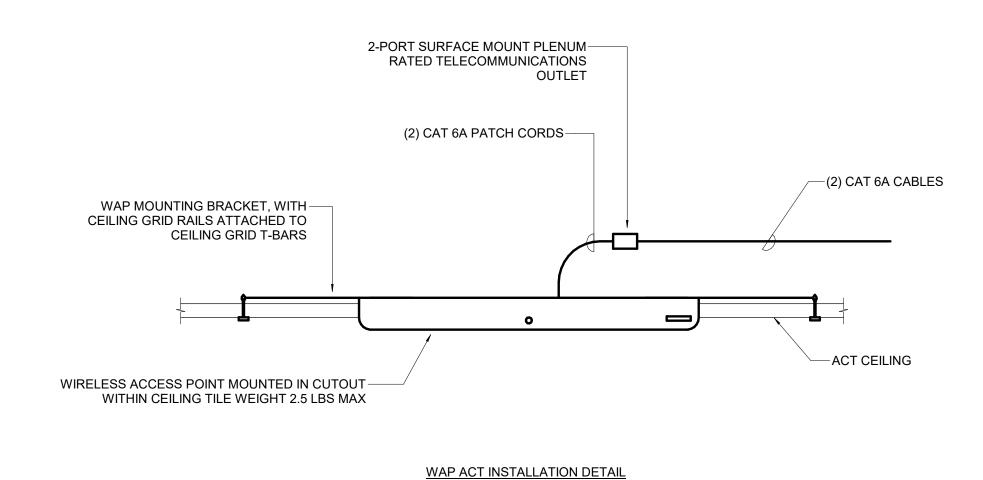






TECHNOLOGY RISER
DIAGRAM AND
SCHEDULES

T5.01

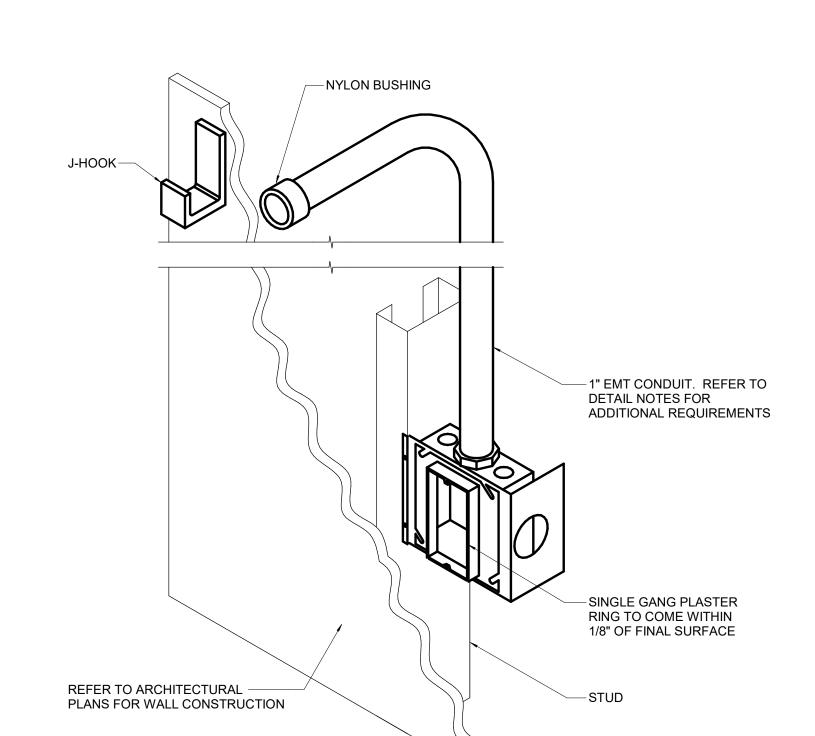


3 CEILING SPEAKER MOUNTING

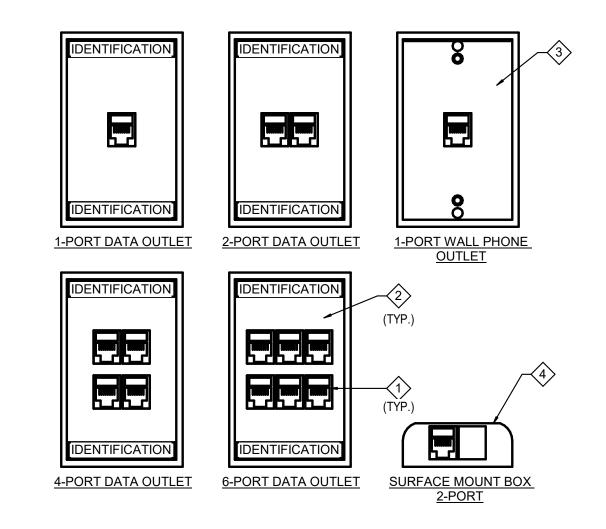
1. WHERE SUPPORTS ATTACH TO METAL ROOF DECKING, EXCLUDING CONCRETE ON METAL DECKING, DO NOT EXCEED 25 LBS. PER HANGAR AND A MINIMUM SPACING OF 2'-0" ON CENTER. THIS 25 LB. LOAD AND 2'-0" SPACING INCLUDE ELECTRICAL AND MECHANICAL ITEMS HANGING FROM DECK. IF THE HANGER RESTRICTIONS CANNOT BE ACHIEVED, THE ADDITION OF SUPPLEMENTAL FRAMING OFF STEEL FRAMING

1 DATA OUTLETS CONFIGURATION DETAIL

12" = 1'-0"



- 1" EMT CONDUIT SHALL STUB UP TO NEAREST ACCESSIBLE CEILING AND TERMINATE ORIENTED HORIZONTALLY AT THE HEIGHT OF THE ASSOCIATED CABLE TRAY OR J-HOOK ROUTE. CONDUIT RUN SHALL NOT CONTAIN MORE THAN 180 DEGREES OF BEND BETWEEN ACCESSIBLE JUNCTION BOXES OR BETWEEN JUNCTION BOX AND END OF CONDUIT.
- WHERE CONDUIT STUB IS LOCATED IN A ROOM WITH AN ACCESSIBLE CEILING AND IS NOT REQUIRED TO RUN TO CABLE ROUTE LOCATED OUTSIDE THE ROOM, STUB MUST TERMINATE ABOVE THE ACCESSIBLE CEILING WITH A 90-DEGREE BEND AT THE TOP ORIENTED IN TO THE ROOM AT THE HEIGHT OF THE ASSOCIATED CABLE TRAY OR J-HOOK ROUTE IN THE ROOM.
- 3. ALL STUBS MUST BE FITTED WITH A NYLON BUSHING ON EACH END OF THE CONDUIT.
- INSTALLING CONTRACTOR SHALL FURNISH AND INSTALL FIRESTOP MATERIALS FOR TECHNOLOGY ROUGH-INS PER PROJECT REQUIREMENTS. REFER TO SPECIFICATIONS FOR FIRESTOP REQUIREMENTS.



#### NOTES:

- 1. REFER TO SPECIFICATION SECTION 27 15 00 HORIZONTAL CABLING REQUIREMENTS
- FOR CATEGORY CABLE PERFORMANCE REQUIREMENTS. 2. REFER TO SPECIFICATION SECTION 27 05 53 - IDENTIFICATION FOR DATA OUTLET PORT
- 3. DATA OUTLET SHALL BE INSTALL IN A 4" SQUARE BACKBOX WITH A SINGLE GANG PLASTER RING. REFER TO DETAIL 1/T5.01 TECHNOLOGY ROUGH-IN MOUNTING DETAILS
- FOR CONDUIT SIZE.
- 4. PROVIDE REMOVABLE BLANK INSERTS FOR UNUSED PORTS. 5. USE T568B WIRING SCHEME TO TERMINATE THE TWISTED-PAIR CABLE ONTO THE
- CONNECTOR INTERFACE. 6. WHERE APPLIES PER PLANS, PROVIDE AV OUTLET WITH HDMI CONNECTION PER BELOW. PANDUIT COVER PLATE: CBEIWY OR APPROVED EQUAL
- PANDUIT JACK:(HDMI 2.0) CMHDMIIW OR APPROVED EQUAL PANDUIT MODULAR INSERT: CHF2IW-X OR APPROVED EQUAL

#### **KEYNOTE NOTES:**

1. PROVIDE CAT6 RJ-45 JACKS, 8-POSITION, 8-CONTACT (8P8C), COLOR BLUE FOR DATA, WHITE FOR VOICE, RED FOR SECURITY. PANDUIT PRODUCTS "CJ688TGBU", COMMSCOPE "MGS400-318" OR APPROVED

2. PROVIDE 1,2,4,6-PORT FACEPLATE AS INDICATED ON DRAWINGS.

- 1-PORT: PANDUIT PRODUCTS "CFPE1WHY", COMMSCOPE OR APPROVED
  - 2-PORT: PANDUIT PRODUCTS "CFPE2WHY", COMMSCOPE OR APPROVED
  - 4-PORT: PANDUIT PRODUCTS "CFPE4WHY", COMMSCOPE OR APPROVED

6-PORT: PANDUIT PRODUCTS "CFPE6WHY", COMMSCOPE OR APPROVED

3. PROVIDE STAINLESS STEEL 1-PORT FACEPLATE FOR OUTLETS INDICATED WITH "W" ON DRAWINGS. "W" INDICATES WALL PHONE MOUNTED AT +48" AFF FOR WALL HUNG PHONE. 1-PORT: WALL PHONE "W" PANDUIT PRODUCTS "KWP6PY", COMMSCOPE OR

APPROVED EQUAL. 4. PROVIDE SURFACE MOUNT BOX, PLENUM RATED, MOUNTED ABOVE CEILING FOR CONNECTIONS

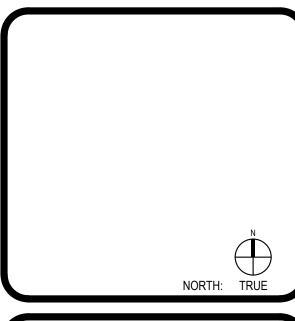
TO WIRELESS ACCESS POINTS. 2-PORT: PANDUIT PRODUCTS "CBX2WH-AY", COMMSCOPE OR APPROVED EQUAL.



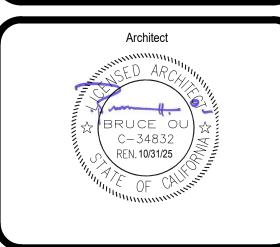
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School District







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	DATE XXXX	PROJECT N 2303				
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## ARCHITECTURAL

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General Architectu	ral S	shee (	ets GEI	ΝEΙ	RA	L ARCH	HITECT	JRAL S	HEETS							Sheet
COVER SHEET																A0.0
PROJECT OPTIONS SC	PROJECT OPTIONS SCHEDULE									A0.0.1						
TYPICAL KEY PLAN AND SCHEDULE, GEN NOTES										A0.1						
SIGNAGE AND SYMBOLS										A0.2						
DSA-103 T&I CONCRETE FLOORS										A0.3						
DSA-103 T&I PLYWOOD FLOORS										A0.4						
CALGREEN SPEC'S	CALGREEN SPEC'S										A0.5					
CALGREEN SHEET																A0.6
CALGREEN SHEET																A0.7
CALGREEN SHEET																A0.8
5 Floor Plan Details 1/4" = 1'-0"				AR	CH	HITECT	URAL F	LOOR F	PLANS							Sheet
x Floor Plans			X F	Floo	or F	Plan - 2	4'x40'									A1.0
				Floo	or F	Plan - 3	6'x40'									A1.1
				Floo	or F	Plan - 4	8'x40'									A1.2
Arch Floor Framing	j De	tails	5 ,			TEOTLU		20D FF								
1/4" = 1'-0"			<u> </u>	RC	НІ	TECTU	RAL FLO	JOR FF	RAMING	DE	IAIL	S				
																Sheet
¥ Wood Floor									1	2		3	4	5	6	A2.9
□ Concrete Floor									7	8		9	10	11	12	A2.9
2 Wall Schedule 1/4" = 1'-0"						ARCHI <sup>-</sup>	ΓECTUF	RAL WA	LL DET	AIL	S					
x Wood Studs								De	etail							Sheet
	Do	oor	1	ИL	\	Window	Corner	HVAC	Top PL	T6"	' SEP	1-HR OPT 1	1-HR OPT 2	EXT HDR	INT HDR	
x Sheating	8	9	2 3	3 4	5	11	1	16	17		5	х	х	10A	10B	A2.1(A)
□ Sheating	8	9	2 3	3 4	5	11	1	16	17		5	х	х	10A	10B	A2.1(B)
□ Plaster	8	9	3	4	5	11	1	16	17		5	х	х	10A	10B	A2.2
□ 1-HR Sheating	8	9	2 3	3 4	5	11	1	16	17		5	-	-	10A	-	A2.5(A)
□ 1-HR Sheating	8	9	_	3 4		11	1	16	17		5	-	-	10A	-	A2.5(B)
□ 1-HR Plaster	8	9		3 4		11	1	16	17		4	-	-	10A	-	A2.6
□ Additional Fire Rating □	Detai	ils a	nd	No	tes	3										A3.0
□ Single OCC. Bathroom																A3.1
□ Single OCC. Bathroom																A3.1.1

4 Ceiling Plans 1/4" = 1'-0"	A	RCHITECTURAL CEILING	PLANS				Sheet		
Reflected Ceiling	🗶 24' x 40'	x 8 (2'x4') Recessed Light Fixture							
Plans:		□ 12 (1'x8') Pendant Light w/ 4 (1'x16') Recessed Light							
	□ 36' x 40'		abt Fixtura				A3.2 A3.2		
	□ 30 X 40	<ul> <li>□ 12 (2'x4') Recessed Li</li> <li>□ 16 (1'x8') Pendant Light</li> </ul>	_				A3.Z		
		(1'x16') Recessed Light	TIC VV/ T				A3.2		
	□ 48' x 40'	□ 16 (2'x4') Recessed Li	ght Fixture				A3.2		
		□ 18 (1'x8') Pendant Ligl	nt w/ 4						
		(1'x16') Recessed Light					A3.2		
Celing Notes	:1_						A3.2.1		
3 Ceiling Deta 1/4" = 1'-0"	IIS	ARCHITECTURAL (	CEILING DE	TAILS					
Celing Framin	g			De	tail		Sheet		
			Wall	Joists	Access	BLK'G			
X T-GRID			1			SEE PLAN	A3.3		
□ Wood			1	2	5	Тур	A3.4		
7 Roof Plans 1/4" = 1'-0"		ARCHITECTURAL	ROOF PLA	NS		'			
□ Mono							Sheet		
			□ EPDM				A4.2.1		
			□ Standing	Seam			A4.0.1		
			□ Parapet				A4.4.1		
🔀 Dual			□ EPDM				A4.2.2		
			x Standing	Seam			A4.0.2		
22 Roof Details 1/4" = 1'-0"		ARCHITECTURAL				<u> </u>			
□ Mono							Sheet		
			□ EPDM				A4.3		
			□ Standing	Seam			A4.1		
Duol			□ Parapet				A4.5		
<b>x</b> Dual			□ EPDM				A4.3		
			x Standing	Seam			A4.1		
8 Arch Buildin	g Section	ARCHITECTURAL				<u> </u>			
<u> </u>							Sheet		
			□ EPDM				A6.3		
			□ Standing	Seam			A6.0		
<b>χ</b> Dual						•			
<b>X</b> Dual			□ EPDM <b>x</b> Standing	_			A6.1 A6.0.1		

## ARCHITECTURAL

		De	etail	Sheet	Def	tail	Sheet
Exterior Elevations:	x 24'x40'	Left	Right		Front	Rear	
	□ Mono Slope	1	2	A5.0	1	2	A5.1
	□ Parapet Roof - Mono Slope	3	4	A5.0	3	4	A5.1
	x Dual Slope	5	6	A5.0	1	2	A5.1
	□ 36'x40'						
	□ Mono Slope	1	2	A5.0	5	6	A5.1
	□ Parapet Roof - Mono Slope	3	4	A5.0	7	8	A5.1
	□ Dual Slope	5	6	A5.0	5	6	A5.1
	□ 48'x40'						
	□ Mono Slope	1	2	A5.0	9	10	A5.1
	□ Parapet Roof - Mono Slope	3	4	A5.0	11	12	A5.1
	□ Dual Slope	5	6	A5.0	9	10	A5.1
14 Interior Elevation	ns ARCHITECTURAL INTE	ERIOR EL	EVATIO	NS			
- 1/4 - 1-()					Detail		Sheet
nterior Elevations:			Le	ft Righ	t Front	Rear	
	x 24'x40'		1	2	3	4	A5.2
	□ 36'x40'		1	2	5	6	A5.2
	□ 48'x40'		1	2	8	7	A5.2
23 ADDITIONAL O 1/4" = 1'-0"	PTIONS DETAILS ADDITIONAL OPTION	IS DETAIL	_S				
							Shee
ADDITIONAL OPTIO	NS DETAILS						A7.0
ADDITIONAL OPTIO	NS DETAILS						A7.1
							A7.2

		MEP		
9 Plumbing 1/4" = 1'-0	0"	PLUMBING		Sheet
	ils and Schedules			P1.0
10 Mechanic	al	MECHANICAL	She	
1/4" = 1'-0		MECHANICAL	•	
MISCELLANEOUS NO	OTES & DETAILS		M0	
 Mechanical	w 24' v 40'	W Wall Mount	Ceiling Plan	Roof Plan
Plans:	🕱 24' x 40'	X Wall Mount □ Roof Mount	M5.1	M5.2
	□ 36' x 40'	□ Wall Mount	M5.1 M6.1	M5.2 M6.2
	□ 30 X 40	□ Roof Mount	M6.1	M6.2
	□ 48' x 40'	□ Wall Mount	M7.1	M7.2
	1 40 X 40	□ Roof Mount	M7.1	M7.2
	□ 60' x 40'	□ Wall Mount	1017.1	IVIT .Z
	□ 00 X 40	□ Roof Mount		
	□ 72' x 40'	□ Wall Mount		
	12 X 40	□ Roof Mount		
	□ 84' x 40'	□ Wall Mount		
		□ Roof Mount	AC	1 1
	□ 96' x 40'	□ Wall Mount		/. I
		□ Roof Mount		
	□ 108' x 40'	□ Wall Mount		
	100 X 40	□ Roof Mount		
	□120' x 40'			
		□ Roof Mount		
Electrical		2 Rosi Modin		
11) Electrical 1/4" = 1'-(		ELECTRICAL	She	eet
Reflected Ceiling		x 8 (2'x4') Recessed Light Fixture		
Plans:		□ 12 (1'x8') Pendant Light w/ 4		
		(1'x16') Recessed Light	E1.0	E1.1
	□ 36' x 40'	□ 12 (2'x4') Recessed Light Fixture		
		□ 18 (1'x8') Pendant Light w/ 4		
		(1'x16') Recessed Light	E1.2	E1.3
	□ 48' x 40'	□ 16 (2'x4') Recessed Light Fixture		
		□ 24 (1'x8') Pendant Light w/ 4		
		(1'x16') Recessed Light	E1.4	E1.5
	□ 60' x 40'	□ 20 (2'x4') Recessed Light Fixture		
		□ 30 (1'x8') Pendant Light w/ 4 (1'x16') Recessed Light		
	- 701 v 401			
	□ 72' x 40'	□ 24 (2'x4') Recessed Light Fixture		
		□ 36 (1'x8') Pendant Light w/ 4 (1'x16') Recessed Light		
	□ 84' x 40'	□ 28 (2'x4') Recessed Light Fixture		
		□ 42 (1'x8') Pendant Light w/ 4		
		(1'x16') Recessed Light		
	□ 96' x 40'	□ 32 (2'x4') Recessed Light Fixture		
		□ 48 (1'x8') Pendant Light w/ 4		
		(1'x16') Recessed Light		
	□ 108' x 40'	□ 36 (2'x4') Recessed Light Fixture		
		□ 54 (1'x8') Pendant Light w/ 4		
		(1'x16') Recessed Light		
	□ 120' x 40'	□ 40 (2'x4') Recessed Light Fixture		
		□ 60 (1'x8') Pendant Light w/ 4		
		(1'x16') Recessed Light		

Foundations Plans 1/4" = 1'-0"	FOUNDATION	
X Wood		She
Foundation	Wood Foundation NOTES SCHED FOR BLDG W/ 50+15	F1.
Plan:	🗶 24'x40' (50+15 PSF)	F1.
	□ 24'x40' (100 PSF)	F1.
	□ 24'x40' (150 PSF)	F1.
	□ 36'x40' (50+15 PSF)	F1.
	□ 36'x40' (100 PSF)	F1.:
	□ 36'x40' (150 PSF)	F1.
	□ 48'x40' (50+15 PSF)	F1.
	□ 48'x40' (100 PSF)	F1.2
	□ 48'x40' (150 PSF)	F1.3
	Wood Foundation Details	F1.4
□ Concrete Foundation Plan		F2.
□ Concrete Above Grade Foundation D	etails	F2.2
□ Concrete Below Grade Foundation D	etails	F2.:
		F2.:
General Structural Sheets 1/4" = 1'-0"	GENERAL STRUCTURAL SHEETS	She
STRUCTURAL GEN NOTES		S0.
Floor Framing Plans		00.
1/4" = 1'-0"	STRUCTURAL FLOOR FRAMING PLANS	
x₩ood		She
Sheating Floor:	x (50+15 PSF)	S1.
	□ (100 PSF)	S1.
	□ (150 PSF)	S1.
□ Concrete		
Framing Floor:	□ (50+15 PSF)	S1.
	□ (100 PSF)	S1.
	□(150 PSF)	S1.
Floor Framing Details 1/4" = 1'-0"	STRUCTURAL FLOOR FRAMING DETAILS	She
ĭ Wood Framing		S1.:
□ Concrete Framing		S1.
Roof Framing Plans	STRUCTURAL ROOF FRAMING PLANS	She
□ Mono Slope Roof Framing		S3.
★ Dual Slope Roof Framing		S3.
. 5	STRUCTURAL DETAILS ROOF	She
STRUCTURAL DETAILS	OTTOOTORAL DETAILO NOOI	S3.
ROOF DETAILS(SOFFIT/ PARRAPET	)	S3.
ROOF PERIMETER TRUSS	,	S3.
20 Wall Framing Details	CTDUCTUDAL MALL EDAMINO DETAIL C	30.
○ 1/4" = 1'-0"	STRUCTURAL WALL FRAMING DETAILS	She
W Framing Flevation		Sne S4.
x Framing Elevation x Wall Details		S4.
		S4.
🕱 Typ Framing:		

Building Section 1/4" = 1'-0"	STRUCTURAL BUILDING SECTION	Sheet
□ Mono		S5.0
🕱 Dual		S5.1

ons Plans	FOUNDATION		
-0"	I	Choot	
	W. J.E. J.C. NOTEO COLIED FOR BLDO W/ 50 . 45	Sheet	
	Wood Foundation NOTES SCHED FOR BLDG W/ 50+15	F1.10	
	x 24'x40' (50+15 PSF)	F1.11	
	□ 24'x40' (100 PSF)	F1.21	
	□ 24'x40' (150 PSF)	F1.31	
	□ 36'x40' (50+15 PSF)	F1.12	
	□ 36'x40' (100 PSF)	F1.22	
	□ 36'x40' (150 PSF)	F1.32	
	101 (01 (50 15 005)	<u> </u>	
	□ 48'x40' (50+15 PSF)	F1.13	
	□ 48'x40' (100 PSF)	F1.23	
	□ 48'x40' (150 PSF)	F1.33	_
	Wood Foundation Details	F1.40	
dation Plan		F2.10	
e Grade Foundation Details		F2.20	
w Grade Foundation Details		F2.22	
		F2.23	
Structural Sheets -0"	GENERAL STRUCTURAL SHEETS	Sheet	
'-0"	SEIVER VIE OTTOOTOTVIE OTTEETO	Sheet	

<b>X</b> Wood		Sheet
Sheating Floor:	x (50+15 PSF)	S1.01
	□ (100 PSF)	S1.02
	□ (150 PSF)	S1.03
□ Concrete		
Framing Floor:	□ (50+15 PSF)	S1.1.1
	□ (100 PSF)	S1.1.2
	□(150 PSF)	S1.1.3
Floor Framing Details 1/4" = 1'-0"	STRUCTURAL FLOOR FRAMING DETAILS	Sheet
🕱 Wood Framing		S1.2
□ Concrete Framing		S1.2
Roof Framing Plans	STRUCTURAL ROOF FRAMING PLANS	Sheet
□ Mono Slope Roof Framing		S3.0.1
🗶 Dual Slope Roof Framing		S3.0.2
	STRUCTURAL DETAILS ROOF	Sheet
STRUCTURAL DETAILS		S3.1
ROOF DETAILS(SOFFIT/ PARRAPET)		00.0
,		S3.2
· · · · · · · · · · · · · · · · · · ·		\$3.2 \$3.3
· · · · · · · · · · · · · · · · · · ·	STRUCTURAL WALL FRAMING DETAILS	
ROOF PERIMETER TRUSS  (20) Wall Framing Details	STRUCTURAL WALL FRAMING DETAILS	

Building Section 1/4" = 1'-0"	STRUCTURAL BUILDING SECTION	Sheet
□ Mono		S5.0
M Dual		Q5 1

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT APP. 04-122805 INC:

REVIEWED FOR SS 🗹 FLS 🗹 ACS 🗸

PROJECT SPECIFIC STATE AGENCY APPROVAL



FESSIONAL STAMP



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1651 SOUTH JUANITA STREET SAN JACINTO CA. 92581 VOICE (951) 943-1908 FAX (951)943-5768

ORIGINAL PC STATE AGENCY APPROVAL



Description

PRE-CHECK (PC) DOCUMENT

A separate project application for construction is required

PC 2022 CBC: 24' x 40' **EXPANDABLE TO** 120' x 40'

PROJECT OPTIONS SCHEDULE

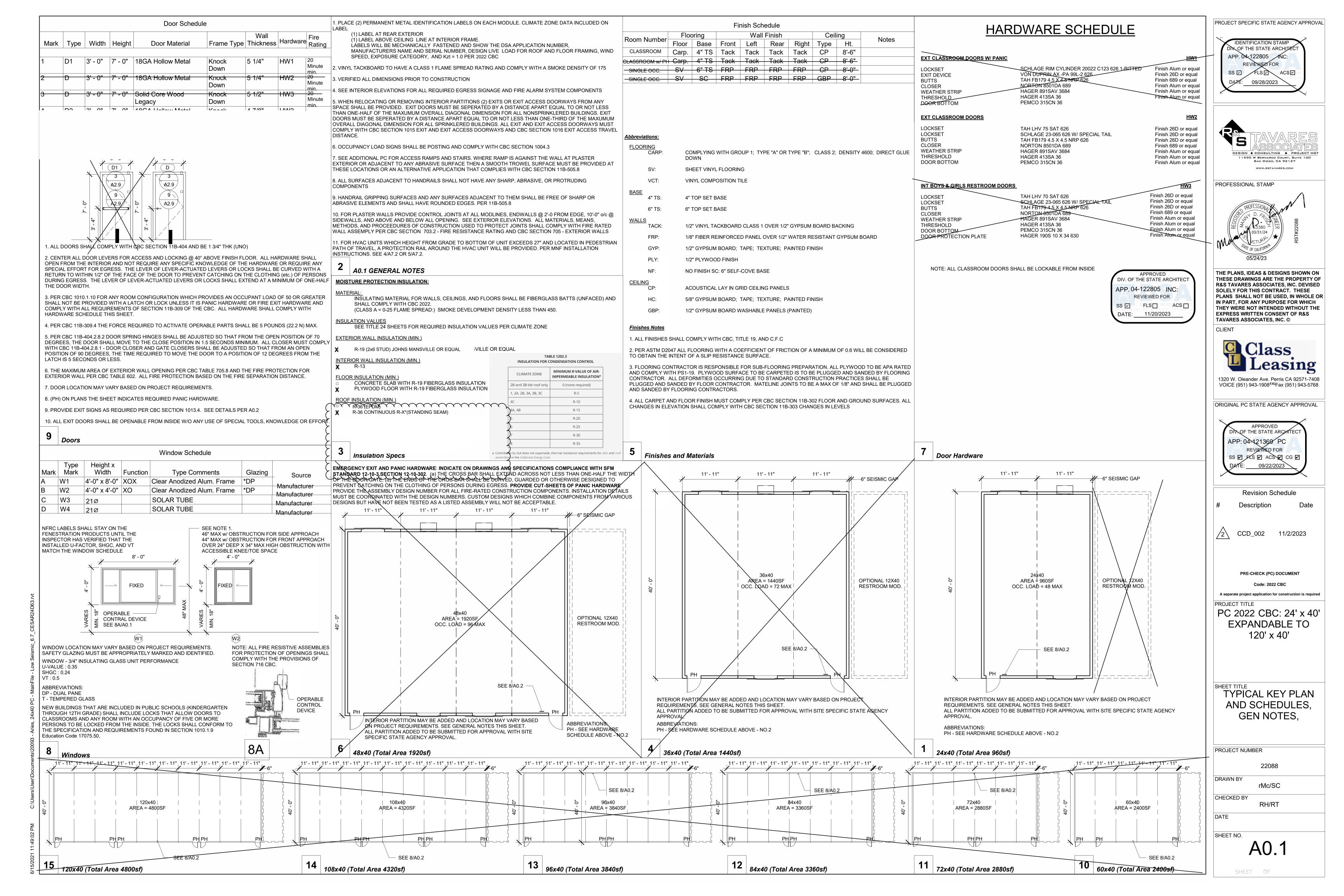
PROJECT NUMBER 22088

CHECKED BY

06/15/2021

A0.0.1

SHEET OF



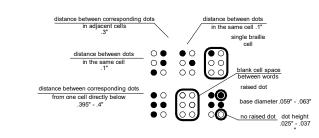
11B.703.2.6 Stroke Thickness for raised characters. Stroke thickness of the uppercase letter "I" shall be 15 percent maximum of the height of the character.

11B.703.2.7 Character Spacing. Character spacing shall be measured between the two closest points of adjacent raised characters within a message, excluding word spaces. Where characters have rectangular cross sections, spacing between individual raised characters shall be 1/8 inch (3.2 mm) minimum and 4 times the raised character stroke width maximum. Where characters have other cross sections, spacing between individual raised characters shall be 1/16 inch (1.6 mm) minimum and 4 times the raised character stroke width maximum at the base of the cross sections, and 1/8 inch (3.2 mm) minimum and 4 times the raised character stroke width maximum at the top of the cross sections. Characters shall be separated from raised borders and decorative elements 3/8 inch (9.5 mm) minimum.

11B.703.2.8 Line Spacing. Spacing between the baselines of separate lines of raised characters within a message shall be 135 percent minimum and 170 percent maximum of the raised character height.

11B.703.3 Braille. Braille shall be contracted (Grade 2) and shall comply with 703.3 and 703.4.

11B.703.3.1 Dimensions and Capitalization. Braille dots shall have a domed or rounded shape and shall comply with Table 703.3.1. The indication of an uppercase letter or letters shall only be used before the first word of sentences, proper nouns and names, individual letters of the alphabet, initials, and acronyms.



11B.703.3.2 Position. Braille shall be positioned below the corresponding text. If text is multi-lined, braille shall be placed below the entire text. Braille shall be separated 3/8 inch (9.5 mm) minimum from any other tactile characters and 3/8 inch (9.5 mm) minimum from raised borders and decorative elements.

Figure 703.3.1 Braille Measurement

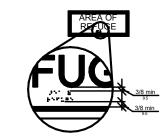


Figure 703.3.2 Position of Braille

1/32" RAISED TEXT

PAINT-FILLED
TEXT IF PREFERRED

PLASTIC LAMINATE FACE

DEMARCATION LINE EITHER

RAISED AND CHEMICALLY

CORE OR ENGRAVED AND PAINT FILLED PER USER

GRADE II BRAILLE BEADS

SEE FIGURE AND TABLE.

CORNER TREATMENT

(EITHER SQUARE

OR RADIUS) PER

SEE 9/A0.2

WELDED TO ACRYLIC

LINE SIZE PER USER

**PARENT** 

**GYMNASIUM** 

ELEVATION

OVER ACRYLIC BACK

MARGIN AREA

11B.703.4 Installation Height and Location. Signs with tactile characters shall comply with 703.4. 11B.703.4.1 Height Above Finish Floor or Ground. Tactile characters on signs shall be located 48 inches (1220

mm) minimum above the finish floor or ground surface, measured from the baseline of the lowest braille character and 60 inches (1525 mm) maximum above the finish floor or ground surface, measured from the baseline of the highest tactile character.

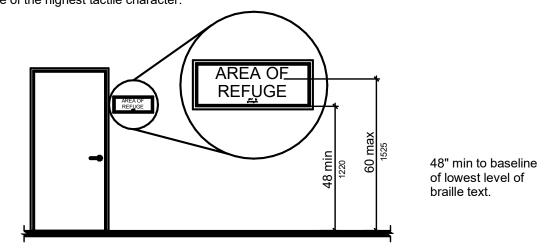


Figure 703.4.1 Height of Tactile Characters Above Finish Floor or Ground

MOUNTING TAPE

SILICONE ADHESIVE

MOUNTING TAPE

11B.703.4.2 Location. Where a tactile sign is provided at a door, the sign shall be located alongside the door at the latch side. Where a tactile sign is provided at double doors with one active leaf, the sign shall be located on the inactive leaf. Where a tactile sign is provided at double doors with two active leafs, the sign shall be located to the right of the right hand door. Where there is no wall space at the latch side of a single door or at the right side of double doors, signs shall be located on the nearest adjacent wall. Signs containing tactile characters shall be located so that a clear floor space of 18 inches (455 mm) minimum by 18 inches (455 mm) minimum, centered on the tactile characters, is provided beyond the arc of any door swing between the closed position and 45 degree open position.

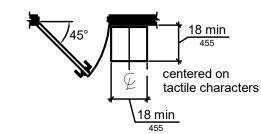


Figure 703.4.2 Location of Tactile Signs at Doors

11B.703.5 Visual Characters. Visual characters shall comply with 703.5. 11B.703.5.1 Finish and Contrast. Characters and their background shall have a non-glare finish. Characters shall contrast with their background with either light characters on a dark background or dark characters

11B.703.5.2 Case. Characters shall be uppercase or lowercase or a combination of both.

11B.703.5.3 Style. Characters shall be conventional in form. Characters shall not be italic, oblique, script, highly decorative, or of other unusual forms.

11B.703.5.4 Character Proportions. Characters shall be selected from fonts where the width of the uppercase letter "O" is 60 percent minimum and 110 percent maximum of the height of the uppercase letter "I".

11B.703.5.5 Character Height. Minimum character height shall comply with Table 703.5.5. Viewing distance shall be measured as the horizontal distance between the character and an obstruction preventing further

approach towards the sign. Character height shall be based on the uppercase letter "I". 11B.703.5.6 Height From Finish Floor or Ground. Visual characters shall be 40 inches (1015 mm) minimum above the finish floor or ground.

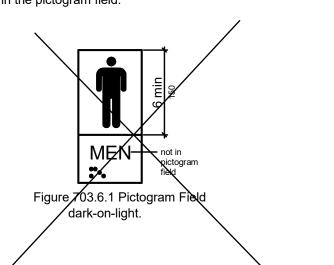
11B.703.5.7 Stroke Thickness. Stroke thickness of the uppercase letter "I" shall be 10 percent minimum and 20 percent maximum of the height of the character.

11B.703.5.8 Character Spacing. Character spacing shall be measured between the two closest points of adjacent characters, excluding word spaces. Spacing between individual characters shall be 10 percent minimum and 35 percent maximum of character height.

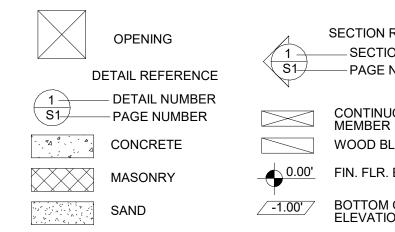
11B.703.5.9 Line Spacing. Spacing between the baselines of separate lines of characters within a message shall be 135 percent minimum and 170 percent maximum of the character height.

11B.703.6 Pictograms. Pictograms shall comply with 703.6.

11B.703.6.1 Pictogram Field. Pictograms shall have a field height of 6 inches (150 mm) minimum. Characters and braille shall not be located in the pictogram field.

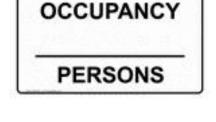


MULTIPURPOSE





THE "INTERNATIONAL SYMBOL FOR ACCESS FOR



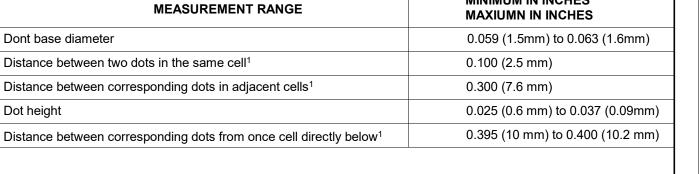
MAXIMUM

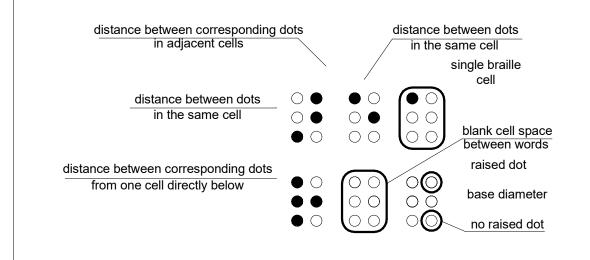
OCCUPANT LOAD SIGN REQUIRED PER DSA BU11-08.

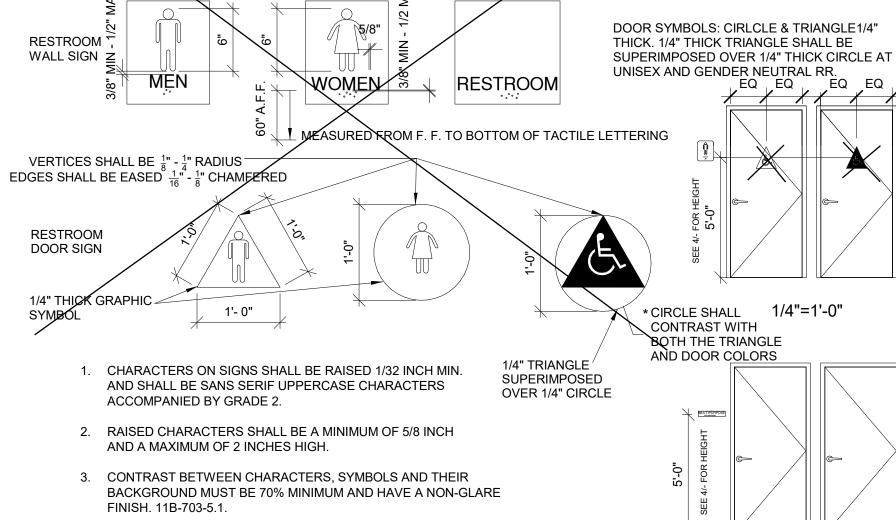
EVERY ROOM OR SPACE WHICH IS USED FOR ASSEMBLY, CLASSROOM. DINING OR SIMILAR PURPOSES HAVING AN OCCUPANT LOAD OF 50 OR MORE SHALL HAVE THE OCCUPANT LOAD OF THE ROOM OR SPACE POSTED IN A CONSPICUOUS PLACE, NEAR THE MAIN EXIT OR EXIT ACCESS DOORWAY

1" = 1'-0" **EQUIPMENT ANCHORAGE** Assistive Listening System Symbol









EXIT

6. 11B-703.2.6 STROKE THICKNESS. STROKE THICKNESS OF THE UPPERCASE LETTER "I" SHALL BE 15 PERCENT MAXIMUM OF THE

CALIFORNIA CONTRACTED BRAILLE SHALL BE USED WHENEVER BRAILLE IS REQUIRED IN OTHER PORTIONS OF THESE STANDARDS DOTS SHALL BE 1/10 INCH ON CENTERS IN EACH CELL WITH 2/10 INCH

SPACE BETWEEN CELLS, MEASURED THE SECOND COLUMN OF DOTS IN THE FIRSTCELL TO THE FIRST COLUMN OF DOTS IN THE SECOND CELL DOTS SHALL BE RAISED A MINIMUM OF 1/40 INCHES ABOVE THE BACKGROUND. \* NOTE FOR UNISEX OR SINGLE USER RESTROOM DOOR SYMBOL

THE COLOR OF THE TRIANGLE SHALL CONTRAST WITH THE COLOR OF THE CIRCLE SYMBOL, EITHER LIGHT ON A DARK BACKGROUND OR DARK ON A LIGHT BACKGROUND. THE COLOR OF THE CIRCLE SYMBOL SHALL CONTRAST WITH THE COLOR OF THE DOOR OR SURFACE ON WHICH THE COMBINED CIRCLE AND TRIANGLE SYMBOL IS MOUNTED, EITHER LIGHT ON A DARK BACKGROUND OR DARK ON A LIGHT BACKGROUND.

BRAILLE DIMENSIONS

NOTE: TACTILE SIGN TEXT

SHALL BE CENTERED 18"

CLEAR FROM STRIKE OF

DOOR

SECTION REFERENCE SECTION LABEL - PAGE NUMBER CONTINUOUS WOOD MEMBER WOOD BLOCKING 0.00' FIN. FLR. ELEV.

**BOTTOM OF FOOTING** DESIGN ♦ CONSULTING ♦ PROJECT MG 11590 W BERNARDO COURT, SUITE 100 SAN DIEGO, CA 92127 S———S STEPPED FOOTING

PROFESSIONAL STAMP

PROJECT SPECIFIC STATE AGENCY APPROVAL

IDENTIFICATION STAMP

DIV. OF THE STATE ARCHITECT

REVIEWED FOR

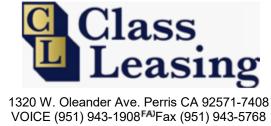
SS V FLS V HESTACS V

APP. 04-122805 INC:

DATE: 09/28/2023

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CLIENT



ORIGINAL PC STATE AGENCY APPROVAL



Revision Schedule

Description

PRE-CHECK (PC) DOCUMENT

Code: 2022 CBC

A separate project application for construction is require PROJECT TITLE

PC 2022 CBC: 24' x 40' **EXPANDABLE TO** 120' x 40'

SIGNAGE AND

**SYMBOLS** 

22088 DRAWN BY rMc/SC CHECKED BY RH/RT

PROJECT NUMBER

DATE

SHEET NO.

SHEET OF

CHAPTER 11:COMMUNICATION ELEMENTS AND FEATURES

communication features shall comply with NFPA 72 (2022 edition)

11B.702.1 General. Fire alarm systems shall have permanently installed audible and visible alarms complying with

except that the maximum allowable sound level of audible notification appliances complying with section

11B.703.1 General. Signs shall comply with 703. Where both visual and tactile characters are required, either

11B.703.2 Raised Characters. Raised characters shall comply with 703.2 and shall be duplicated in braille

hearing distance from the audible appliance. In addition, alarms in guest rooms required to provide

one sign with both visual and tactile characters, or two separate signs, one with visual, and one with

11B.703.2.1 Depth. Raised characters shall be 1/32 inch (0.8 mm) minimum above their background.

11B.703.2.3 Style. Characters shall be sans serif. Characters shall not be italic, oblique, script, highly

letter "O" is 60 percent minimum and 110 percent maximum of the height of the uppercase letter "I".

11B.703.2.4 Character Proportions. Characters shall be selected from fonts where the width of the uppercase

11B.703.2.5 Character Height. Character height measured vertically from the baseline of the character shall be

Figure 703.2.5 Height of Raised Characters

TABLE 11B-703.3.1

1/32" RAISED SYMBOLS

TO ACRYLIC CORE (TYP) PLASTIC LAMINATE FACE

DEMARCATION LINE EITHER

RAISED AND CHEMICALLY

CORE OR ENGRAVED AND

PAINT FILLED PER USER

LINE SIZE PER USER

AND PAINT-FILLED
TEXT IF PREFERE

CORNER TREATMENT

GRADE II BRAILLE BEADS

/ RAISED 1/32" SEE FIGURE AND TABLE

(EITHER SQUARE OR RADIUS) PER

WELDED TO ACRYLIC

OVER ACRYLIC BACK

MARGIN AREA

MINIMUM IN INCHE

0.059 (1.5 mm) to 0.063 (1.6 mm)

0.100 (2.5 mm)

0.300 (7.6 mm)

0.025 (0.6 mm) to 0.037 (0.9 mm)

0.395 (10 mm) to 0.400 (10.2 mm

MOUNTING TAPE

SILICONE ADHESIVE

MOUNTING TAPE

BRAILLE DIMENSIONS

5/8 inch (15.9 mm) minimum and 2 inches (51 mm) maximum based on the height of the uppercase letter

11B.4-3.2.1 of NFPA 72 shall have a sound level no more than 110 dB at the minimum

complying with 703.3. Raised characters shall be installed in accordance with 703.4.

11B.702 Fire Alarm Systems

tactile characters, shall be provided.

decorative, or of other unusual forms.

11B.703.2.2 Case. Characters shall be uppercase.

MEASUREMENT RANGE

Dot base diamete

Distance between two dots in the same cel

1. Measured center to center

WOMEN

GIRLS

ELEVATIONS

1/4" = 1'-0"

Sign Notes

MEN

BOYS

1/2" = 1'-0'

Signage

Distance between corresponding dots in adjacent cells1

ace between corresponding dots from one cell directly below

ALL GENDER

**RESTROOM** 

\*\*\*\*\*\*\*\*\*\* D116

NFPA 72 (2022 edition)

11B.703 Signs

SEE FIGURE AND TABLE. SEE 2/A0.2

HEIGHT OF THE CHARACTER.

RAMP DOWN

1/4" = 1'-0" Signage and Notes

**Application Number:** School Name: 11-111111 **DSA File Number: Increment Number: Date Created:** 2023-05-16 13:57:04

#### 2022 CBC

**IMPORTANT**: This form is only a summary list of structural tests and some of the special inspections required for the project. Generally, the structural tests and special inspections noted on this form are those that will be performed by the Geotechnical Engineer of Record, Laboratory of Record, or Special Inspector. The actual complete test and inspection program must be performed as detailed on the DSA approved documents. The appendix at the bottom of this form identifies work NOT subject to DSA requirements for special inspection or structural testing. The project inspector is responsible for providing inspection of all facets of construction, including but not limited to, special inspections not listed on this form such as structural wood framing, high-load wood diaphragms, cold-formed steel framing, anchorage of non-structural components, etc., per Title 24, Part 2, Chapter 17A (2022 CBC).

\*\*NOTE: Undefined section and table references found in this document are from the CBC, or California Building Code.

#### **KEY TO COLUMNS**

1. TYPE

	1, 1 1 F L		۷- ۲۰	FLINI ONIVILIDIDI
<b>Con</b> trequ	<b>tinuous</b> – Indicates that a continuous special inspection is iired		performe represent	technical Engineer) – Indicates that the special inspection shall be and by a registered geotechnical engineer or his or her authorized tative.  The properties of the control of the cont
Perio	<b>odic</b> – Indicates that a periodic special inspection is required		be perfor and Acce PI (Proje by a proje	med by a testing laboratory accepted in the DSA Laboratory Evaluation ptance (LEA) Program. See CAC Section 4-335.  ct Inspector) – Indicates that the special inspection may be performed
Test	– Indicates that a test is required		SI (Specia	al Inspection) – Indicates that the special inspection shall be performed propriately qualified/approved special inspector.
	S/A1. STRUCTURAL STEEL, COLD-FORMED STEEL AND A	LUMINUM USE		
	Test or Special Inspection	Туре	Performed By	Code References and Notes
<b>✓</b>	<ul> <li>a. Verify identification of all materials and:</li> <li>Mill certificates indicate material properties that comply with requirements.</li> <li>Material sizes, types and grades comply with requirements.</li> </ul>	Periodic	*	<b>Table 1705A.2.1 Item 3a 3c.</b> 2202A.1; AISI S100-20 Section A3.1 & A3.2, AISI S240-20 Section A3 & A5, AISI S220-20 Sections A4 & A6. * By special inspector or qualified technician when performed off-site.
<b>√</b>	b. Test unidentified materials	Test	LOR	2202A.1.
<b>✓</b>	c. Examine seam welds of HSS shapes	Periodic	SI	DSA IR 17-3.
<b>√</b>	d. Verify and document steel fabrication per DSA-approved construction documents.	Periodic	SI	Not applicable to cold-formed steel light-frame construction, except for trusses (1705A.2.4).
	S/A3. WELDING:			
	Test or Special Inspection	Туре	Performed By	Code References and Notes
<b>V</b>	a. Verify weld filler material identification markings per AWS designation listed on the DSA-approved documents and the WPS.	Periodic	SI	1705A.2.5, Table 1705A.2.1 Items 4 & 5; AWS D1.1 and AWS D1.8 for structural steel; AWS D1.2 for Aluminum; AWS D1.3 for cold-formed steel; AWS D1.4 for reinforcing steel; DSA IR 17-3.
<b>7</b>	<b>b</b> . Verify weld filler material manufacturer's certificate of compliance.	Periodic	SI	DSA IR 17-3.
<b>√</b>	c. Verify WPS, welder qualifications and equipment.	Periodic	SI	DSA IR 17-3.
	S/A4. SHOP WELDING (IN ADDITION TO SECTION S/A3):			
	Test or Special Inspection	Туре	Performed By	Code References and Notes
<b>V</b>	a. Inspect groove welds, multi-pass fillet welds, single pass fillet welds > 5/16", plug and slot welds.	Continuous	SI	<b>Table 1705A.2.1 Items 5a.1 4</b> ; AISC 360-16 (and AISC 341-16 as applicable); DSA IR 17-3.
<b>V</b>	b. Inspect single-pass fillet welds ≤ 5/16", floor and roof deck welds.	Periodic	SI	<b>1705A.2.2, Table 1705A.2.1 Items 5a.5 &amp; 5a.6</b> ; AISC 360-16 (and AISC 341-16 as applicable); DSA IR 17-3.
<b>V</b>	c. Inspect welding of stairs and railing systems.	Periodic	SI	<b>1705A.2.1</b> ; AISC 360-16 (and AISC 341-16 as applicable); AWS D1.1 & D1.3; DSA IR 17-3.
	Test or Special Inspection	Туре	Performed By	Code References and Notes
	S/A6. NONDESTRUCTIVE TESTING:		1	
	Test or Special Inspection	Туре	Performed By	Code References and Notes
<b>V</b>	a. Ultrasonic	Test	LOR	<b>1705A.2.1, 1705A.2.5</b> ; AISC 341-16 J6.2, AISC 360-16 N5.5; AWS D1.1, AWS D1.8; DSA IR 17-2.
<b>✓</b>	b. Magnetic Particle	Test	LOR	<b>1705A.2.1, 1705A.2.5</b> ; AISC 341-16 J6.2, AISC 360-16 N5.5; AWS D1.1, AWS D1.8; DSA IR 17-2.

1. Structural Testing and Inspection: Laboratory Verified Report Form DSA 291

Shop Welding Inspection: Laboratory Verified Report Form DSA 291, or, for independently contracting SI, Special Inspection Verified Report Form

THE EXAMPLE OF FORM DSA-103s SHOWN ON THIS SHEET ARE FOR ILLUSTRATION PURPOSE ONLY. A FORM DSA-103 IS TO BE COMPLETED FOR EACH APPLICATION THAT THIS PC BEING INCORPORATED INTO AND EXAMPLE FORM DSA-103s ARE TO BE CROSSED OUT ON THIS DRAWING. DSA 103-22: LISTING OF STRUCTURAL TESTS & SPECIAL INSPECTIONS, 2022 CBC Application Number: **Increment Number:** Date Created:

DSA File Number:

#### 2022 CBC

**IMPORTANT**: This form is only a summary list of structural tests and some of the special inspections required for the project. Generally, the structural tests and special inspections noted on this form are those that will be performed by the Geotechnical Engineer of Record, Laboratory of Record, or Special Inspector. The actual complete test and inspection program must be performed as detailed on the DSA approved documents. The appendix at the bottom of this form identifies work NOT subject to DSA requirements for special inspection or structural testing. The project inspector is responsible for providing inspection of all facets of construction, including but not limited to, special inspections not listed on this form such as structural wood framing, high-load wood diaphragms, cold-formed steel framing, anchorage of non-structural components, etc., per Title 24, Part 2, Chapter 17A (2022 CBC).

2023-05-16 14:08:48

\*\*NOTE: Undefined section and table references found in this document are from the CBC, or California Building Code.

1. TYPE	2. PERFORMED BY
Continuous – Indicates that a continuous special inspection is	<b>GE (Geotechnical Engineer)</b> – Indicates that the special inspection shall be performed by a registered geotechnical engineer or his or her authorized representative.
required	LOR (Laboratory of Record) – Indicates that the test or special inspection shal be performed by a testing laboratory accepted in the DSA Laboratory Evaluation and Acceptance (LEA) Program. See CAC Section 4-335.
Periodic – Indicates that a periodic special inspection is required	
	PI (Project Inspector) – Indicates that the special inspection may be performed by a project
Test – Indicates that a test is required	inspector when specifically approved by DSA.
Tool marcates and a test is required	<b>SI (Special Inspection)</b> – Indicates that the special inspection shall be performed by an appropriately qualified/approved special inspector.

controlled fill marker excessions for foundations.  - Security of the procession of the proportion of the procession of	Cont	cochnical Poports: Project does NOT have and	doos NOT ro		propriately qualified/approved special inspector.
See Notes   Performed by   Code References and Notes   Control of the Association of th	Jeor		Toes NOT Te	quire a geotec	mnicai report
See Notes   Picture   Picture   See Notes   Picture   See Notes   Picture   Picture   See Notes   Picture			T	D. 6	Ondo Before and Nation
- Site is been prequently constructed and controlled file construction of controlled file controlled file construction of controlled file controlled file construction of controlled file cont					
Test of Special Impection	∑	Site has been prepared properly prior to placement of controlled fill and/or excavations for foundations. Foundation excavations are extended to proper depth and have reached proper material.  Materials below footings are adequate to achieve the	See Notes	PI	for limitations. Placement of controlled fill exceeding 12" depth u foundations is not permitted without a geotechnical report.
New York Date of program residents, denotine and impact Influences to discharge angewing the content of the program and compaction during placement of file.   New York Date of the Program of the Prog					
New York Date of program residents, denotine and impact Influences to discharge angewing the content of the program and compaction during placement of file.   New York Date of the Program of the Prog		Test or Special Inspection	Type	Performed By	Code References and Notes
thicknesses, placement and consection during placement on the special part of them is destribled in placement and compaction during placement and compact on the special part of the properties of a placement of a placement designer of all parts of the properties of a placement designer of all parts of the properties of a placement designer of all parts of the properties of a placement of a placement designer of all parts of the properties of a placement	<b>V</b>				* Under the supervision of a geotechnical engineer or LOR's
esgineering manager, lefer to significations.  C1. CAST-IN-PLACE CONCRETE  Test or Special Inspection  Type Performed By Code References and Notes  Table 1706A.3 Item 5, 1910A.1.  Default rough, and lete remforcing steel. Perfodic S1 Table 1706A.3 Item 5, 1910A.1.  LOR 1910A.2. ACI 1818 19.0.30 and Section 26.6.1.2 DSN N, Appendix and off this form for exemptions) and section 26.1.2 DSN N, Appendix and off this form for exemptions and section 26.1.2 DSN N, Appendix and off this form for exemptions and section 26.1.3 DSN N, Appendix and off this form for exemptions and section 26.1.3 DSN N, Appendix and off this form for exemptions and section 26.1.3 DSN N, Appendix and distributions are removed by the program of the section 26.1.3 DSN N, Appendix and distributions are removed by the program of the section 26.1.3 DSN N, Appendix and the section 26.1.3 DSN N, Appendix and distributions are removed by the program of the section 26.1.3 DSN N, Appendix and the section 26.1.3 DSN N, A		thicknesses, placement and compaction during			engineering manager. Refer to specific items identified in the
Test or Special Inspection  Type Portformed By Dodgerenass and Notes  Load 1790A.3.2 (18 19 79.0.3.2 m. 18 19 17.0.3.2 m. 18 19 17.0.3 m. 18 19 17.0	<b>V</b>	<b>b</b> . Compaction testing.	Test	LOR*	* Under the supervision of a geotechnical engineer or LOR's engineering manager. Refer to specific items identified in the Appendix listing exemptions for limitations.
Particular   Par		C1. CAST-IN-PLACE CONCRETE			
Debutify, sample, and text reinforcing steel.   Test		Test or Special Inspection	Туре	Performed By	Code References and Notes
Appendix (end of this form) for exemptions)   Appendix (end of this form) for exemptions)   Pest for strength tests, performs the themperature of the concentration test, and determine the temperature of the concentration of the concentrat	<b>7</b>	a. Verify use of required design mix.	Periodic	SI	Table 1705A.3 Item 5, 1910A.1.
for strength tests, performs Jump and air content tests, and charmer the the temperature of the concrete.    Test	<b>V</b>	b. Identifiy, sample, and test reinforcing steel.	Test	LOR	1910A.2; ACI 318-19 Ch.20 and Section 26.6.1.2; DSA IR 17-10. (Se Appendix (end of this form) for exemptions.)
tests, and determine the temperature of the concrete.    Insert Concrete   Total   LOR   1905A.1.17, ACI 318-19 Section 26.112.     Insert Concrete   Total   LOR   1905A.1.17, ACI 318-19 Section 26.112.     Insert Concrete   Total   LOR   1905A.1.17, ACI 318-19 Section 26.112.     Insert Concrete   Total   LOR   1905A.1.17, ACI 318-19 Section 26.112.     Insert Concrete   Total   LOR   1905A.1.17, ACI 318-19 Section 26.112.     Insert Concrete   Total   LOR   1905A.1.17, ACI 318-19 Section 26.112.     Insert Concrete   Total   LOR   1905A.1.17, ACI 318-19 Section 26.112.     Insert Concrete   Total   LOR   1905A.1.17, ACI 318-19 Section 26.112.     Insert Concrete   Total   LOR   1905A.1.17, ACI 318-19 Section 26.112.     Insert Concrete   Total   LOR   1905A.1.17, ACI 318-19 Section 26.112.     Insert Concrete   Total   LOR   1905A.1.17, ACI 318-19 Section 26.112.     Insert Concrete   LOR   1905A.1.17, ACI 318-19 Section 36.112.     Insert Concrete   LOR   1	<b>V</b>		Test	LOR	Table 1705A.3 Item 6; ACI 318-19 Sections 26.5 & 26.12.
Z.   d. Test concrete (fr.).   Test   LOR   1905A.1.17. AC 318-19 Section 26.12.		tests, and determine the temperature of the			
plant inspection may be reduced to Perfodic" subject to in section 1706.A. 3.2 i. derilantate per 1706.A. 3.2 i. See Appendix (end of this form) for exemptions.)    Test or Special Inspection   Type   Performed By   Code References and Notes	<b>7</b>		Test	LOR	<b>1905A.1.17</b> ; ACI 318-19 Section 26.12.
plant inspection may be reduced to Perfodic" subject to in section 1706.A. 3.2 i. derilantate per 1706.A. 3.2 i. See Appendix (end of this form) for exemptions.)    Test or Special Inspection   Type   Performed By   Code References and Notes		Ratch plant increation: Continuous	Soc Mater	ei ei	Default of 'Continuous' new 1705A 2.2 Kannassed http://dx.
Test or Special Inspection  Inspect installation of post-installed anchors  See Notes  Sit 1617A.1.19, Table 1705A.3 (See Appendix (end of this form) for exemptic 318-14 Sections 17.8 & 26.13. May be performed by the inspector when specifically approved by DSA.  Inspect installation of post-installed anchors.  Test LOR 1910A.5, See Appendix (end of this form) for exemptic 318-14 Sections 17.8 & 26.13. May be performed by the inspector when specifically approved by DSA.  Inspect provided the inspect provided by DSA.  S/A1.STRUCTURAL STEEL, COLD-FORMED STEEL AND ALUMINUM USED FOR STRUCTURAL PURPOSES  Test or Special Inspection  Type Performed By  Code References and Notes  Test or Special Inspection  Periodic  Inspect provided by Code References and Notes  Test or Special Inspection of all materials and:  Inspect provided by Code References and Notes  Test or Special Inspection of all materials and:  Inspect provided by Code References and Notes  Test or Special Inspection  Test LOR  ZOZA.1.  Inspect provided the chinician when performed the chinician when performed special inspection of qualified technician when performed special inspection of qualified technician when performed special inspection of qualified technician when performed special inspection of the Special References and Notes  Inspect grow and document steel fabrication per DSA-approved contraction documents.  Inspect grow and documents and provided documents and the Way.  Inspect grow and documents.  Inspect grow and documents.  Inspect grow and the Special References and Notes  Test or Special Inspection  Type Performed By  Code References and Notes  Inspect grow and the Special References and Notes  Inspect grow and the Way.  Inspect grow and the Special References and Notes  Inspect grow and th	∑	e. Batch plant inspection: Continuous	See Notes	51	plant inspection may be reduced to 'Periodic' subject to requirer in Section 1705A.3.3.1, or eliminated per 1705A.3.3.2. See IR 17
a. Inspect installation of post-installed anchors   See Notes   Si				1	
1705A. 3 & See Appendix rend this form in for exemption 318-14 Sections 17-8 & 26.13.* May be performed by the inspector when specifically approved by DSA.  I Test DS installed anchors.  I Test LOR 1910A.5. (See Appendix (end of this form) for exemption  S/A1. STRUCTURAL STEEL, COLD-FORMED STEEL AND ALUMINIUM USED FOR STRUCTURAL PURPOSES  Test or Special Inspection Type Performed By Code References and Notes  A werity identification of all materials and: - Mill certificates indicate material properties that comply with requirements Mill certificates indicate material properties that comply with requirements Mill certificates indicate material properties that comply with requirements Mill certificates indicate material properties that comply with requirements Mill certificates indicate material properties that comply with requirements Mill certificates indicate material properties that comply with requirements Mill certificates indicate material properties that comply with requirements Mill certificates indicate material properties that comply with requirements Mill certificates indicate material properties that comply with requirements Periodic SI Not applicable to cold-formed steel light-frame construct for trusses (1705A.2.4).  SA/A3. WEIDING:  Test or Special Inspection  Type Performed By Code References and Notes  SI 705A.2.4.  SA/A3. WEIDING: - Say Continuous Periodic SI 1705A.2.5. Table 1705A.2.1 titens 4 S. AWS D1.1 and the WPS Werify weld filler material manufacturer's certificate of compliance Line of Special Inspection Periodic SI DSA IR 17-3.  SA/A3. WEIDING: WEIDING (IN ADDITION TO SECTION S/A)3:  Test or Special Inspection Type Performed By Code References and Notes  SI 705A S. AWS BD 1.1 from Sa.1.4. AMS Cybe D-16 (and AMS Cs.3.4.1.6.6.) SA/A. SHOP WEIDING (IN ADDITION TO SECTION S/A)3:  Test or Special Inspection Type Performed By Odde References and Notes  SI 705A S. AWS D1.4. DSA IR 17-3.  Test or Special Inspection Type Performed By Odde References and Notes		Test or Special Inspection	Туре	Performed By	Code References and Notes
Signature   Signature   Signature   Signature   Signature   Periodic   Signature   Periodic   Signature   Signat		a. Inspect installation of post-installed anchors	See Notes	SI*	1617A.1.19, Table 1705A.3 Item 4a (Continuous) & 4b (Period 1705A.3.8 (See Appendix (end of this form) for exemptions). ACI 318-14 Sections 17.8 & 26.13.* May be performed by the project inspector when specifically approved by DSA.
Test or Special Inspection  Type Performed By Code References and Notes  Authyrity dentification of all materials and: Authority with requirements.  Test Inspect or qualified technician when performed exactly and as a second property with requirements.  District by Test and a second property with requirements.  District by Test and a second property with requirements.  District by Test and a second property with requirements.  District by Test and a second property with requirements.  District by Test and a second property with requirements.  District by Test and document steel fabrication per DSA-approved construction documents.  Syda: WEDING:  Test or Special Inspection  Type Performed By Code References and Notes  Si Not applicable to cold-formed steel light-frame construct for trusses (1705A.2.4).  Syda: WEDING:  Test or Special Inspection  Type Performed By Code References and Notes  Si Not applicable to cold-formed steel light-frame construct for trusses (1705A.2.4).  Si Not applicable to cold-formed steel light-frame construct for trusses (1705A.2.4).  Total Code References and Notes  Type Performed By Code References and Notes  Si 1705A.2.5, Table 1705A.2.1 Items 4.8.5 xWS D1.1 and structural steek, MVS D1.2 of Aluminum; AWS D1.3 for construction to the WPS.  District by Wed Billier material manufacturer's certificate of compilance.  District by Wed Billier material manufacturer's certificate of compilance.  District by Wed Billier material manufacturer's certificate of compilance.  District by Wed Billier material manufacturer's certificate of compilance.  District by Wed Billier material manufacturer's certificate of compilance.  District by Wed Billier material manufacturer's certificate of compilance.  District by Wed Billier material manufacturer's certificate of compilance.  District by Wed Billier material manufacturer's certificate of compilance.  District by Wed Billier material manufacturer's certificate of compilance.  District by Wed Billier material manufacturer's certificate of compilance.	<b>✓</b>	<b>b.</b> Test post-installed anchors.	Test	LOR	1910A.5. (See Appendix (end of this form) for exemptions.)
Test or Special Inspection  Type Performed By Code References and Notes  Authyrity dentification of all materials and: Authority with requirements.  Test Inspect or qualified technician when performed exactly and as a second property with requirements.  District by Test and a second property with requirements.  District by Test and a second property with requirements.  District by Test and a second property with requirements.  District by Test and a second property with requirements.  District by Test and a second property with requirements.  District by Test and document steel fabrication per DSA-approved construction documents.  Syda: WEDING:  Test or Special Inspection  Type Performed By Code References and Notes  Si Not applicable to cold-formed steel light-frame construct for trusses (1705A.2.4).  Syda: WEDING:  Test or Special Inspection  Type Performed By Code References and Notes  Si Not applicable to cold-formed steel light-frame construct for trusses (1705A.2.4).  Si Not applicable to cold-formed steel light-frame construct for trusses (1705A.2.4).  Total Code References and Notes  Type Performed By Code References and Notes  Si 1705A.2.5, Table 1705A.2.1 Items 4.8.5 xWS D1.1 and structural steek, MVS D1.2 of Aluminum; AWS D1.3 for construction to the WPS.  District by Wed Billier material manufacturer's certificate of compilance.  District by Wed Billier material manufacturer's certificate of compilance.  District by Wed Billier material manufacturer's certificate of compilance.  District by Wed Billier material manufacturer's certificate of compilance.  District by Wed Billier material manufacturer's certificate of compilance.  District by Wed Billier material manufacturer's certificate of compilance.  District by Wed Billier material manufacturer's certificate of compilance.  District by Wed Billier material manufacturer's certificate of compilance.  District by Wed Billier material manufacturer's certificate of compilance.  District by Wed Billier material manufacturer's certificate of compilance.					
☑         a. Verify identification of all materials and:             —Mill certificates indicate material properties that comply with requirements.             —Material sizes, types and grades comply with requirements.             —Material sizes, types and grades comply with requirements.             —It is a properties of the periodic sizes in the periodic s		·	1		1
. Mill certificates indicate material properties that comply with requirements.  - Material sizes, types and grades comply with requirements.  - It b. Test unidentified materials  - C. Examine seam welds of HSS shapes  - C. Examine seam welds of HSS shapes  - Defiodic  - D. Test unidentified materials  - C. Examine seam welds of HSS shapes  - Periodic  - D. Test on Special inspection  - Type  - Periodic  - D. Verify and document steel fabrication per DSA-approved construction documents.  - S/A3. WELDING:  - Test or Special inspection  - Type  - Periodic  - D. Verify weld filler material identification markings per AWS designation listed on the DSA-approved documents and the WFS.  - D. Verify weld filler material manufacturer's certificate of compliance.  - D. Verify weld filler material manufacturer's certificate of compliance.  - D. Verify weld filler material manufacturer's certificate of compliance.  - D. Verify weld filler material manufacturer's certificate of compliance.  - D. Verify weld filler material manufacturer's certificate of compliance.  - D. Verify weld filler material manufacturer's certificate of compliance.  - D. Verify weld filler material manufacturer's certificate of compliance.  - D. Verify weld filler material manufacturer's certificate of compliance.  - D. Verify weld filler material manufacturer's certificate of compliance.  - D. Verify weld filler material manufacturer's certificate of compliance.  - D. SI DSA IR 17-3.  - D. SA IR 17-3.	]	• •			
☑       c. Examine seam welds of HSS shapes       Periodic       SI       DSA IR 17-3.         ☑       d. Verify and document steel fabrication per DSA-approved construction documents.       Periodic       SI       Not applicable to cold-formed steel light-frame construct for trusses (1705A.2.4).         S/A3. WELDING:         Test or Special Inspection       Type       Periodic       SI       1705A.2.5, Table 1705A.2.1 Items 4.8.5; AWS D1.1 and structural steek, AWS D1.2 for Aluminum; AWS D1.3 for cot structural steek, AWS D1.2 for Aluminum; AWS D1.3 for cot structural steek, AWS D1.6 for inforcing steel; DSA IR 17-3.         ☑       b. Verify weld filler material manufacturer's certificate of compliance.       Periodic       SI       DSA IR 17-3.         ☑       D. Verify Weld filler material manufacturer's certificate of compliance.       Periodic       SI       DSA IR 17-3.         ☑       D. Verify Weld filler material manufacturer's certificate of compliance.       Periodic       SI       DSA IR 17-3.         ☑       O. Verify WPS, welder qualifications and equipment.       Periodic       SI       DSA IR 17-3.         Image: Special Inspect of Cook welds, multi-pass fillet welds, single pass fillet welds, single pass fillet welds, single pass fillet welds, single pass fillet welds is 5/16°, floor and roof deck welds.       Continuous       SI       Table 1705A.2.1 Items 5a.1 4; AISC 260-16 (and AISC 346-16 (and AISC 3	<b>\</b>	<ul> <li>Mill certificates indicate material properties that comply with requirements.</li> <li>Material sizes, types and grades comply with</li> </ul>	Periodic	*	<b>Table 1705A.2.1 Item 3a 3c.</b> 2202A.1; AISI S100-20 Section A3.1 A3.2, AISI S240-20 Section A3 & A5, AISI S220-20 Sections A4 & A6 special inspector or qualified technician when performed off-site.
☑       d. Verify and document steel fabrication per DSA-approved construction documents.       Periodic       SI       Not applicable to cold-formed steel light-frame construct for trusses (1705A.2.4).         S/A3. WELDING:       Test or Special Inspection       Type       Performed By       Code References and Notes         ☑       a. Verify weld filler material identification markings per AWS designation listed on the DSA-approved documents and the WPS.       Periodic       SI       1705A.2.5, Table 1705A.2.1 Items 4 & 5, AWS D1.1 and structural steel; AWS D1.4 for reinforcing steel; DSA IR 17-3.         ☑       b. Verify weld filler material manufacturer's certificate of compliance.       Periodic       SI       DSA IR 17-3.         ☑       c. Verify WPS, welder qualifications and equipment.       Periodic       SI       DSA IR 17-3.         ☑       a. Inspect groove welds, multi-pass fillet welds, single pass fillet welds, plug and slot welds.       Continuous       SI       Table 1705A.2.1 Items 5a.1 4; AISC 360-16 (and AISC 3 applicable); DSA IR 17-3.         ☑       b. Inspect groove welds, multi-pass fillet welds, single pass fillet welds > 5/16°, floor and roof deck welds.       Periodic       SI       Table 1705A.2.1 Items 5a.1 4; AISC 360-16 (and AISC 3 applicable); DSA IR 17-3.         ☑       c. Inspect welding of stairs and railing systems.       Periodic       SI       1705A.2.2, Table 1705A.2.1 Items 5a.5 & Sa.6; AISC 36.16 (and AISC 341-16 as applicable); DSA IR 17-3. <t< td=""><td>✓</td><td>b. Test unidentified materials</td><td>Test</td><td>LOR</td><td>2202A.1.</td></t<>	✓	b. Test unidentified materials	Test	LOR	2202A.1.
S/A3. WELDING:  Test or Special Inspection  Type  Performed By  Code References and Notes  S/A3. Well filler material identification markings per AWS designation listed on the DSA-approved documents and the WPS.  Designation listed on the DSA-approved documents and the WPS.  Designation listed on the DSA-approved documents and the WPS.  Designation listed on the DSA-approved documents and the WPS.  Designation listed on the DSA-approved documents and the WPS.  Designation listed on the DSA-approved documents and the WPS.  Designation listed on the DSA-approved documents and the WPS.  Designation listed on the DSA-approved documents and the WPS.  Designation listed on the DSA-approved documents and the WPS.  Designation listed on the DSA-approved documents and the WPS.  Designation listed on the DSA-approved documents and the WPS.  Designation listed on the DSA-approved documents and the WPS.  Designation listed on the DSA-approved documents and the WPS.  Designation listed on the DSA-approved documents and the WPS.  S/A4. SHOP WELDING (IN ADDITION TO SECTION S/A3):  Test or Special Inspection  Type  Performed By  Code References and Notes  SI Table 1705A.2.1 Items 5a.1 4; AISC 360-16 (and AISC 3 applicable); DSA IR 17-3.  Designation listed evel designation listed welds s. 5/16", floor and roof deck welds.  Designation listed welds s. 5/16", floor and roof deck welds.  Designation listed welds s. 5/16", floor and roof deck welds.  Designation listed evel s.  Periodic  SI 1705A.2.1 Table 1705A.2.1 Items 5a.1 4; AISC 360-16 (and AISC 3 applicable); DSA IR 17-3.  Designation listed evel s.  Designation listed evel s.  Designation listed and Notes applicable); DSA IR 17-3.  Designation listed evel s.  Designation listed and Notes applicable listed and AISC 3 applicable); DSA IR 17-3.  Designation listed and Notes applicable listed and AISC 3 a	<b>√</b>	c. Examine seam welds of HSS shapes	Periodic	SI	DSA IR 17-3.
S/A3. WELDING:  Test or Special Inspection  Type Performed By Code References and Notes  A. Verify weld filler material identification markings per AWS designation listed on the DSA-approved documents and the WPS.  D. Verify weld filler material manufacturer's certificate of compliance.  D. Verify weld filler material manufacturer's certificate of compliance.  D. Verify weld filler material manufacturer's certificate of compliance.  D. Verify weld filler material manufacturer's certificate of compliance.  D. Verify weld filler material manufacturer's certificate of compliance.  D. Verify weld filler material manufacturer's certificate of compliance.  D. Verify weld filler material manufacturer's certificate of compliance.  D. Los IR 17-3.  D. SAIR 17-3.  Test or Special Inspection  Type Performed By  Code References and Notes  Inspect groove welds, multi-pass fillet welds, single pass fillet welds, single pass fillet welds ≤ 5/16°, floor and roof deck welds.  D. Inspect single-pass fillet welds ≤ 5/16°, floor and roof deck welds.  C. Inspect welding of stairs and railing systems.  Periodic SI 1705A.2.1, AISC 360-16 (and AISC 341-16 as applicable); DSA IR 17-3.  d. Verification of reinforcing steel weldability of the reinforcing steel.  Continuous  SI 1705A.2.1, AISC 360-16 (and AISC 341-16 as applicable); DSA IR 17-3.  S/AS. FIELD WELDING (IN ADDITION TO SECTION S/A3):  Test or Special Inspection  Type Performed By  Code References and Notes  SI 1808 1705A.2.1, Item 5b., 1705A.3.1, Table 1705A.3 It 1903A / AWS D1.4; DSA IR 17-3.  Test or Special Inspection  Type Performed By Code References and Notes  S/A6. NONDESTRUCTIVE TESTING:  Test or Special Inspection  Type Performed By Code References and Notes  LOR 1705A.2.1, 1705A.2.5; AISC 341-16 J6.2, AISC 360-10 D1.1, AWS D1.8; DSA IR 17-2.	<b>7</b>		Periodic	SI	Not applicable to cold-formed steel light-frame construction, exc
☑       a. Verify weld filler material identification markings per AWS designation listed on the DSA-approved documents and the WPS.       Periodic       SI       1705A.2.5, Table 1705A.2.1 Items 4 & 5, AWS D1.1 and structural steel; AWS D1.2 for Aluminium; AWS D1.3 for cost steel; AWS D1.4 for reinforcing steel; DSA IR 17-3.         ☑       b. Verify weld filler material manufacturer's certificate of compliance.       Periodic       SI       DSA IR 17-3.         ☑       c. Verify WPS, welder qualifications and equipment.       Periodic       SI       DSA IR 17-3.         S/A4. SHOP WELDING (IN ADDITION TO SECTION S/A3):       Test or Special Inspection       Type       Performed By       Code References and Notes         ☑       a. Inspect groove welds, multi-pass fillet welds, single pass fillet welds > 5/16", plug and slot welds.       Continuous       SI       Table 1705A.2.1 Items 5a.1 4; AISC 260-16 (and AISC 3 applicable); DSA IR 17-3.         ☑       b. Inspect single-pass fillet welds ≤ 5/16", floor and roof deck welds.       SI       1705A.2.2, Table 1705A.2.1 Items 5a.1 4; AISC 260-16 (and AISC 3 AISC 341-16 as applicable); DSA IR 17-3.         ☑       c. Inspect welding of stairs and railing systems.       Periodic       SI       1705A.2.1; AISC 360-16 (AISC 341-16 as applicable); DSA IR 17-3.         ☑       c. Inspect welding of reinforcing steel weldability other than ASTM A706.       Periodic       SI       1705A.2.1; AISC 360-16 (AISC 341-16 as DSA IR 17-3.         ☑       e.					(Not the state of
AWS designation listed on the DSA-approved documents and the WPS.  □ D. Verify weld filler material manufacturer's certificate of compiliance.  □ C. Verify WPS, welder qualifications and equipment.  □ C. Inspect groove welds, multi-pass fillet welds, single pass fillet welds > 5/16°, plug and slot welds.  □ D. Inspect single-pass fillet welds ≤ 5/16°, floor and roof deck welds.  □ D. Inspect single-pass fillet welds ≤ 5/16°, floor and roof deck welds.  □ C. Inspect welding of stairs and railing systems.  □ Deriodic SI 1705A.2.1, Table 1705A.2.1 Items 5a.5 & 5a.6; AISC 36 AISC 341-16 as applicable); DEA IR 17-3.  □ D. Verification of reinforcing steel weldability other than ASTM A706.  □ D. Inspect welding of reinforcing steel.  □ D. Inspect single-pass fillet welds ≤ 5/16°.  □ D.		Test or Special Inspection	Туре	Performed By	Code References and Notes
compliance.  c. Verify WPS, welder qualifications and equipment.  Periodic  SI  DSA IR 17-3.  S/A4. SHOP WELDING (IN ADDITION TO SECTION S/A3):  Test or Special Inspection  Type  Performed By  Code References and Notes  Inspect groove welds, multi-pass fillet welds, single pass fillet welds > 5/16", plug and slot welds.  D. Inspect single-pass fillet welds ≤ 5/16", floor and roof deck welds.  C. Inspect welding of stairs and railling systems.  Periodic  Inspect welding of stairs and railling systems.  Periodic  Inspect welding of reinforcing steel weldability other than ASTM A706.  Inspect welding of reinforcing steel.  Continuous  SI  Table 1705A.2.1   12ms 5a.5 & 5a.6; AISC 36 AISC 341-16 as applicable); D6A IR 17-3.  Continuous  SI  Topsa.2.1; AISC 360-16 (and AISC 341-16 as applicable); D6A IR 17-3.  Continuous  SI  Topsa.2.1; AISC 360-16 (and AISC 341-16 as applicable); D1.3; D5A IR 17-3.  Continuous  SI  Topsa.2.1; AISC 360-16 (and AISC 341-16 as applicable); D6A IR 17-3.  Continuous  SI  Topsa.2.1; AISC 360-16 (and AISC 341-16 as applicable); D6A IR 17-3.  Continuous  SI  Topsa.2.1; AISC 360-16 (and AISC 341-16 as applicable); D6A IR 17-3.  Continuous  SI  Topsa.2.1; AISC 360-16 (and AISC 341-16 as applicable); D6A IR 17-3.  Continuous  SI  Table 1705A.2.1   1705A.2.1   1705A.2.1   1705A.3.1   170	<b>V</b>	AWS designation listed on the DSA-approved documents	Periodic	SI	1705A.2.5, Table 1705A.2.1 Items 4 & 5; AWS D1.1 and AWS D1 structural steel; AWS D1.2 for Aluminum; AWS D1.3 for cold-form steel; AWS D1.4 for reinforcing steel; DSA IR 17-3.
S/A4. SHOP WELDING (IN ADDITION TO SECTION S/A3):  Test or Special Inspection  Type Performed By Code References and Notes  a. Inspect groove welds, multi-pass fillet welds, single pass fillet welds > 5/16", plug and slot welds.  b. Inspect single-pass fillet welds ≤ 5/16", floor and roof deck welds.  c. Inspect welding of stairs and railing systems.  Periodic  d. Verification of reinforcing steel weldability other than ASTM A706.  c. Inspect welding of reinforcing steel.  Continuous  SI T705A.2.1, AISC 360-16 (And AISC 341-16 as applicable); DSA IR 17-3.  d. Verification of reinforcing steel weldability other than ASTM A706.  e. Inspect welding of reinforcing steel.  Continuous  SI Table 1705A.2.1 them 5b, 1705A.3.1, Table 1705A.3.1 to mill certificates.  S/A5. FIELD WELDING (IN ADDITION TO SECTION S/A3):  Test or Special Inspection  Type Performed By Code References and Notes  SI Table 1705A.2.1 Item 5a.5; AISC 360-16 (AISC 341-16 as applicable); DSA IR 17-3.  Test or Special Inspection  Type Performed By Code References and Notes  S/A6. NONDESTRUCTIVE TESTING:  Test or Special Inspection  Type Performed By Code References and Notes  Test or Special Inspection  Type Performed By Code References and Notes  LOR 1705A.2.1, 1705A.2.5; AISC 341-16 J6.2, AISC 360-10 1.1, AWS D1.8; DSA IR 17-2.	<b>V</b>		Periodic	SI	DSA IR 17-3.
Test or Special Inspection  Type Performed By Code References and Notes  a. Inspect groove welds, multi-pass fillet welds, single pass fillet welds > 5/16*, plug and slot welds.  b. Inspect single-pass fillet welds ≤ 5/16*, floor and roof deck welds.  c. Inspect welding of stairs and railing systems.  Periodic d. Verification of reinforcing steel weldability other than ASTM A706.  c. Inspect welding of reinforcing steel.  Continuous  SI T705A.2.1; AISC 360-16 (and AISC 341-16 as applicable); DSA IR 17-3.  d. Verification of reinforcing steel weldability other than ASTM A706.  c. Inspect welding of reinforcing steel.  Continuous  SI T705A.2.1; AISC 360-16 (and AISC 341-16 as applicable); DSA IR 17-3.  Verify carbon equival on mill certificates.  SIADIL 1705A.2.1; Item 5b, 1705A.3.1, Table 1705A.3.1 table 1705A.2.1 tem 5b, 1705A.3.1 table 1705A.3.1 table 1705A.2.1 tem 5b, 1705A.3.1 table 1705A.3.1	<b>V</b>	•	Periodic	SI	DSA IR 17-3.
☑       a. Inspect groove welds, multi-pass fillet welds, single pass fillet welds > 5/16", plug and slot welds.       Continuous       SI       Table 1705A.2.1 Items 5a.1 4; AISC 360-16 (and AISC 3 applicable); DSA IR 17-3.         ☑       b. Inspect single-pass fillet welds ≤ 5/16", floor and roof deck welds.       Periodic       SI       1705A.2.2, Table 1705A.2.1 Items 5a.5 & 5a.6; AISC 36 AISC 341-16 as applicable); DSA IR 17-3.         ☑       c. Inspect welding of stairs and railing systems.       Periodic       SI       1705A.2.1; AISC 360-16 (and AISC 341-16 as applicable); DSA IR 17-3.         ☐       d. Verification of reinforcing steel weldability other than ASTM A706.       Periodic       SI       1705A.2.1; AISC 360-16 (and AISC 341-16 as applicable); DSA IR 17-3.         ☑       e. Inspect welding of reinforcing steel weldability other than ASTM A706.       Periodic       SI       1705A.2.1; AISC 360-16 (and AISC 341-16 as applicable); DSA IR 17-3.         ☑       e. Inspect welding of reinforcing steel weldability other than ASTM A706.       Continuous       SI       Table 1705A.2.1 Item 5b, 1705A.3.1, Table 1705A.3.1 Item 5b, 1705A.3.1, Table 1705A.3.1 Item 5a.5; AISC 360-16 (AISC 341-16 as DSA IR 17-3.         ☑       b. Inspect single-pass fillet welds ≤ 5/16".       Periodic       SI       Table 1705A.2.1 Item 5a.5; AISC 360-16 (AISC 341-16 as DSA IR 17-3.         ☑       b. Inspect single-pass fillet welds ≤ 5/16".       Periodic       SI       Table 1705A.2.1 Item 5a.5; AISC 360-16 (AISC 341-16 as		S/A4. SHOP WELDING (IN ADDITION TO SECTION S/A3):			
fillet welds > 5/16", plug and slot welds.    Description   Description		Test or Special Inspection	Туре	Performed By	Code References and Notes
deck welds.  AISC 341-16 as applicable); D8A IR 17-3.  C. Inspect welding of stairs and railing systems.  Periodic  SI  1705A.2.1; AISC 360-16 (and AISC 341-16 as applicable); D1.3; DSA IR 17-3.  d. Verification of reinforcing steel weldability other than ASTM A706.  SI  1705A.3.1; AWS J1.4; DSA IR 17-3. Verify carbon equivalence on mill certificaces.  Continuous  SI  Table 1705A.2.1 Item 5b, 1705A.3.1, Table 1705A.3 It 1903A.8 / AWS D1.4; DSA IR 17-3.  S/A5. FIELD WELDING (IN ADDITION TO SECTION S/A3):  Test or Special Inspection  Type  Periodic  SI  Table 1705A.2.1 Item 5a.5; AISC 360-16 (AISC 341-16 as DSA IR 17-3.  Test or Special Inspection  Type  Performed By  Code References and Notes  S/A6. NONDESTRUCTIVE TESTING:  Test or Special Inspection  Type  Performed By  Code References and Notes  Code References and Notes  Type  Performed By  Code References and Notes  Type  Performed By  Code References and Notes  Interval Inspection  Type  Performed By  Code References and Notes  Code References and Notes  Interval Inspection  Type  Performed By  Code References and Notes  Code References and Notes  Interval Inspection  Type  Performed By  Code References and Notes  Interval Inspection  Type  Performed By  Code References and Notes	<b>7</b>		Continuous	SI	<b>Table 1705A.2.1 Items 5a.1 4</b> ; AISC 360-16 (and AISC 341-16 as applicable); DSA IR 17-3.
D1.3; DSA IR 17-3.  □ d. Verification of reinforcing steel weldability other than ASTM A706.  □ e. Inspect welding of reinforcing steel.  □ continuous  SI  □ Table 1705A.2.1 Item 5b, 1705A.3.1, Table 1705A.3 It. 1903A.8, AWS D1.4; DSA IR 17-3.  S/A5. FIELD WELDING (IN ADDITION TO SECTION S/A3):  □ Test or Special Inspection  □ D1.3; DSA IR 17-3.  Test or Special Inspection  □ D2.3; DSA IR 17-3.  □ D3.4; DSA IR 17-3.  □ D3.5; AISC 360-16 (AISC 341-16 as DSA IR 17-3.  □ D3.6; AISC 360-16 (AISC 341-16 as DSA IR 17-3.  □ D3.6; AISC 360-16 (AISC 341-16 as DSA IR 17-3.  □ Test or Special Inspection  □ Type  □ Performed By  □ Code References and Notes  □ Code References and Notes  □ D3.6; AISC 360-16 (AISC 341-16 as DSA IR 17-3.  □ D3.6; AISC 360-16 (AISC 341-16 as DSA IR 17-3.  □ Test or Special Inspection  □ Type  □ Performed By  □ Code References and Notes  □ AIC IT05A.2.1, 1705A.2.5; AISC 341-16 J6.2, AISC 360-10 D1.1, AWS D1.8; DSA IR 17-2.	<b>V</b>	, , , ,	Periodic	SI	1705A.2.2, Table 1705A.2.1 Items 5a.5 & 5a.6; AISC 360-16 (an AISC 341-16 as applicable); D&A IR 17-3.
other than ASTM A706.  ☑ e. Inspect welding of reinforcing steel.  ☐ continuous  ☐ Table 1705A.2.1 Item 5b, 1705A.3.1, Table 1705A.3 Item 1903A.8, AWS D1.4; DSA IR 17-3.  ☐ S/A5. FIELD WELDING (IN ADDITION TO SECTION S/A3):  ☐ Test or Special Inspection  ☐ D. Inspect single-pass fillet welds ≤ 5/16".  ☐ Definition  ☐ Type  ☐ Performed By  ☐ Definition ☐ Type  ☐ Performed By  ☐ Code References and Notes ☐ DSA IR 17-3. ☐ Test or Special Inspection ☐ Type ☐ Definition ☐ Type ☐ Performed By ☐ Code References and Notes ☐ Code References and Notes ☐ Definition ☐ Type ☐ Definition ☐ Type ☐ Definition ☐	<b>V</b>	c. Inspect welding of stairs and railing systems.	Periodic	SI	1705A.2.1; AISC 360-16 and AISC 341-16 as applicable); AWS D1 D1.3; DSA IR 17-3.
S/A5. FIELD WELDING (IN ADDITION TO SECTION S/A3):  Test or Special Inspection  Description  Type  Performed By  Description  Type  Type  Performed By  Description  Type  Description  Type  Performed By  Description  Type  Description  Type  Performed By  Description  Type  Description  Type  Description  Type  Performed By  Description  Type  Descr			Periodic	SI	1705A.3.1; AWS 01.4; DSA IR 17-3. Verify carbon equivalent repo
Test or Special Inspection       Type       Performed By       Code References and Notes         ✓       b. Inspect single-pass fillet welds ≤ 5/16".       Periodic       SI       Table 1705A.2.1 Item 5a.5; AISC 360-16 (AISC 341-16 as DSA IR 17-3.         Test or Special Inspection       Type       Performed By       Code References and Notes         S/A6. NONDESTRUCTIVE TESTING:       Type       Performed By       Code References and Notes         ✓       a. Ultrasonic       Test       LOR       1705A.2.1, 1705A.2.5; AISC 341-16 J6.2, AISC 360-10 D1.1, AWS D1.8; DSA IR 17-2.	<b>V</b>	e. Inspect welding of reinforcing steel.	Continuous	SI	Table 1705A.2.1 Item 5b, 1705A.3.1, Table 1705A.3 Item 2, 1903A.8, AWS D1.4; DSA IR 17-3.
☑       b. Inspect single-pass fillet welds ≤ 5/16".       Periodic       SI       Table 1705A.2.1 Item 5a.5; AISC 360-16 (AISC 341-16 as DSA IR 17-3.         Test or Special Inspection       Type       Performed By       Code References and Notes         S/A6. NONDESTRUCTIVE TESTING:       Type       Performed By       Code References and Notes         ✓       a. Ultrasonic       Test       LOR       1705A.2.1, 1705A.2.5; AISC 341-16 J6.2, AISC 360-10 D1.1, AWS D1.8; DSA IR 17-2.		S/A5. FIELD WELDING (IN ADDITION TO SECTION S/A3):	1	1	<u>'                                    </u>
☑       b. Inspect single-pass fillet welds ≤ 5/16".       Periodic       SI       Table 1705A.2.1 Item 5a.5; AISC 360-16 (AISC 341-16 as DSA IR 17-3.         Test or Special Inspection       Type       Performed By       Code References and Notes         S/A6. NONDESTRUCTIVE TESTING:       Type       Performed By       Code References and Notes         ✓       a. Ultrasonic       Test       LOR       1705A.2.1, 1705A.2.5; AISC 341-16 J6.2, AISC 360-10 D1.1, AWS D1.8; DSA IR 17-2.		Test or Special Inspection	Туре	Performed By	Code References and Notes
Test or Special Inspection  S/A6. NONDESTRUCTIVE TESTING:  Test or Special Inspection  Type Performed By Code References and Notes  Test or Special Inspection  Type Performed By Code References and Notes  LOR 1705A.2.1, 1705A.2.5; AISC 341-16 J6.2, AISC 360-1 D1.1, AWS D1.8; DSA IR 17-2.	<b>V</b>			ļ ,	<b>Table 1705A.2.1 Item 5a.5</b> ; AISC 360-16 (AISC 341-16 as applica
S/A6. NONDESTRUCTIVE TESTING:  Test or Special Inspection  Type Performed By Code References and Notes  a. Ultrasonic  Test LOR  1705A.2.1, 1705A.2.5; AISC 341-16 J6.2, AISC 360-1 D1.1, AWS D1.8; DSA IR 17-2.		Test or Special Inspection	Type	Performed By	
Test or Special Inspection  Type Performed By Code References and Notes  Test LOR 1705A.2.1, 1705A.2.5; AISC 341-16 J6.2, AISC 360-1 D1.1, AWS D1.8; DSA IR 17-2.		• •	- 75~		
☑ a. Ultrasonic			Type	Performed Rv	Code References and Notes
	<b>7</b>	•			<b>1705A.2.1, 1705A.2.5</b> ; AISC 341-16 J6.2, AISC 360-16 N5.5;
b. Magnetic Particle Test LOR 1705A.2.1, 1705A.2.5; AISC 341-16 J6.2, AISC 360-1	<b>V</b>	b. Magnetic Particle	Test	LOR	<b>1705A.2.1</b> , <b>1705A.2.5</b> ; AISC 341-16 J6.2, AISC 360-16 N5.5;

1. Structural Testing and Inspection: Laboratory Verified Report Form DSA 291

2. Concrete Batch Plant Inspection: Laboratory Verified Report Form DSA 291

Post-installed Anchors: Laboratory Verified Report Form DSA 291, or, for independently contracting SI, Special Inspection Verified Report Form DSA

Shop Welding Inspection: Laboratory Verified Report Form DSA 291, or, for independently contracting SI, Special Inspection Verified Report Form

Field Welding Inspection: Laboratory Verified Report Form DSA 291, or, for independently contracting SI, Special Inspection Verified Report Form DSA

THE EXAMPLE OF FORM DSA-103s SHOWN ON THIS SHEET ARE FOR ILLUSTRATION PURPOSE ONLY. A FORM DSA-103 IS TO BE COMPLETED FOR EACH APPLICATION THAT THIS PC BEING INCORPORATED INTO AND EXAMPLE FORM DSA-103s ARE TO BE CROSSED OUT ON THIS DRAWING.

IF THERE IS A GEOTECHNICAL REPORT, THE GEOTECH ENGINEER SHOULD DO THE INSPECTION INSTEAD OF PROJECT INSPECTOR (PI).

DSA-103 PLYWOOD FLOOR (CONCRETE FOUNDATION)

DSA 103-22: LISTING OF STRUCTURAL TESTS & SPECIAL INSPECTIONS, 2022 CBC School Name: **Application Number:** School District:

**DSA File Number: Increment Number:** Date Created: 2023-05-16 14:19:31

#### 2022 CBC

**IMPORTANT**: This form is only a summary list of structural tests and some of the special inspections required for the project. Generally, the structural tests and special inspections noted on this form are those that will be performed by the Geotechnical Engineer of Record, Laboratory of Record, or Special Inspector. The actual complete test and inspection program must be performed as detailed on the DSA approved documents. The appendix at the bottom of this form identifies work NOT/subject to DSA requirements for special inspection or structural testing. The project inspector is responsible for providing inspection of all facets of construction, including but not limited to, special inspections not listed on this form such as structural wood framing, bigh-load wood diaphragms, cold-formed steel framing, anchorage of non-structural components, etc., per Title 24, Part 2, Chapter 17A (2022 CBC).

\*\*NOTE: Undefined section and table references found in this document are from the CBC, or California Building Code.

		O COLUMNS  1. TYPE		1/3	. PERFORMED BY		
		I. ITPE					
		Intinuous – Indicates that a continuous special inspection is quired			<b>GE</b> (Geotechnical Engineer) – Indicates that the special inspection shall be performed by a registered geotechnical engineer or his or her authorized representative.  LOR (Laboratory of Record) – Indicates that the test or special inspection shall be performed by a registered geotechnical engineer or his or her authorized representative.		
					rmed by a testing laboratory accepted in the DSA Laboratory Evaluati eptance (LEA) Program. See CAC Section 4-335.		
Pe	erio	odic – Indicates that a periodic special inspection is required		and Acce	eptance (LLA) Program. See CAC Section 4-555.		
	00	maicates trace periodic special inspection is required		by a proj			
1_				inspecto	r when specifically approved by DSA.		
16	est -	- Indicates that a test is required			ial Inspection) – Indicates that the special inspection shall be perforn propriately qualified/approved special inspector.		
		S/A1. STRUCTURAL STEEL, COLD-FORMED STEEL AND AI	LUMINUM USE	D FOR STRUCTU	RAL PURPOSES		
		Test or Special Inspection	Туре	Performed By	Code References and Notes		
V	<b>7</b>	<ul><li>a. Verify identification of all materials and:</li><li>Mill certificates indicate material properties that comply</li></ul>	Periodic	*	Table 1705A.2.1 Item 3a 3c. 2202A.1; AISI S100-20 Section A3.1 8		
		<ul> <li>with requirements.</li> <li>Material sizes, types and grades comply with requirements.</li> </ul>			A3.2, AISI S240-20 Section A3 & A5, AISI S220-20 Sections A4 & A6. * special inspector or qualified technician when performed off-site.		
V	<b>7</b>	b. Test unidentified materials	Test	LOR	2202A.1.		
V	<b>V</b>	c. Examine seam welds of HSS shapes	Periodic	SI	DSA IR 17-3.		
✓	7	d. Verify and document steel fabrication per DSA- approved construction documents.	Periodic	SI	Not applicable to cold-formed steel light-frame construction, exceptor trusses (1705A.2.4).		
		S/A3. WELDING:					
		Test or Special Inspection	Туре	Performed By	Code References and Notes		
<b>V</b>		A. Verify weld filler material identification markings per AWS designation listed on the DSA-approved documents and the WPS.	Periodic	SI	1705A.2.5, Table 1705A.2.1 Items 4 & 5; AWS D1.1 and AWS D1.8 structural steel; AWS D1.2 for Aluminum; AWS D1.3 for cold-formed steel; AWS D1.4 for reinforcing steel; DSA IR 17-3.		
	7	<b>b.</b> Verify weld filler material manufacturer's certificate of compliance.	Periodic	SI	DSA IR 17-3.		
	7	c. Verify WPS, welder qualifications and equipment.	Periodic	SI	DSA IR 17-3.		
		S/A4. SHOP WELDING (IN ADDITION TO SECTION S/A3):		1			
	A	Test or Special Inspection	Туре	Performed By	Code References and Notes		
V		a.\nspect groove welds, multi-pass fillet welds, single pass fillet welds > 5/16", plug and slot welds.	Continuous	SI	<b>Table 1705A.2.1 Items 5a.1 4</b> ; AISC 360-16 (and AISC 341-16 as applicable); DSA IR 17-3.		
V	<b>7</b>	b. Inspect single-pass fillet welds ≤ 5/16", floor and roof deck welds.	Periodic	SI	<b>1705A.2.2, Table 1705A.2.1 Items 5a.5 &amp; 5a.6</b> ; AISC 360-16 (and AISC 341-16 as applicable); DSA IR 17-3.		
·	<b>7</b>	c. Inspect welding of stairs and railing systems.	Periodic	SI	<b>1705A.2.1</b> ; AISC 360-16 (and AISC 341-16 as applicable); AWS D1.1 D1.3; DSA IR 17-3.		
	T	Test or Special Inspection	Туре	Performed By	Code References and Notes		
		S/A5. FIELD WELDING (IN ADDITION TO SECTION S/A3):		•			
	+	Test or Special Inspection	Туре	Performed By	Code References and Notes		
		<b>a.</b> Inspect groove welds, multi-pass fillet welds, single pass fillet welds > 5/16", plug and slot welds.	Continuous	SI	<b>Table 1705A.2.1 Items 5a.1 4</b> ; AISC 360-16 (AISC 341-16 as applicable); DSA IR 17-3.		
✓	7	b. Inspect single-pass fillet welds ≤ 5/16".	Periodic	SI	<b>Table 1705A.2.1 Item 5a.5</b> ; AISC 360-16 (AISC 341-16 as applicable DSA IR 17-3.		
		Test or Special Inspection	Туре	Performed By	Code References and Notes		
		S/A6. NONDESTRUCTIVE TESTING:					
		Test or Special Inspection	Туре	Performed By	Code References and Notes		
<u> </u>	7	a. Ultrasonic	Test	LOR	<b>1705A.2.1, 1705A.2.5</b> ; AISC 341-16 J6.2, AISC 360-16 N5.5; A		
			1.53.		D1.1, AWS D1.8; DSA IR 17-2.		
✓	7	b. Magnetic Particle	Test	LOR	<b>1705A.2.1, 1705A.2.5</b> ; AISC 341-16 J6.2, AISC 360-16 N5.5; AD1.1, AWS D1.8; DSA IR 17-2.		
1							

1. Structural Testing and Inspection: Laboratory Verified Report Form DSA 291

Shop Welding Inspection: Laboratory Verified Report Form DSA 291, or, for independently contracting SI, Special Inspection Verified Report Form

Field Welding Inspection: Laboratory Verified Report Form DSA 291, or, for independently contracting SI, Special Inspection Verified Report Form DSA

THE EXAMPLE OF FORM DSA-103s SHOWN ON THIS SHEET ARE FOR ILLUSTRATION PURPOSE ONLY. A FORM DSA-103 IS TO BE COMPLETED FOR EACH APPLICATION THAT THIS PC BEING INCORPORATED INTO AND EXAMPLE FORM DSA-103s ARE TO BE CROSSED OUT ON THIS DRAWING.

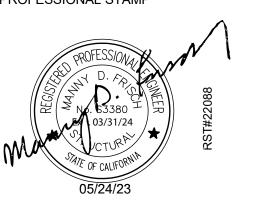
DSA-103 PLYWOOD FLOOR (WOOD FOUNDATION)

PROJECT SPECIFIC STATE AGENCY APPROVAL IDENTIFICATION STAMP

DIV. OF THE STATE ARCHITECT APP. 04-122805 INC: REVIEWED FOR SS 🗸 FLS 🗸 ACS 🗸 DATE: 09/28/2023



PROFESSIONAL STAMP



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ORIGINAL PC STATE AGENCY APPROVAL



Revision Schedule

Description

PRE-CHECK (PC) DOCUMENT

A separate project application for construction is required

PC 2022 CBC: 24' x 40' EXPANDABLE TO 120' x 40'

DSA-103 T&I **PLYWOOD FLOORS** 

PROJECT NUMBER



## UL U419 OR UL U465 (OR EQ) TO BE USED FOR INT. STC RATING. WOOD STUD MAY BE USED ILO OF MTL STUD

4 <sup>7</sup> / <sub>8</sub> "	UL U419 or MEA 81- 98-M Steel Stud (Non-loadbearing) Interior Partitions Sound Test: RAL-TL11-125	Fire Rating 1 hr.	40	Thickness (in.) 4-7/8"	<ul> <li>Gypsum Board - 5/8 in. thick gypsum board applied vertically or horizontally SHEETROCK Brand FIRECODE Core (Type X)</li> <li>Steel Studs - 3-5/8 in. wide min. 25 gauge steel studs @ max 24 in. OC - 362S125-18</li> <li>Gypsum Board - 5/8 in. thick gypsum board applied vertically or horizontally SHEETROCK Brand FIRECODE Core (Type X)</li> <li>Visit U419 ☑</li> </ul>
47/8"	UL U465 Steel Stud (Non-loadbearing) Interior Partitions Sound Test: RAL-TL11-125	Fire Rating 1 hr.	sтс 40	Thickness (in.) 4-7/8"	<ul> <li>Gypsum Board - 5/8 in. thick board, applied vertically, attached to studs with 1 in. long, Type S -12 screws, spaced 8 in. OC along the edges and 12 in. OC of the board - SHEETROCK Brand FIRECODE Core (Type X)</li> <li>Steel Studs - 3-5/8 in. wide min. 25 gauge steel. Attached to floor and ceiling with fasteners, 24 in. OC - 362S125-18</li> <li>Gypsum Board - 5/8 in. thick gypsum board applied vertically or horizontally SHEETROCK Brand FIRECODE Core (Type X)</li> <li>Visit U465 🗷</li> </ul>
UL U457 (OR EQ) TO	O BE USED FOR EXT.	STC RA	TING .	WOOD :	STUD MAY BE USED ILO OF MTL STUD
4¾4" 00000000000000000000000000000000000	UL U457 Steel Stud (Non-loadbearing) Interior Partitions Sound Test: USG-840222	Fire Rating 1 hr.	50 50	Thickness (in.) 4-3/4"	<ul> <li>Cement Board - 1/2 thick board, square edge - DUROCK Brand Cement Board Next Gen</li> <li>Steel Studs - 3-5/8 in. wide by 1-1/4 in. deep, min. 20 gauge steel, max 16 in. OC - 362S125-30</li> <li>Batts and Blankets - 3 in. mineral wool batt insulation</li> <li>Gypsum Board - 5/8 in. thick gypsum board applied vertically - SHEETROCK Brand FIRECODE Core (Type X)</li> <li>Visit U457 2 U457 2</li> </ul>

ACOUSTIC CONTROL- When the Pre-check building is site adapted, the building and site features need to comply with the CALGreen Code, Section 5.507.4 for the specific site location, and when PC building is place adjacent to another PC building, the adjoining wall section for interior sound transmission must meet the minimum requirement of a STC rating of 40 (per 2022 CALGreen Code, Section 507.4.3).

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
APP. 04-122805 INC:
REVIEWED FOR
SS D FLS D ACS D
DATE: 09/28/2023



PROFESSIONAL STAMP



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ORIGINAL PC STATE AGENCY APPROVAL



Revision Schedule

PRE-CHECK (PC) DOCUMENT

RE-CHECK (PC) DOCUMENT

Code: 2022 CBC

arate project application for constr

PROJECT TITLE
PC 2022 CBC: 24' x 40'
EXPANDABLE TO
120' x 40'

SHEET TITLE
CALGREEN SPEC'S

PROJECT NUMBER

22088

rMc/SC
CHECKED BY

DATE

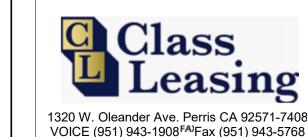
A0.5

OF

PROJECT SPECIFIC STATE AGENCY APPROVAL



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ORIGINAL PC STATE AGENCY APPROVAL

DIV. OF THE STATE ARCHITEC

Revision Schedule

Description

PRE-CHECK (PC) DOCUMENT Code: 2022 CBC

A separate project application for construction is required

PC 2022 CBC: 24' x 40' **EXPANDABLE TO** 

CAL GREEN

CHECKLIST

PROJECT NUMBER

22088

rMc/SC

CHECKED BY RH/RT

**CHAPTER 3 GREEN BUILDING SECTION 301 GENERAL** 

the Lahontan Regional Water Quality Control Board (for projects in the Lake Tahoe Hydrologic Unit). 301.3 NONRESIDENTIAL ADDITIONS AND ALTERATIONS. [BSC-CG] The provisions of individual sections of Chapter 5 apply to newly constructed buildings, building additions of 1,000 square feet or greater, and/or building alterations with a permit valuation of \$200,000 or above (for occupancies within the authority of California Building Standards Commission). Code sections relevant to additions and alterations shall only apply to the portions of the building being added or altered within the scope of the

A code section will be designated by a banner to indicate where the code section only applies to newly constructed buildings [N] or to additions and/or alterations [A]. When the code section applies to both, no

301.3.1 Nonresidential additions and alterations that cause updates to plumbing fixtures only:

**301.1 SCOPE.** Buildings shall be designed to include the green building measures specified as mandatory in

but are not required unless adopted by a city, county, or city and county as specified in Section 101.7.

the application checklists contained in this code. Voluntary green building measures are also included in the

application checklists and may be included in the design and construction of structures covered by this code,

Note: On and after January 1, 2014, certain commercial real property, as defined in Civil Code Section 1101.3, shall have its noncompliant plumbing fixtures replaced with appropriate water-conserving plumbing fixtures under specific circumstances. See Civil Code Section 1101.1 et seg. for definitions, types of commercial real property affected, effective dates, circumstances necessitating replacement of noncompliant plumbing fixtures, and duties and responsibilities for

301.3.2 Waste Diversion. The requirements of Section 5.408 shall be required for additions and alterations whenever a permit is required for work.

301.4 PUBLIC SCHOOLS AND COMMUNITY COLLEGES. (see GBSC) 301.5 HEALTH FACILITIES. (see GBSC)

**SECTION 302 MIXED OCCUPANCY BUILDINGS** 

**302.1 MIXED OCCUPANCY BUILDINGS.** In mixed occupancy buildings, each portion of a building shall comply with the specific green building measures applicable to each specific occupancy.

**SECTION 303 PHASED PROJECTS** 

303.1 PHASED PROJECTS. For shell buildings and others constructed for future tenant improvements only those code measures relevant to the building components and systems considered to be new construction (or newly constructed) shall apply.

**303.1.1 Initial Tenant improvements.** The provisions of this code shall apply only to the initial tenant improvements to a project. Subsequent tenant improvements shall comply with the scoping provisions in

ABBREVIATION DEFINITIONS:

Department of Housing and Community Development California Building Standards Commission Division of the State Architect, Structural Safety OSHPD Office of Statewide Health Planning and Development Low Rise

Section 301.3 non-residential additions and alterations.

High Rise Additions and Alterations

CHAPTER 5 NONRESIDENTIAL MANDATORY MEASURES

DIVISION 5.1 PLANNING AND DESIGN

**SECTION 5.101 GENERAL** 

The provisions of this chapter outline planning, design and development methods that include environmentally responsible site selection, building design, building siting and development to protect, restore and enhance the environmental quality of the site and respect the integrity of adjacent properties.

**SECTION 5.102 DEFINITIONS** 

5.102.1 DEFINITIONS The following terms are defined in Chapter 2 (and are included here for reference)

CUTOFF LUMINAIRES. Luminaires whose light distribution is such that the candela per 1000 lamp lumens does not numerically exceed 25 (2.5 percent) at an angle of 90 degrees above nadir, and 100 (10 percent) at a vertical angle of 80 degrees above nadir. This applies to all lateral angles around the luminaire.

LOW-EMITTING AND FUEL EFFICIENT VEHICLES.

Eligible vehicles are limited to the following: 1. Zero emission vehicle (ZEV), enhanced advanced technology PZEV (enhanced AT ZEV) or transitional zero emission vehicles (TZEV) regulated under CCR, Title 13, Section 1962. 2. High-efficiency vehicles, regulated by U.S. EPA, bearing a fuel economy and greenhouse gas rating od 9 oe

0 as regulated under 40 CFR Section 600 Subpart D. NEIGHBORHOOD ELECTRIC VEHICLE (NEV). A motor vehicle that meets the definition of "low-speed vehicle" either in Section 385.5 of the Vehicle Code or in 49CFR571.500 (as it existed on July 1, 2000), and is certified to

TENANT-OCCUPANTS. Building occupants who inhabit a building during its normal hours of operation as permanent occupants, such as employees, as distinguished from customers and other transient visitors.

VANPOOL VEHICLE. Eligible vehicles are limited to any motor vehicle, other than a motortruck or truck tractor, designed for carrying more than 10 but not more than 15 persons including the driver, which is maintained and used primarily for the nonprofit work-related transportation of adults for the purpose of ridesharing.

**Note:** Source: Vehicle Code, Division 1, Section 668

**ZEV.** Any vehicle certified to zero-emission standards.

SECTION 5.106 SITE DEVELOPMENT

5.106.1 STORM WATER POLLUTION PREVENTION FOR PROJECTS THAT DISTURB LESS THAN ONE ACRE **OF LAND.** Newly constructed projects and additions which disturb less than one acre of land, and are not part of a larger common plan of development or sale, shall prevent the pollution of storm water runoff from the construction

activities through one or more of the following measures: **5.106.1.1 Local ordinance**. Comply with a lawfully enacted storm water management and/or erosion control

**5.106.1.2 Best Management Practices (BMPs).** Prevent the loss of soil through wind or water erosion by implementing an effective combination of erosion and sediment control and good housekeeping BMPs.

 Soil loss BMPs that should be considered for implementation as appropriate for each project include, but are not limited to, the following:

 a. Scheduling construction activity during dry weather, when possible. b. Preservation of natural features, vegetation, soil, and buffers around surface waters. c. Drainage swales or lined ditches to control stormwater flow.

 Erosion control to protect slopes Protection of storm drain inlets (gravel bags or catch basin inserts). g. Perimeter sediment control (perimeter silt fence, fiber rolls).

d. Mulching or hydroseeding to stabilize disturbed soils.

Sediment trap or sediment basin to retain sediment on site. Stabilized construction exits. Wind erosion control.

k. Other soil loss BMPs acceptable to the enforcing agency. 2. Good housekeeping BMPs to manage construction equipment, materials, non-stormwater discharges and wastes that should be considered for implementation as appropriate for each project include, but

are not limited to, the following: Dewatering activities. b. Material handling and waste management.

c. Building materials stockpile management.

d. Management of washout areas (concrete, paints, stucco, etc.). e. Control of vehicle/equipment fueling to contractor's staging area. f. Vehicle and equipment cleaning performed off site. Spill prevention and control.

h. Other housekeeping BMPs acceptable to the enforcing agency.

5.106.2 STORMWATER POLLUTION PREVENTION FOR PROJECTS THAT DISTURB ONE OR MORE ACRES OF LAND. Comply with all lawfully enacted stormwater discharge regulations for projects that (1) disturb one acre or more of land, or (2) disturb less than one acre of land but are part of a larger common plan of development sale.

Note: Projects that (1) disturb one acre or more of land, or (2) disturb less than one acre of land but are part of the larger common plan of development or sale must comply with the post-construction requirements detailed in the applicable National Pollutant Discharge Elimination System (NPDES) General permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities issued by the State Water Resources Control Board or

The NPDES permits require postconstruction runoff (post-project hydrology) to match the preconstruction runoff (pre-project hydrology) with the installation of postconstruction stormwater management measures. The NPDES permits emphasize runoff reduction through on-site stormwater use, interception, evapotranspiration, and infiltration through nonstructural controls, such as Low Impact Development (LID) practices, and conversation design measures. Stormwater volume that cannot be addressed using nonstructural practices is required to be captured in structural practices and be approved by the enforcing agency.

Refer to the current applicable permits on the State Water Resources Control Board website at: www.waterboards.ca.gov/constructionstormwater. Consideration to the stormwater runoff management measures should be given during the initial design process for appropriate integration into site development.

**5.106.4 BICYCLE PARKING.** For buildings within the authority of California Building Standards Commission as specified in Section 103, comply with Section 5.106.4.1. For buildings within the authority of the Division of the State Architect pursuant to Section 105, comply with Section 5.106.4.2

**5.106.4.1 Bicycle parking. [BSC-CG]** Comply with Sections 5.106.4.1.1 and 5.106.4.1.2; or meet the applicable local ordinance, whichever is stricter.

**5.106.4.1.1 Short-term bicycle parking.** If the new project or an addition or alteration is anticipated to generate visitor traffic, provide permanently anchored bicycle racks within 200 feet of the visitors' entrance, readily visible to passers-by, for 5% of new visitor motorized vehicle parking spaces being

added with a minimum of one two-bike capacity rack. **Exception:** Additions or alterations which add nine or less visitor vehicular parking spaces.

**5.106.4.1.2 Long-term bicycle parking.** For new buildings with tenant spaces that have 10 or more tenant-occupants, provide secure bicycle parking for 5 percent of the tenant-occupant vehicular parking spaces with a minimum of one bicycle parking facility.

**5.106.4.1.3** For additions or alterations that add 10 or more tenant-occupant vehicular parking spaces, provide secure bicycle parking for 5 percent of the tenant vehicular parking spaces being added, with a minimum of one bicycle parking facility.

5.106.4.1.4 For new shell buildings in phased projects provide secure bicycle parking for 5 percent of the anticipated tenant-occupant vehicular parking spaces with a minimum of one bicycle parking facility.

5.106.4.1.5 Acceptable bicycle parking facility for Sections 5.106.4.1.2, 5.106.4.1.3, and 5.106.4.1.4 shall be convenient from the street and shall meet one of the following:

 Covered, lockable enclosures with permanently anchored racks for bicycles; 2. Lockable bicycle rooms with permanently anchored racks; or Lockable, permanently anchored bicycle lockers.

Note: Additional information on recommended bicycle accommodations may be obtained from Sacramento Area Bicycle Advocates

**5.106.4.2.1 Student bicycle parking.** Provide permanently anchored bicycle racks conveniently accessed with a minimum of four two-bike capacity racks per new building. 5.106.4.2.2 Staff bicycle parking. Provide permanent, secure bicycle parking conveniently accessed with a minimum of two staff bicycle parking spaces per new building. Acceptable bicycle parking facilities shall be convenient from the street or staff parking area and shall meet one of the following:

 Covered, lockable enclosures with permanently anchored racks for bicycles; 2. Lockable bicycle rooms with permanently anchored racks; or Lockable, permanently anchored bicycle lockers.

**5.106.4.2 Bicycle parking. [DSA-SS]** For public schools and community colleges, comply with Sections

5.106.4.2.1 and 5.106.4.2.2

**5.106.5.3 Electric vehicle (EV) charging.** [N] Construction to provide electric vehicle infrastructure and facilitate electric vehicle charging shall comply with Section 5.106.5.3.1 and shall be provided in accordance with regulations in the California Building Code and the California Electrical Code

1. On a case-by-case basis where the local enforcing agency has determined compliance with

this section is not feasible based upon one of the following conditions: a. Where there is no local utility power supply b. Where the local utility is unable to supply adequate power.

c. Where there is evidence suitable to the local enforcement agency substantiating the local utility infrastructure design requirements, directly related to the implementation of Section 5.106.5.3, may adversely impact the construction cost of the project. 2. Parking spaces accessible only by automated mechanical car parking systems are not

required to comply with this code section

[N] EV capable spaces shall be provided in accordance with Table 5.106.5.3.1 and the following 1. Raceways complying with the California Electrical Code and no less that 1-inch (25 mm) diameter shall be provided and shall originate at a service panel or a subpanel(s) serving the area, and shall terminate in close proximity to the proposed location of the EV capable

and into a suitable listed cabinet, box,enclosure or equivalent. A common raceway may be used to serve multiple EV charging spaces. 2. A service panel or subpanel (s) shall be provided with panel space and electrical load

capacity for a dedicated 208/240 volt, 40-ampere minimum branch circuit for each EV capable space, with delivery of 30-ampere minimum to an installed EVSE at each EVCS. 3. The electrical system and any on-site distribution transformers shall have sufficient capacity to supply full rated amperage at each EV capable space.

4. The service panel or subpanel circuit directory shall identify the reserved overcurrent protective devices space(s) as "EV CAPABLE". The raceway termination location shall be permanently and visibly marked as "EV CAPABLE."

Note: A parking space served by electric vehicle supply equipment or designed as a future EV charging space shall count as at least one standard automobile parking space only for the purpose of complying with any applicable minimum parking space requirements established by an enforcement agency. See vehicle Code Section 22511.2 for further details.

TABLE 5.106.5.3.1		
TOTAL NUMBER OF ACTUAL PARKING SPACES	NUMBER OF REQUIRED EV CAPABLE SPACES	NUMBER OF EVCS (EV CAPABLE SPACES PROVIDED WITH EVSE)^2
0-9	0	0
10-25	2	0
26-50	8	2
51-75	13	3
76-100	17	4
101-150	25	6
151-200	35	9
201 AND OVER	20% of total <sup>1</sup>	25% of EV capable spaces <sup>1</sup>

 Where there is insufficient electrical supply. 2. The number of required EVCS (EV capable spaces provided with EVSE) in column 3 count towards

5.106.5.3.2 Electric vehicle charging stations (EVCS)

the total number of required EV capable spaces shown in column 2.

EV capable spaces shall be provided with EVSE to create EVCS in the number indicated in Table 5.106.5.3.1. The EVCS required by Table 5.106.5.3.1 may be provided with EVSE in any combination of Level 2 and Direct Current Fast Charging (DCFC), except that at least one Level 2 EVSE shall be

One EV charger with multiple connectors capable of charging multiple EVs simultaneously shall be permitted if the electrical load capacity required by Section 5.106.5.3.1 for each EV capable space is

The installation of each DCFC EVSE shall be permitted to reduce the minimum number of required EV capable spaces without EVSE by five and reduce proportionally the required electrical load capacity to the

5.106.5.3.3 Use of automatic load management systems (ALMS). ALMS shall be permitted for EVCS. When ALMS is installed, the required electrical load capacity

5.106.5.3.1 for each EVCS may be reduced when serviced by an EVSE controlled by an ALMS. Each EVSE controlled by an ALMS shall deliver a minimum 30 amperes to an EV when charging one vehicle and shall deliver a minimum 3.3 kW while simultaneously charging multiple EVs.

5.106.5.3.4 Accessible EVCS. When EVSE is installed, accessible EVSC shall be provided in accordance with the California Building Code, Chapter 11B, Section 11B-228.3.

Note: For EVCS signs, refer to Caltrans Traffic Operations Policy Directive 13-01 (Zero Emission Vehicle Signs and Pavement Markings) or its successor(s). 5.106.5.4 Electric Vehicle (EV) charging: medium-duty and heavy-duty. [N]

Construction shall comply with section 5.106.5.4.1 to facilitate future installation of electric vehicle supply equipment (EVSE). Construction for warehouses, grocery stores and retail stores with planned off-street loading spaces shall also comply with Section 5.106.5.4.1 for future installation of medium- and heavy-duty EVSE.

1. On a case-by-case basis where the local enforcing agency has determined compliance with this section is not feasible based upon one of the following conditions:

a. Where there is no local utility power supply.

b. Where the local utility is unable to supply adequate power. c. Where there is evidence suitable to the local enforcing agency substantiating that additional local utility infrastructure design requirements, directly related to the implementation of Section 5.106.5.3, may adversely impact the construction cost of the project. When EVSE(s) is/are installed, it shall be in accordance with the California Building Code, the California Electrical Code and as follows:

5.106.5.4.1 Electric vehicle charging readiness requirements for warehouse, grocery stores and retail stores

with planned off-street loading spaces. [N] In order to avoid future demolition when adding EV charging supply and distribution equipment, spare raceways(s) or busway(s) and adequate capacity for transformers(s), service panels(s) or subpanel(s) shall be installed at the time of construction in accordance with the California Electrical Code. Construction plans and specifications shall include but are not limited to, the following:

1. The transformer, main service equipment and subpanel shall meet the minimum power requirement in Table 5.106.5.4.1 to accommodate the dedicated branch circuits for the future

2. The construction documents shall indicate on or more location(s) convenient to the planned offstreet loading space(s) reserved for medium-and heavy-duty ŽEV charging cabinets and charging dispensers, and a pathway reserved for routing of conduit from the termination of the raceway(s) or busway(s) to the charging cabinet(s) and dispenser(s) as shown in Table

3. Raceway(s) or busway(s) originating at a main service panel or a subpanel(s) serving the area where potential future medium-and heavy-duty EVSE will be located and shall terminate in close proximity to the potential future location of the charging equipments for medium- and heavy-duty

4. The raceway(s) or busway(s) shall be sufficient size to carry the minimum additional system load to the future location of the charging for medium- and heavy-duty ZEVs as shown in Table

TABLE 5.106.5.4.1 RACEWAY CONDUIT AND PANEL POWER REQUIREMENTS FOR MEDIUM- AND HEAVY-DUTY EVSE IN

		_	
BUILDING TYPE	BUILDING SIZE (SQ. FT.)	NUMBER OF OFF-STREET LOADING SPACES	ADDITIONAL CAPACITY REQUIRED (KVA) FOR RACEWAY & BUSWAY AND TRANSFORMER & PANEL
	10,000 to 90,000	1 or 2	200
Grocery	10,000 to 90,000	3 or Greater	400
	Greater than 90,000	1 or Greater	400
	10,000 to 135,000	1 or 2	200
Retail	10,000 to 133,000	3 or Greater	400
	Greater than 135,000		400
		1 or 2	200
Warehouse	20,000 to 256,000	3 or Greater	400
	Greater than 256,000	1 or Greater	400

5.106.8 LIGHT POLLUTION REDUCTION. [N]. I Outdoor lighting systems shall be designed and installed to comply

1. The minimum requirements in the California Energy Code for Lighting Zones 0-4 as defined in Chapter 10,

3. Uplight and Glare ratings as defined in California Energy Code (shown in Tables 130.2-A and 130.2-B in

Luminaires that qualify as exceptions in Sections 130.2 (b) and 140.7 of the California Energy Code.

Building facade meeting the requirements in Table 140.7-B of the California Energy Code, Part 6.

TABLE 5.106.8 [N] MA UPLIGHT AND GLARE					
ALLOWABLE RATING	LIGHTING ZONE LZ0	LIGHTING ZONE LZ1	LIGHTING ZONE LZ2	LIGHTING ZONE LZ3	LIGHTING ZONE LZ4
MAXIMUM ALLOWABLE BACKLIGHT RATING 3					
Luminaire greater than 2 mounting heights (MH) from property line	N/A	No Limit	No Limit	No Limit	No Limit
Luminaire back hemisphere is 1-2 MH from property line	N/A	B2	В3	B4	B4
Luminaire back hemisphere is 0.5-1 MH from property line	N/A	B1	B2	В3	В3
Luminaire back hemisphere is less than 0.5 MH from property line	N/A	В0	В0	B1	B2
MAXIMUM ALLOWABLE UPLIGHT RATING (U)					
For area lighting 3	N/A	U0	U0	U0	U0
For all other outdoor					

Greater than 256,000 | 1 or Greater 400

Section 10-114 of the California Administrative Code; and

4. Allowable BUG ratings not exceeding those shown in Table 5.106.8, [N] or Comply with a local ordinance lawfully enacted pursuant to Section 101.7, whichever is more stringent.

lighting,including decorative

UPLIGHT AND GLARE (BUG) RATINGS 1,2						
ALLOWABLE RATING	LIGHTING ZONE LZ4					
MAXIMUM ALLOWABLE BACKLIGHT RATING 3						
Luminaire greater than 2 mounting heights (MH) from property line	N/A	No Limit	No Limit	No Limit	No Limit	
Luminaire back hemisphere is 1-2 MH from property line	N/A	B2	В3	B4	В4	
Luminaire back hemisphere is 0.5-1 MH from property line	N/A	B1	B2	В3	В3	
Luminaire back hemisphere is less than 0.5 MH from property line	N/A	В0	В0	B1	B2	
MAXIMUM ALLOWABLE UPLIGHT RATING (U)						
For area lighting 3	N/A	U0	U0	U0	U0	
For all other outdoor						

2. Backlight (B) ratings as defined in IES TM-15-11 (shown in Table A-1 in Chapter 8);

4. Custom lighting features as allowed by the local enforcing agency, as permitted by Section 101.8 Alternate materials, designs and methods of construction. 5. Luminaires with less than 6,200 initial luminaire lumens.

MAXIMUM ALLOWABLE G2 N/A G0 G1 GLARE RATING 5 (G) MAXIMUM ALLOWABLE N/A G0 G1 G1 G0 GLARE RATING 5 (G) MAXIMUM ALLOWABLE G0 GLARE RATING 5 (G) I. IESNA Lighting Zones 0 and 5 are not applicable; refer to Lighting Zones as defined in the California Energy Code and Chapter 10 of the Callifornia Administrative Code. 2. For property lines that abut public walkways, bikeways, plazas and parking lots, the property line may be considered to be 5 feet beyond the actual property line for purpose of determining compliance with this section. For

G1

NOT APPLICABLE

G2

RESPONSIBLE PARTY (ie: ARCHITECT, ENGINEER,

3. General lighting luminaires in areas such as outdoor parking, sales or storage lots shall meet these reduced ratings. Decorative luminaries located in these areas shall meet *U*-value limits for "all other outdoor lighting"

centerline of the public roadway or public transit corridor for the purpose of determining compliance with this

property lines that abut public roadways and public transit corridors, the property line may be considered to be the

MAXIMUM ALLOWABLE

MAXIMUM ALLOWABLE

GLARE RATING 5 (G)

GLARE RATING 5 (G)

Luminaries within 2MH of a property line shall be oriented so that the nearest property line is behind the fixture, and shall comply with the backlight rating specified in Table 5.106.8 based on the lighting zone and distance to the nearest point of that property line.

Exception: Corners. If two property lines (or two segments of the same property line) have equidistant point to the luminaire, then the luminaire may be oriented so that the intersection of the two lines (the corner) is directly behind the luminaire. The luminaire shall still use the distance to the nearest points(s) on the property lines to determine the required backlight rating.

For luminaires covered by 5.106.8.1, if a property line also exists within or extends into the front hemisphere within

5.106.8 based on the lighting zone and distance to the nearest point on the nearest property line within the front

2MH of the luminaire then the luminaire shall comply with the more stringent glare rating specified in Table

1.See also California Building Code, Chapter 12, Section 1205.6 for college campus lighting requirements for parking facilities and walkways.

2.Refer to Chapter 8 (Compliance Forms, Worksheets and Reference Material) for IES TM-15-11 Table A-1, California Energy Code Tables 130.2-A and 130.2-B. 3. Refer to the California Building Code for requirements for additions and alterations.

.106.10 GRADING AND PAVING. Construction plans shall indicate how site grading or a drainage system will

manage all surface water flows to keep water from entering buildings. Examples of methods to manage surface

water include, but are not limited to, the following:

Water collection and disposal systems. French drains.

Water retention gardens 5. Other water measures which keep surface water away from buildings and aid in groundwater recharge. **Exception:** Additions and alterations not altering the drainage path.

.106.12 SHADE TREES [DSA-SS]. Shade Trees shall be planted to comply with Sections 5.106.12.1, 5.106.12.2, and 5.106.12.3. Percentages shown shall be measured at noon on the summer solstice. Landscape irrigation necessary to establish and maintain tree health shall comply with Section 5.304.6. 5.106.12.1 Surface parking areas. Shade tree plantings, minimum #10 container size or equal, shall be installed

**Exceptions:** Surface parking area covered by solar photovoltaic shade structures with roofing materials that comply with Table A5.106.11.2.2 in Appendix A5 shall be permitted in whole or in part in lieu of shade tree planting.

**5.106.12.2 Landscape areas.** Shade tress plantings, minimum #10 container size or equal shall be installed to

**Exceptions:** Playfields for organized sport activity are not included in the total area calculation. **5.106.12.3.** Hardscape areas. Shade tree plantings, minimum #10 container size or equal shall be installed to provide shade over 20 percent of the hardscape area within 15 years.

1. Walks, hardscape areas covered by solar photovoltaic shade structures or shade structures with roofing materials that comply with Table A5.106.11.2.2 in Appendix A5 shall be permitted in whole or in part in lieu 2. Designated and marked play areas of organized sport activity are not included in the total area calculation.

SECTION 5.201 GENERAL **5.201.1 Scope [BSC-CG].** California Energy Code [DSA-SS]. For the purposes of mandatory energy efficiency standards in this code, the California Energy Commission will continue to adopt mandatory building standards.

to provide shade over 50 percent of the parking area within 15 years.

provide shade of 20% of the landscape area within 15 years.

**DIVISION 5.2 ENERGY EFFICIENCY** 

DIVISION 5.3 WATER EFFICIENCY AND CONSERVATION

and in wastewater convevance.

the amount of water that needs to be applied to the landscape.

SECTION 5.301 GENERAL

**SECTION 5.302 DEFINITIONS 5.302.1 Definitions.** The following terms are defined in Chapter 2 (and are included here for reference)

EVAPOTRANSPIRATION ADJUSTMENT FACTOR (ETAF) [DSA-SS]. An adjustment factor when applied to

reference evapotranspiration that adjusts for plant factors and irrigation efficiency, which ae two major influences on

**5.301.1 Scope.** The provisions of this chapter shall establish the means of conserving water use indoors, outdoors

FOOTPRINT AREA [DSA-SS]. The total area of the furthest exterior wall of the structure projected to natural grade, not including exterior areas such as stairs, covered walkways, patios and decks.

METERING FAUCET. A self-closing faucet that dispenses a specific volume of water for each actuation cycle. The volume or cycle duration can be fixed or adjustable. GRAYWATER. Pursuant to Health and Safety Code Section 17922.12, "graywater" means untreated wastewater that has not been contaminated by any toilet discharge, has not been affected by infectious, contaminated, or unhealthy bodily wastes, and does not present a threat from contamination by unhealthful processing, manufacturing, or operating wastes. "Graywater" includes, but is not limited to wastewater from bathtubs, showers, bathroom

washbasins, clothes washing machines and laundry tubs, but does not include waste water from kitchen sinks or

MODEL WATER EFFICIENT LANDSCAPE ORDINANCE (MWELO). The California ordinance regulating landscape design, installation and maintenance practices that will ensure commercial, multifamily and other developer installed landscapes greater than 2500 square feet meet an irrigation water budget developed based on landscaped area and

MODEL WATER EFFICIENT LANDSCAPE ORDINANCE (MWELO). [HCD] The California model ordinance

(California Code of Regulations, Title 23, Division 2, Chapter 2.7), regulating landscape design, installation and

POTABLE WATER. Water that is drinkable and meets the U.S. Environmental Protection Agency (EPA) Drinking Water Standards. See definition in the California Plumbing Code, Part 5.

POTABLE WATER. [HCD] Water that is satisfactory for drinking, culinary, and domestic purposes, and meets the

maintenance practices. Local agencies are required to adopt the updated MWELO, or adopt a local ordinance at least

U.S. Environmental Protection Agency (EPA) Drinking Water Standards and the requirements of the Health Authority **RECYCLED WATER.** Water which, as a result of treatment of waste, is suitable for a direct beneficial use or a

SUBMETER. [HCD 1] A secondary device beyond a meter that measures water consumption of an individual rental unit within a multiunit residential structure or mixed-use residential and commercial structure. (See Civic Code Section 1954.202 (g) and Water code Section 517 for additional details.)

controlled use that would not otherwise occur [Water Code Section 13050 (n)]. Simply put, recycled water is water

WATER BUDGET. Is the estimated total landscape irrigation water use which shall not exceed the maximum applied water allowance calculated in accordance with the Department of Water Resources Model Efficient Landscape

treated to remove waste matter attaining a quality that is suitable to use the water again.

DISCLAIMER: THIS DOCUMENT IS PROVIDED AND INTENDED TO BE USED AS A MEANS TO INDICATE AREAS OF COMPLIANCE WITH THE CALIFORNIA GREEN BUILDING STANDARDS (CALGREEN) CODE. DUE TO THE VARIABLES BETWEEN BUILDING DEPARTMENT JURISDICTIONS, THIS CHECKLIST IS TO BE USED ON AN INDIVIDUAL PROJECT BASIS AND MAY BE MODIFIED BY THE END USER TO MEET THOSE INDIVIDUAL NEEDS. THE END USER ASSUMES ALL RESPONSIBILITY ASSOCIATED WITH THE USE OF THIS DOCUMENT, INCLUDING VERIFICATION WITH THE FULL CODE.

**EFFICIENCY** 

**SECTION 5.401 GENERAL** 

**5.401.1 SCOPE.** The provisions of this chapter shall outline means of achieving material conservation and resource

techniques to reduce pollution through recycling of materials, and building commissioning or testing and adjusting.

efficiency through protection of buildings from exterior moisture, construction waste diversion, employment of

## California 2022 CALIFORNIA GREEN BUILDING STANDARDS CODE

NONRESIDENTIAL MANDATORY MEASURES, SHEET 2 (January 2023)

NOT APPLICABLE RESPONSIBLE PARTY (ie: ARCHITECT, ENGINEER,

**SECTION 5.303 INDOOR WATER USE 5.303.1 METERS.** Separate submeters or metering devices shall be installed for the uses described in Sections SECTION 5.402 DEFINITIONS **5.303.1.1 Buildings in excess of 50,000 square feet.** Separate submeters shall be installed as follows: **5.402.1 DEFINITIONS.** The following terms are defined in Chapter 2 (and are included here for reference) 1. For each individual leased, rented or other tenant space within the building projected to consume ADJUST. To regulate fluid flow rate and air patterns at the terminal equipment, such as to reduce fan speed or adjust more than 100 gal/day (380 L/day), including, but not limited to, spaces used for laundry or cleaners. a damper restaurant or food service, medical or dental office, laboratory, or beauty salon or barber shop. 2. Where separate submeters for individual building tenants are unfeasible, for water supplied to the BALANCE. To proportion flows within the distribution system, including sub-mains, branches and terminals, following subsystems: according to design quantities. a. Makeup water for cooling towers where flow through is greater than 500 gpm (30 L/s). b. Makeup water for evaporative coolers greater than 6 gpm (0.04 L/s). BUILDING COMMISSIONING. A systematic quality assurance process that spans the entire design and construction c. Steam and hot water boilers with energy input more than 500,000 Btu/h (147 kW). process, including verifying and documenting that building systems and components are planned, designed, installed, tested, operated and maintained to meet the owner's project requirements. **5.303.1.2 Excess consumption.** A separate submeter or metering device shall be provided for any tenant within a new building or within an addition that is projected to consume more than 1,000 gal/day. ORGANIC WASTE. Food waste, green waste, landscape and pruning wste, nonhazardous wood waste, and food soiled paper waste that is mixed in with food waste. 5.303.3 WATER CONSERVING PLUMBING FIXTURES AND FITTINGS. Plumbing fixtures (water closets and TEST. A procedure to determine quantitative performance of a system or equipment urinals) and fittings (faucets and showerheads) shall comply with the following: SECTION 5.407 WATER RESISTANCE AND MOISTURE MANAGEMENT **5.303.3.1 Water Closets.** The effective flush volume of all water closets shall not exceed 1.28 gallons per **5.407.1 WEATHER PROTECTION.** Provide a weather-resistant exterior wall and foundation envelope as required by flush. Tank-type water closets shall be certified to the performance criteria of the U.S. EPA WaterSense California Building Code Section 1402.2 (Weather Protection), manufacturer's installation instructions or local Specification for Tank-Type toilets ordinance, whichever is more stringent. Note: The effective flush volume of dual flush toilets is defined as the composite, average flush volume of **5.407.2 MOISTURE CONTROL.** Employ moisture control measures by the following methods. two reduced flushes and one full flush. **5.407.2.1 Sprinklers.** Design and maintain landscape irrigation systems to prevent spray on structures. 5.303.3.2.1 Wall-mounted Urinals. The effective flush volume of wall-mounted urinals shall not exceed 5.407.2.2 Entries and openings. Design exterior entries and/or openings subject to foot traffic or wind-driven 0.125 gallons per flush. rain to prevent water intrusion into buildings as follows: **5.303.3.2.2 Floor-mounted Urinals.** The effective flush volume of floor-mounted or other urinals shall **5.407.2.2.1 Exterior door protection.** Primary exterior entries shall be covered to prevent water not exceed 0.5 gallons per flush. intrusion by using nonabsorbent floor and wall finishes within at least 2 feet around and perpendicular to such openings plus at least one of the following: **5.303.3.3.1 Single showerhead.** Showerheads shall have a maximum flow rate of not more than 1.8 1. An installed awning at least 4 feet in depth. gallons per minute at 80 psi. Showerheads shall be certified to the performance criteria of the U.S. EPA 2. The door is protected by a roof overhang at least 4 feet in depth. WaterSense Specification for Showerheads. The door is recessed at least 4 feet. 4. Other methods which provide equivalent protection. **5.303.3.3.2 Multiple showerheads serving one shower.** When a shower is served by more than one showerhead, the combined flow rate of all the showerheads and/or other shower outlets controlled by a **5.407.2.2.2 Flashing.** Install flashings integrated with a drainage plane. single valve shall not exceed 1.8 gallons per minute at 80 psi, or the shower shall be designed to allow only one shower outlet to be in operation at a time. Note: A hand-held shower shall be considered a showerhead SECTION 5.408 CONSTRUCTION WASTE REDUCTION, DISPOSAL AND RECYCLING 5.303.3.4 Faucets and fountains. **5.408.1 CONSTRUCTION WASTE MANAGEMENT.** Recycle and/or salvage for reuse a minimum of 65% of the non-hazardous construction and demolition waste in accordance with Section 5.408.1.1, 5.408.1.2 or 5.408.1.3; or **5.303.3.4.1 Nonresidential Lavatory faucets.** Lavatory faucets shall have a maximum flow rate of not meet a local construction and demolition waste management ordinance, whichever is more stringent. more than 0.5 gallons per minute at 60 psi. 5.408.1.1 Construction waste management plan. Where a local jurisdiction does not have a construction and **5.303.3.4.2 Kitchen faucets.** Kitchen faucets shall have a maximum flow rate of not more than 1.8 demolition waste management ordinance, submit a construction waste management plan that: gallons per minute at 60 psi. Kitchen faucets may temporarily increase the flow above the maximum rate but not to exceed 2.2 gallons per minute at 60 psi, and must default to a maximum flow rate of 1.8 gallons 1. Identifies the construction and demolition waste materials to be diverted from disposal by efficient usage, recycling, reuse on the project or salvage for future use or sale. Determines if construction and demolition waste materials will be sorted on-site (source-separated) or **5.303.3.4.3 Wash fountains.** Wash fountains shall have a maximum flow rate of not more than 1.8 bulk mixed (single stream). gallons per minute/20 [rim space (inches) at 60 psi]. Identifies diversion facilities where construction and demolition waste material collected will be taken. Specifies that the amount of construction and demolition waste materials diverted shall be calculated **5.303.3.4.4 Metering faucets.** Metering faucets shall not deliver more than 0.20 gallons per cycle. by weight or volume, but not by both. **5.303.3.4.5 Metering faucets for wash fountains.** Metering faucets for wash fountains shall have a 5.408.1.2 Waste Management Company. Utilize a waste management company that can provide verifiable maximum flow rate of not more than 0.20 gallons per minute/20 [rim space (inches) at 60 psi]. documentation that the percentage of construction and demolition waste material diverted from the landfill complies with this section. Note: Where complying faucets are unavailable, aerators or other means may be used to achieve Note: The owner or contractor shall make the determination if the construction and demolition waste material 5.303.3.4.6 Pre-rinse spray value will be diverted by a waste management compar When installed, shall meet the requirements in the California Code of Regulations, Title 20 (Appliance **Exceptions to Sections 5.408.1.1 and 5.408.1.2:** Efficiency Regulations), Section 1605.1 (h)(4) Table H-2, Section 1605.3 (h)(4)(A), and Section 1607 (d)(7), and shall be equipped with an integral automatic shutoff. Excavated soil and land-clearing debris 2. Alternate waste reduction methods developed by working with local agencies if diversion or recycle FOR REFERENCE ONLY: The following table and code section have been reprinted from the California facilities capable of compliance with this item do not exist. Code of Regulations, Title 20 (Appliance Efficiency Regulations), Section 1605.1 (h)(4) and Section 3. Demolition waste meeting local ordinance or calculated in consideration of local recycling facilities TABLE H-2 **5.408.1.3 Waste stream reduction alternative.** The combined weight of new construction disposal that does not exceed two pounds per square foot of building area may be deemed to meet the 65% minimum requirement as approved by the enforcing agency. STANDARDS FOR COMMERCIAL PRE-RINSE SPRAY **5.408.1.4 Documentation.** Documentation shall be provided to the enforcing agency which demonstrates VALUES MANUFACTURED ON OR AFTER JANUARY 28, 2019 compliance with Sections 5.408.1.1, through 5.408.1.3. The waste management plan shall be updated as PRODUCT CLASS necessary and shall be accessible during construction for examination by the enforcing agency. MAXIMUM FLOW RATE (gpm) [spray force in ounce force (ozf)] Product Class 1 (≤ 5.0 ozf) Sample forms found in "A Guide to the California Green Building Standards Code (Nonresidential)" Product Class 2 (> 5.0 ozf and  $\leq$  8.0 ozf) 1.20 located www.dgs.ca.gov/BSC/Resources/Page-Content/Building-Standards-Commission-Resources-List-Folder/CALGreen may be used to assist in documenting compliance with the waste Product Class 3 (> 8.0 ozf) 1.28 management plan. 2. Mixed construction and demolition debris processors can be located at the California Department of 5.303.4 COMMERCIAL KITCHEN EQUIPMENT. Resources Recycling and Recovery (CalRecycle). **5.303.4.1 Food Waste Disposers.** Disposers shall either modulate the use of water to no more than 1 gpm **5.408.2 UNIVERSAL WASTE. [A]** Additions and alterations to a building or tenant space that meet the scoping when the disposer is not in use (not actively grinding food waste/no-load) or shall automatically shut off after no provisions in Section 301.3 for nonresidential additions and alterations, shall require verification that Universal Waste more than 10 minutes of inactivity. Disposers shall use no more than 8 gpm of water. tems such as fluorescent lamps and ballast and mercury containing thermostats as well as other California prohibited Note: This code section does not affect local jurisdiction authority to prohibit or require disposer Universal Waste materials are disposed of properly and are diverted from landfills. A list of prohibited Universal Waste materials shall be included in the construction documents. **5.303.5 AREAS OF ADDITION OR ALTERATION.** For those occupancies within the authority of the California Note: Refer to the Universal Waste Rule link at: http://www.dtsc.ca.gov/universalwaste/ Building Standards Commission as specified in Section 103, the provisions of Section 5.303.3 and 5.303.4 shall apply to new fixtures in additions or areas of alteration to the building. 5.408.3 EXCAVATED SOIL AND LAND CLEARING DEBRIS. 100 percent of trees, stumps, rocks and associated vegetation and soils resulting primarily from land clearing shall be reused or recycled. For a phased project, such 5.303.6 STANDARDS FOR PLUMBING FIXTURES AND FITTINGS. Plumbing fixtures and fittings shall be installed material may be stockpiled on site until the storage site is developed. in accordance with the California Plumbing Code, and shall meet the applicable standards referenced in Table 1701.1 of the California Plumbing Code and in Chapter 6 of this code. **Exception:** Reuse, either on or off-site, of vegetation or soil contaminated by disease or pest infestation. SECTION 5.304 OUTDOOR WATER USE **5.304.1 OUTDOOR POTABLE WATER USE IN LANDSCAPE AREAS.** Nonresidential developments shall comply with a local water efficient landscape ordinance or the current California Department of Water Resources' Model Water . If contamination by disease or pest infestation is suspected, contact the County Agricultural Efficient Landscape Ordinance (MWELO), whichever is more stringent. Commissioner and follow its direction for recycling or disposal of the material. 2. For a map of know pest and/or disease quarantine zones, consult with the California Department of Food and Agriculture. (www.cdfa.ca.gov) 1. The Model Water Efficient Landscape Ordinance (MWELO) is located in the California Code of Regulations, Title 23, Chapter 2.7, Division 2. 2. MWELO and supporting documents, including a water budget calculator, are available at: https://www.water.ca.gov/. 5.304.6 OUTDOOR POTABLE WATER USE IN LANDSCAPE AREAS. For public schools and community colleges, landscape projects as described in Sections 5.304.6.1 and 5.304.6.2 shall comply with the California Department of SECTION 5.410 BUILDING MAINTENANCE AND OPERATIONS Water Resources Model Water Efficient Landscape Ordinance (MWELO) commencing with Section 490 of Chapter **5.410.1 RECYCLING BY OCCUPANTS.** Provide readily accessible areas that serve the entire building and are 2.7, Division 2, Title 23, California Code of Regulations, except that the evapotranspiration adjustment factor (ETAF) identified for the depositing, storage and collection of non-hazardous materials for recycling, including (at a minimum) shall be 0.65 with an additional water allowance for special landscape areas (SLA) of 0.35. paper, corrugated cardboard, glass, plastics, organic waste, and metals or meet a lawfully enacted local recycling ordinance, if more restrictive. Exception: Any project with an aggregate landscape area of 2,500 square feet or less may comply with the prescriptive measures contained in Appendix D of the MWELO. **Exception**: Rural jurisdictions that meet and apply for the exemption in Public Resources Code 42649.82 (a)(2)(A) et seq. shall also be exempt from the organic waste portion of this section. **5.304.6.1 Newly constructed landscapes.** New construction projects with an aggregate landscape area equal to or greater than 500 square feet. **5.410.1.1 Additions.** All additions conducted within a 12-month period under single or multiple permits, resulting in an increase of 30% or more in floor area, shall provide recycling areas on site. **5.304.6.2 Rehabilitated landscapes.** Rehabilitated landscape projects with an aggregate landscape area equal to or greater than 1,200 square feet. **Exception**: Additions within a tenant space resulting in less than a 30% increase in the tenant space DIVISION 5.4 MATERIAL CONSERVATION AND RESOURCE

5.410.2 COMMISSIONING. [N] New buildings 10,000 square feet and over. For new buildings 10,000 square feet and over, building commissioning shall be included in the design and construction processes of the building project to verify that the building systems and components meet the owner's or owner representative's project requirements. Commissioning shall be performed in accordance with this section by trained personnel with experience on projects of omparable size and complexity. For I-occupancies that are not regulated by OSHPD or for I-occupancies and L-occupancies that are not regulated y the California Energy Code Section 100.0 Scope, all requirements in Sections 5.410.2 through 5.410.2.6 shall apply. Note: For energy-related systems under the scope (Section 100) of the California Energy Code, including heating, ventilation, air conditioning (HVAC) systems and controls, indoor lighting systems and controls, as well as water heating systems and controls, refer to California Energy Code Section 120.8 for commissioning requirements

Commissioning requirements shall include:

1. Owner's or Owner representative's project requirements. . Basis of design.

3. Commissioning measures shown in the construction documents. 4. Commissioning plan. 5. Functional performance testing

6. Documentation and training. 7. Commissioning report.

1. Unconditioned warehouses of any size.

2. Areas less than 10,000 square feet used for offices or other conditioned accessory spaces within unconditioned warehouses.

3. Tenant improvements less than 10,000 square feet as described in Section 303.1.1. 4. Open parking garages of any size, or open parking garage areas, of any size, within a structure.

Note: For the purposes of this section, unconditioned shall mean a building, area, or room which does not provide heating and or air conditioning.

#### Informational Notes

1. IAS AC 476 is an accreditation criteria for organizations providing training and/or certification of commissioning personnel. AC 476 is available to the Authority Having Jurisdiction as a reference for qualifications of commissioning personnel. AC 476 des not certify individuals to conduct functional performance tests or to adjust and balance systems.

2. Functional performance testing for heating, ventilation, air conditioning systems and lighting controls must be performed in compliance with the California Energy Code.

5.410.2.1 Owner's or Owner Representative's Project Requirements (OPR). [N] The expectations and requirements of the building appropriate to its phase shall be documented before the design phase of the

project begins. This documentation shall include the following: Environmental and sustainability goals.

2. Building sustainable goals. 3. Indoor environmental quality requirements.

4. Project program, including facility functions and hours of operation, and need for after hours

5. Equipment and systems expectations.

6. Building occupant and operation and maintenance (O&M) personnel expectations.

5.410.2.2 Basis of Design (BOD). [N] A written explanation of how the design of the building systems meets the OPR shall be completed at the design phase of the building project. The Basis of Design document shall cover the following systems:

1. Renewable energy systems.

2. Landscape irrigation systems. Water reuse system.

5.410.2.3 Commissioning plan. [N] Prior to permit issuance a commissioning plan shall be completed to document how the project will be commissioned. The commissioning plan shall include the following: 1. General project information

2. Commissioning goals. 3. Systems to be commissioned. Plans to test systems and components shall include:

 a. An explanation of the original design intent. Equipment and systems to be tested, including the extent of tests

c. Functions to be tested

d. Conditions under which the test shall be performed. e. Measurable criteria for acceptable performance.

5. Commissioning process activities, schedules and responsibilities. Plans for the completion of commissioning shall be included.

**5.410.2.4 Functional performance testing. [N]** Functional performance tests shall demonstrate the correct installation and operation of each component, system and system-to-system interface in accordance with the approved plans and specifications. Functional performance testing reports shall contain information addressing each of the building components tested, the testing methods utilized, and include any readings and adjustments

5.410.2.5 Documentation and training. [N] A Systems Manual and Systems Operations Training are required, including Occupational Safety and Health Act (OSHA) requirements in California Code of Regulations (CCR), Title 8, Section 5142, and other related regulations.

**5.410.2.5.1 Systems manual. [N]** Documentation of the operational aspects of the building shall be completed within the systems manual and delivered to the building owner or representative. The

systems manual shall include the following: 1. Site information, including facility description, history and current requirements.

Site contact information.

3. Basic operations and maintenance, including general site operating procedures, basic

troubleshooting, recommended maintenance requirements, site events log.

Maior systems. 5. Site equipment inventory and maintenance notes.

6. A copy of verifications required by the enforcing agency or this code.

7. Other resources and documentation, if applicable.

5.410.2.5.2 Systems operations training. [N] A program for training of the appropriate maintenance

staff for each equipment type and/or system shall be developed and documented in the commissioning report and shall include the following:

1. System/equipment overview (what it is, what it does and with what other systems and/or equipment it interfaces).

2. Review and demonstration of servicing/preventive maintenance.

3. Review of the information in the Systems Manual.

4. Review of the record drawings on the system/equipment.

5.410.2.6 Commissioning report. [N] A report of commissioning process activities undertaken through the design and construction phases of the building project shall be completed and provided to the owner or

5.410.4 TESTING AND ADJUSTING. New buildings less than 10,000 square feet. Testing and adjusting of systems shall be required for new buildings less than 10,000 square feet or new systems to serve an addition or alteration subject to Section 303.1.

#### 5.410.4.2 (Reserved)

Note: For energy-related systems under the scope (Section 100) of the California Energy Code, including heating, ventilation, air conditioning (HVAC) systems and controls, indoor lighting system and controls, as well as water heating systems and controls, refer to California Energy Code Section 120.8 for commissioning requirements and Sections 120.5, 120.6, 130.4, and 140.9(b)3 for additional testing requirements of specific

5.410.4.2 Systems. Develop a written plan of procedures for testing and adjusting systems. Systems to be included for testing and adjusting shall include at a minimum, as applicable to the project:

1. Renewable energy systems.

2. Landscape irrigation systems. Water reuse systems.

**5.410.4.3 Procedures.** Perform testing and adjusting procedures in accordance with manufacturer's specifications and applicable standards on each system.

**5.410.4.3.1 HVAC balancing.** In addition to testing and adjusting, before a new space-conditioning system serving a building or space is operated for normal use, the system shall be balanced in accordance with the procedures defined by the Testing Adjusting and Balancing Bureau National Standards; the National Environmental Balancing Bureau Procedural Standards; Associated Air Balance Council National Standards or as approved by the enforcing agency.

**5.410.4.4 Reporting.** After completion of testing, adjusting and balancing, provide a final report of testing signed by the individual responsible for performing these services.

**5.410.4.5 Operation and maintenance (O & M) manual.** Provide the building owner or representative with detailed operating and maintenance instructions and copies of guaranties/warranties for each system. O & M instructions shall be consistent with OSHA requirements in CCR, Title 8, Section 5142, and other related

**5.410.4.5.1 Inspections and reports.** Include a copy of all inspection verifications and reports required by the enforcing agency.

#### DIVISION 5.5 ENVIRONMENTAL QUALITY

**SECTION 5.501 GENERAL 5.501.1 SCOPE.** The provisions of this chapter shall outline means of reducing the quantity of air contaminants that

are odorous, irritating, and/or harmful to the comfort and well-being of a building's installers, occupants and neighbors. SECTION 5.502 DEFINITIONS

**5.502.1 DEFINITIONS.** The following terms are defined in Chapter 2 (and are included here for reference)

ARTERIAL HIGHWAY. A general term denoting a highway primarily for through traffic usually on a continuous route. A-WEIGHTED SOUND LEVEL (dBA). The sound pressure level in decibels as measured on a sound level meter using the internationally standardized A-weighting filter or as computed from sound spectral data to which A-weighting adjustments have been made.

1 BTU/HOUR. British thermal units per hour, also referred to as Btu. The amount of heat required to raise one pound of water one degree Fahrenheit per hour, a common measure of heat transfer rate. A ton of refrigeration is 12,000 Btu. the amount of heat required to melt a ton (2,000 pounds) of ice at 32<sup>0</sup> Fahrenheit.

COMMUNITY NOISE EQUIVALENT LEVEL (CNEL). A metric similar to the day-night average sound level (Ldn), except that a 5 decibel adjustment is added to the equivalent continuous sound exposure level for evening hours (7pm to 10pm) in addition to the 10 dB nighttime adjustment used in the Ldn.

COMPOSITE WOOD PRODUCTS. Composite wood products include hardwood plywood, particleboard and medium density fiberboard. "Composite wood products" does not include hardboard, structural plywood, structural panels, structural composite lumber, oriented strand board, glued laminated timber, timber, prefabricated wood I-joists or finger-jointed lumber, all as specified in California Code of Regulations (CCR), Title 17, Section 93120.1(a).

Note: See CCR, Title 17, Section 93120.1.

DAY-NIGHT AVERAGE SOUND LEVEL (Ldn). The A-weighted equivalent continuous sound exposure level for a 24-hour period with a 10 dB adjustment added to sound levels occurring during nighttime hours (10p.m. to 7 a.m.).

DECIBEL (db). A measure on a logarithmic scale of the magnitude of a particular quantity (such as sound pressure, sound power, sound intensity) with respect to a reference quantity.

**ELECTRIC VEHICLE (EV).** An automotive-type vehicle for on-road use, such as passenger automobiles, buses, trucks, vans, neighborhood electric vehicles, electric motorcycles, and the like, primarily powered by an electric motor that draws current from a rechargeable storage battery, fuel cell, photovoltaic array, or other source of electric current. Plug-in hybrid electric vehicles (PHEV) are considered electric vehicles. For purposes of the California Electrical Code, off-road. self-propoelled electric vehicles, such as industrial trucks, hoists, lifts, transports, golf carts, airline ground support equipment, tractors, boats, and the like, are not included.

ELECTRIC VEHICLE CHARGING STATION(S) (EVCSj). One or more spaces intended for charging electric vehicles

ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE). The conductors, including the ungrounded, grounded, and equipment grounding conductors and the electric vehicle connectors, attachment plugs, and all other fittings, devices, power outlets, or apparatus installed specifically for the purpose of transferring energy between the premises wiring and the electric vehicle.

ENERGY EQUIVALENT (NOISE) LEVEL (Leq). The level of a steady noise which would have the same energy as the fluctuating noise level integrated over the time of period of interest.

EXPRESSWAY. An arterial highway for through traffic which may have partial control of access, but which may or may not be divided or have grade separations at intersections.

**FREEWAY.** A divided arterial highway with full control of access and with grade separations at intersections.

GLOBAL WARMING POTENTIAL (GWP). The radiative forcing impact of one mass-based unit of a given greenhouse gas relative to an equivalent unit of carbon dioxide over a given period of time. Carbon dioxide is the reference compound with a GWP of one.

GLOBAL WARMING POTENTIAL VALUE (GWP VALUE). A 100-year GWP value published by the Intergovernmental Panel on Climate Change (IPCC) in either its Second Assessment Report (SAR) (IPCC, 1995); or its Fourth Assessment A-3 Report (AR4) (IPCC, 2007). The SAR GWP values are found in column "SAR (100-yr)" of Table 2.14.; the AR4 GWP values are found in column "100 yr" of Table 2.14.

HIGH-GWP REFRIGERANT. A compound used as a heat transfer fluid or gas that is: (a) a chlorofluorocarbon, a hdrochlorofluorocarbon, a hydrofluorocarbon, a perfluorocarbon, or any compound or blend of compounds, with a GWP value equal to or greater than 150, or (B) any ozone depleting substance as defined in Title 40 of the Code of

Federal Regulations, Part 82, sec.82.3 (as amended March 10, 2009). LONG RADIUS ELBOW. Pipe fitting installed between two lengths of pipe or tubing to allow a change of direction,

with a radius 1.5 times the pipe diameter.

LOW-GWP REFRIGERANT. A compound used as a heat transfer fluid or gas that: (A) has a GWP value less than 150, and (B) is not an ozone depleting substance as defined in Title 40 of the Code of Federal Regulations, Part 82, sec.82.3 (as amended March 10, 2009).

MERV. Filter minimum efficiency reporting value, based on ASHRAE 52.2–1999.

MAXIMUM INCREMENTAL REACTIVITY (MIR). The maximum change in weight of ozone formed by adding a compound to the "Base REactive Organic Gas (ROG) Mixture" per weight of compound added, expressed to hundreths of a gram (g O<sup>3</sup>/g ROC).

PRODUCT-WEIGHTED MIR (PWMIR). The sum of all weighted-MIR for all ingredients in a product subject to this article. The PWMIR is the total product reactivity expressed to hundredths of a gram of ozone formed per gram of product (excluding container and packaging).

**PSIG.** Pounds per square inch, guage.

REACTIVE ORGANIC COMPOUND (ROC). Any compound that has the potential, once emitted, to contribute to

SCHRADER ACCESS VALVES. Access fittings with a valve core installed.

SHORT RADIUS ELBOW. Pipe fitting installed between two lengths of pipe or tubing to allow a change of direction,

with a radius 1.0 times the pipe diameter. SUPERMARKET. For the purposes of Section 5.508.2, a supermarket is any retail food facility with 8,000 square feet or more conditioned area, and that utilizes either refrigerated display cases, or walk-in coolers or freezers connected

**VOC.** A volatile organic compound broadly defined as a chemical compound based on carbon chains or rings with vapor pressures greater than 0.1 millimeters of mercury at room temperature. These compounds typically contain hydrogen and may contain oxygen, nitrogen and other elements. See CCR Title 17, Section 94508(a)

Note: Where specific regulations are cited from different agencies such as SCAQMD, ARB, etc., the VOC definition included in that specific regulation is the one that prevails for the specific measure in question.

SECTION 5.503 FIREPLACES

to remote compressor units or condensing units.

5.503.1 FIREPLACES. Install only a direct-vent sealed-combustion gas or sealed wood-burning fireplace, or a sealed woodstove or pellet stove, and refer to residential requirements in the California Energy Code, Title 24, Part 6, Subchapter 7, Section 150. Woodstoves, pellet stoves and fireplaces shall comply with applicable local ordinances.

**5.503.1.1 Woodstoves.** Woodstoves and pellet stoves shall comply with U.S. EPA New Source Performance Standards (NSPS) emission limits as applicable, and shall have a permanent label indicating they are certified to meet the emission limits.

SECTION 5.504 POLLUTANT CONTROL

**5.504.1 TEMPORARY VENTILATION.** The permanent HVAC system shall only be used during construction if necessary to condition the building or areas of addition or alteration within the required temperature range for material and equipment installation. If the HVAC system is used during construction, use return air filters with a Minimum Efficiency Reporting Value (MERV) of 8, based on ASHRAE 52.2-1999, or an average efficiency of 30% based on ASHRAE 52.1-1992 Replace all filters immediately prior to occupancy, or, if the building is occupied during alteration, at the conclusion of construction.

5.504.3 Covering of duct openings and protection of mechanical equipment during construction. At the time of rough installation and during storage on the construction site until final startup of the heating, cooling and ventilation equipment, all duct and other related air distribution component openings shall be covered with tape, plastic, sheetmetal or other methods acceptable to the enforcing agency to reduce the amount of dust, water and debris which

IDENTIFICATION STAMP DIV. OF THE STATE ARCHITECT APP. 04-122805 INC: REVIEWED FOR

SS V FLS V HESTACS V

DATE: 09/28/2023

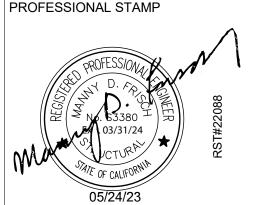
PROJECT SPECIFIC STATE AGENCY APPROVAL



DESIGN ♦ CONSULTING ♦ PROJECT MG

11590 W BERNARDO COURT, SUITE 100

SAN DIEGO, CA 92127



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ORIGINAL PC STATE AGENCY APPROVAL



Revision Schedule

Description

PRE-CHECK (PC) DOCUMENT

PC 2022 CBC: 24' x 40' **EXPANDABLE TO** 

120' x 40'

Code: 2022 CBC

A separate project application for construction is required

CAL GREEN **CHECKLIST** 

PROJECT NUMBER 22088

rMc/SC

CHECKED BY RH/RT

DATE

DISCLAIMER: THIS DOCUMENT IS PROVIDED AND INTENDED TO BE USED ON AN INDIVIDUAL PROJECT BASIS AND MAY BE MODIFIED BY THE END USER TO MEET THOSE INDIVIDUAL PROJECT BASIS AND MAY BE MODIFIED BY THE END USER ASSUMES ALL RESPONSIBILITY ASSOCIATED WITH THE USE OF THIS DOCUMENT, INCLUDING VERIFICATION WITH THE FULL CODE.

**5.410.1.2 Sample ordinance.** Space allocation for recycling areas shall comply with Chapter 18, Part 3,

Division 30 of the Public Resources Code. Chapter 18 is known as the California Solid Waste Reuse and

Note: A sample ordinance for use by local agencies may be found in Appendix A of the document at the

Recycling Access Act of 1991 (Act).

TABLE 5 504 4 3 - CONT

5.504.4 FINISH MATERIAL POLLUTANT CONTROL. Finish materials shall comply with Sections 5.504.4.1 through

**5.504.4.1 Adhesives, sealants and caulks.** Adhesives, sealants, and caulks used on the project shall meet the requirements of the following standards: 1. Adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers and caulks shall comply with local or regional air pollution control or air quality management district rules where applicable, or SCAQMD Rule 1168 VOC limits, as shown in Tables 5.504.4.1 and 5.504.4.2. Such products also shall comply with the Rule 1168 prohibition on the use of certain toxic compounds (chloroform, ethylene dichloride, methylene chloride, perchloroethylene and trichloroethylene), except for aerosol products as specified in subsection 2, below.

2. Aerosol adhesives, and smaller unit sizes of adhesives, and sealant or caulking compounds (in units of product, less packaging, which do not weigh more than one pound and do not consist of more than 16 fluid ounces) shall comply with statewide VOC standards and other requirements, including prohibitions on use of certain toxic compounds, of California Code of Regulations, Title 17, commencing

Less Water and Less Exempt Compounds in Grams per Liter					
ARCHITECTURAL APPLICATIONS	CURRENT VOC LIMIT				
INDOOR CARPET ADHESIVES	50				
CARPET PAD ADHESIVES	50				
OUTDOOR CARPET ADHESIVES	150				
WOOD FLOORING ADHESIVES	100				
RUBBER FLOOR ADHESIVES	60				
SUBFLOOR ADHESIVES	50				
CERAMIC TILE ADHESIVES	65				
VCT & ASPHALT TILE ADHESIVES	50				
DRYWALL & PANEL ADHESIVES	50				
COVE BASE ADHESIVES	50				
MULTIPURPOSE CONSTRUCTION ADHESIVES	70				
STRUCTURAL GLAZING ADHESIVES	100				
SINGLE-PLY ROOF MEMBRANE ADHESIVES	250				
OTHER ADHESIVES NOT SPECIFICALLY LISTED	50				
SPECIALTY APPLICATIONS					
PVC WELDING	510				
CPVC WELDING	490				
ABS WELDING	325				
PLASTIC CEMENT WELDING	250				
ADHESIVE PRIMER FOR PLASTIC	550				
CONTACT ADHESIVE	80				
SPECIAL PURPOSE CONTACT ADHESIVE	250				
STRUCTURAL WOOD MEMBER ADHESIVE	140				
TOP & TRIM ADHESIVE	250				
SUBSTRATE SPECIFIC APPLICATIONS					
METAL TO METAL	30				
PLASTIC FOAMS	50				
POROUS MATERIAL (EXCEPT WOOD)	50				
WOOD	30				
	+				

FIBERGLASS 1. IF AN ADHESIVE IS USED TO BOND DISSIMILAR SUBSTRATES TOGETHER, THE ADHESIVE

2. FOR ADDITIONAL INFORMATION REGARDING METHODS TO MEASURE THE VOC CONTENT SPECIFIED IN THIS TABLE, SEE SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT RULE 1168, www.arb.ca.gov/DRDB/SC/CURHTML/R1168.PDF

WITH THE HIGHEST VOC CONTENT SHALL BE ALLOWED.

TABLE 5.504.4.2 - SEALANT VOC LIMIT					
Less Water and Less Exempt Compounds in Grams per Liter					
SEALANTS	CURRENT VOC LIMIT				
ARCHITECTURAL	250				
MARINE DECK	760				
NONMEMBRANE ROOF	300				
ROADWAY	250				
SINGLE-PLY ROOF MEMBRANE	450				
OTHER	420				
SEALANT PRIMERS					
ARCHITECTURAL					
NONPOROUS	250				
POROUS	775				
MODIFIED BITUMINOUS	500				
MARINE DECK	760				
OTHER	750				

NOTE: FOR ADDITIONAL INFORMATION REGARDING METHODS TO MEASURE THE VOC CONTENT SPECIFIED IN THESE TABLES, SEE SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT RULE 1168.

**5.504.4.3 Paints and coatings.** Architectural paints and coatings shall comply with VOC limits in Table 1 of the ARB Architectural Coatings Suggested Control Measure, as shown in Table 5.504.4.3, unless more stringent local limits apply. The VOC content limit for coatings that do not meet the definitions for the specialty coatings categories listed in Table 5.504.4.3 shall be determined by classifying the coating as a Flat, Nonflat or Nonflat-High Gloss coating, based on its gloss, as defined in Subsections 4.21, 4.36 and 4.37 of the 2007 California Air Resources Board Suggested Control Measure, and the corresponding Flat, Nonflat or Nonflat-High Gloss VOC limit in Table 5.504.4.3 shall apply.

5.504.4.3.1 Aerosol Paints and coatings. Aerosol paints and coatings shall meet the PWMIR Limits for ROC in Section 94522(a)(3) and other requirements, including prohibitions on use of certain toxic compounds and ozone depleting substances, in Sections 94522(c)(2) and (d)(2) of California Code of Regulations, Title 17, commencing with Section 94520; and in areas under the jurisdiction of the Bay Area Air Quality Management District additionally comply with the percent VOC by weight of product limits of Regulation 8 Rule 49.

COATING CATEGORY	CURRENT VOC LIMIT
SPECIALTY COATINGS	
ALUMINUM ROOF COATINGS	400
BASEMENT SPECIALTY COATINGS	400
BITUMINOUS ROOF COATINGS	50
BITUMINOUS ROOF PRIMERS	350
BOND BREAKERS	350
CONCRETE CURING COMPOUNDS	350
CONCRETE/MASONRY SEALERS	100
DRIVEWAY SEALERS	50
DRY FOG COATINGS	150
FAUX FINISHING COATINGS	350
FIRE RESISTIVE COATINGS	350
FLOOR COATINGS	100
FORM-RELEASE COMPOUNDS	250
GRAPHIC ARTS COATINGS (SIGN PAINTS)	500
HIGH-TEMPERATURE COATINGS	420
INDUSTRIAL MAINTENANCE COATINGS	250
LOW SOLIDS COATINGS <sub>1</sub>	120
MAGNESITE CEMENT COATINGS	450
MASTIC TEXTURE COATINGS	100
METALLIC PIGMENTED COATINGS	500
MULTICOLOR COATINGS	250
PRETREATMENT WASH PRIMERS	420
PRIMERS, SEALERS, & UNDERCOATERS	100
REACTIVE PENETRATING SEALERS	350
RECYCLED COATINGS	250
ROOF COATINGS	50
RUST PREVENTATIVE COATINGS	250
SHELLACS:	200
CLEAR	730
OPAQUE	550
SPECIALTY PRIMERS, SEALERS & UNDERCOATERS	100
STAINS	250
STONE CONSOLIDANTS	450
SWIMMING POOL COATINGS	340
TRAFFIC MARKING COATINGS	100
TUB & TILE REFINISH COATINGS	420
WATERPROOFING MEMBRANES	250
WOOD COATINGS	275
WOOD PRESERVATIVES	350
ZINC-RICH PRIMERS	340

 GRAMS OF VOC PER LITER OF COATING, INCLUDING WATER & EXEMPT COMPOUNDS. 2. THE SPECIFIED LIMITS REMAIN IN EFFECT UNLESS REVISED LIMITS ARE LISTED IN SUBSEQUENT COLUMNS IN

3. VALUES IN THIS TABLE ARE DERIVED FROM THOSE SPECIFIED BY THE CALIFORNIA AIR RESOURCES BOARD, ARCHITECTURAL COATINGS SUGGESTED CONTROL MEASURE, FEB. 1, 2008. MORE INFORMATION IS AVAILABLE FROM THE AIR RESOURCES BOARD

5.504.4.3.2 Verification. Verification of compliance with this section shall be provided at the request of the enforcing agency. Documentation may include, but is not limited to, the following: 1. Manufacturer's product specification

5.504.4.4 Carpet Systems

All carpet installed in the building interior shall meet the requirements of the California Department of Public Health, "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers." Version 1.2, January 2017 (Emission testing method for California

See California Department of Public Health's website for certification programs and testing labs. https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/EHLB/IAQ/Pages/VOC.aspx#material

2. Field verification of on-site product containers

**5.504.4.4.1 Carpet cushion.** All carpet cushion installed in the building interior shall meet the requirements of the California Department of Public Health, "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers, "Version 1.2, January 2017 (Emission testing method for California Specifications

See California Department of Public Health's website for certification programs and testing labs. https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/EHLB/IAQ/Pages/VOC.aspx#material

5.504.4.4.2 Carpet adhesive. All carpet adhesive shall meet the requirements of Table 5.504.4.1.

**5.504.4.5 Composite wood products.** Hardwood plywood, particleboard and medium density fiberboard composite wood products used on the interior or exterior of the buildings shall meet the requirements for formaldehyde as specified in ARB's Air Toxics Control Measure (ATCM) for Composite Wood (17 CCR 93120 et seq.). Those materials not exempted under the ATCM must meet the specified emission limits, as shown in

**5.504.4.5.3 Documentation.** Verification of compliance with this section shall be provided as requested by the enforcing agency. Documentation shall include at least one of the following:

Product certifications and specifications. Chain of custody certifications.

Product labeled and invoiced as meeting the Composite Wood Products regulation (see CCR, Title 17, Section 93120, et seq.).

4. Exterior grade products marked as meeting the PS-1 or PS-2 standards of the Engineered Wood Association, the Australian AS/NZS 2269 or European 636 3S

5. Other methods acceptable to the enforcing agency.

MAXIMUM FORMALDEHYDE EMISSIONS IN PARTS PER MILLION						
PRODUCT	CURRENT LIMIT					
HARDWOOD PLYWOOD VENEER CORE	0.05					
HARDWOOD PLYWOOD COMPOSITE CORE	0.05					
PARTICLE BOARD	0.09					
MEDIUM DENSITY FIBERBOARD	0.11					
THIN MEDIUM DENSITY FIBERBOARD2	0.13					

THIN MEDIUM DENSITY FIBERBOARD HAS A MAXIMUM THICKNESS OF 5/16 INCHES (8 MM).

**5.504.4.6 Resilient flooring systems.** Where resilient flooring is installed, at least 80 percent of floor area receiving resilient flooring shall meet the requirements of the California Department of Public Health, "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers," Version 1.2, January 2017 (Emission testing method for California Specifications

See California Department of Public Health's website for certification programs and testing labs. https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/EHLB/IAQ/Pages/VOC.aspx#material

5.504.4.6.1 Verification of compliance. Documentation shall be provided verifying that resilient flooring materials meet the pollutant emission limits.

5.504.4.7 Thermal insulation Comply with the requirements of the California Department of Public Health, "Standard Method of the Testing

and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers, "Version 1.2, January 1.2, January 2017 (Emission testing method for California Specification 01350). See California Department of Public Health's website for certification programs and testing labs. https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/EHLB/IAQ/Pages/VOC.aspx#material

5.504.4.7.1 Verification of compliance. Documentation shall be provided verifying that thermal insulation materials meet the pollutant emission

5.504.4.8 Acoustical ceiling and wall panels.

Comply with the requirements of the California Department of Public Health, "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers, Version 1.2, January 2017 (Emission testing method for California Specification 01350). See California Department of Public Health's website for certification programs and testing labs.

**5.504.4.8.1 Verification of compliance.** Documentation shall be provided verifying that acoustical finish materials meet the pollutant emission limits.

**5.504.5.3 Filters.** In mechanically ventilated buildings, provide regularly occupied areas of the building with air filtration media for outside and return air that provides at least a Minimum Efficiency Reporting Value (MERV) of 13. MERV 13 filters shall be installed prior to occupancy, and recommendations for maintenance with filters of the same value shall be included in the operation and maintenance manual.

**Exceptions:** Existing mechanical equipment

**5.504.5.3.1 Labeling.** Installed filters shall be clearly labeled by the manufacturer indicating the MERV

5.504.7 ENVIRONMENTAL TOBACCO SMOKE (ETS) CONTROL. Where outdoor areas are provided for smoking, prohibit smoking within 25 feet of building entries, outdoor air intakes and operable windows and within the building as already prohibited by other laws or regulations; or as enforced by ordinances, regulations or policies of any city, county, city and county, California Community College, campus of the California State University, or campus of the University of California, whichever are more stringent. When ordinances, regulations or policies are not in place, post signage to inform building occupants of the prohibitions.

SECTION 5.505 INDOOR MOISTURE CONTROL

5.505.1 INDOOR MOISTURE CONTROL. Buildings shall meet or exceed the provisions of California Building Code, CCR, Title 24, Part 2, Sections 1202 (Ventilation) and Chapter 14 (Exterior Walls). For additional measures, see Section 5.407.2 of this code.

**SECTION 5.506 INDOOR AIR QUALITY** 

5.506.1 OUTSIDE AIR DELIVERY. For mechanically or naturally ventilated spaces in buildings, meet the minimum requirements of Section 120.1 (Requirements For Ventilation) of the California Energy Code, or the applicable local code, whichever is more stringent, and Division 1, Chapter 4 of CCR, Title 8.

**5.506.2 CARBON DIOXIDE (CO2) MONITORING.** For buildings or additions equipped with demand control ventilation, CO2 sensors and ventilation controls shall be specified and installed in accordance with the requirements of the California Energy Code, Section 120(c)(4).

5.506.3 Carbon dioxide (CO2) monitoring in classrooms.

(DSA-SS) Each public K-12 school classroom, as listed in Table 120.1-A of the California Energy Code, shall be equipped with a carbon dioxide monitor or sensor that meets the following requirements

The monitor or sensor shall be permanently affixed in a tamper-proof manner in each classroom between 3 and 6 feet (914 mm and 1829 mm) above the floor and at least 5 feet (1524 mm) away from door and operable

When the monitor or sensor is not integral to an Energy Management Control System (EMCS), the monitor or sensor shall display the carbon dioxide readings on the device. When the sensor is integral to an EMCS, the carbon dioxide readings shall be available to and regularly monitored by facility personnel. A monitor shall provide notification though a visual indicator on the monitor when the carbon dioxide levels in the classroom have exceeded 1.100ppm. A sensor integral to an EMCS shall provide notification to facility personnel through a visual and/or audible indicator when the carbon dioxide levels in the classroom have

The monitor or sensor shall measure carbon dioxide levels at minimum 15- minute intervals and shall maintain a record of previous carbon dioxide measurements of not less than 30 days duration.

The monitor or sensor used to measure carbon dioxide levels shall have the capacity to measure carbon dioxide levels with a range of 400ppm to 2000ppm or greater. The monitor or sensor shall be certified by the manufacturer to be accurate within 75ppm at 1,000ppm carbon

dioxide concentration and shall be certified by the manufacturer to require calibration no more frequently than

SECTION 5.507 ENVIRONMENTAL COMFORT

(STC) values determined in accordance with ASTM E 90 and ASTM E 413, or Outdoor-Indoor Sound Transmission Class (OITC) determined in accordance with ASTM E 1332, using either the prescriptive or performance method in

**Exception:** Buildings with few or no occupants or where occupants are not likely to be affected by exterior noise, as determined by the enforcement authority, such as factories, stadiums, storage, enclosed parking

**Exception:** [DSA-SS] For public schools and community colleges, the requirements of this section and all subsections apply only to new construction.

**5.507.4.1 Exterior noise transmission, prescriptive method.** Wall and roof-ceiling assemblies exposed to the noise source making up the building or addition envelope or altered envelope shall meet a composite STC rating of at least 50 or a composite OITC rating of no less than 40, with exterior windows of a minimum STC of 40 or OITC of 30 in the following locations:

1. Within the 65 CNEL noise contour of an airport.

1. Lan or CNEL for military airports shall be determined by the facility Air Installation Compatible

2. Lan or CNEL for other airports and heliports for which a land use plan has not been developed shall be determined by the local general plan noise element.

2. Within the 65 CNEL or Ldn noise contour of a freeway or expressway, railroad, industrial source or fixed-guideway source as determined by the Noise Element of the General Plan.

5.507.4.1.1. Noise exposure where noise contours are not readily available. Buildings exposed to a noise level of 65 dB L<sub>eq</sub> - 1-hr during any hour of operation shall have building, addition or alteration exterior wall and roof-ceiling assemblies exposed to the noise source meeting a composite STC rating of at least 45 (or OITC 35), with exterior windows of a minimum STC of 40 (or OITC 30).

5.507.4.2 Performance Method. For buildings located as defined in Section 5.507.4.1 or 5.507.4.1.1, wall and roof-ceiling assemblies exposed to the noise source making up the building or addition envelope or altered envelope shall be constructed to provide an interior noise environment attributable to exterior sources that does not exceed an hourly equivalent noise level (Leq-1Hr) of 50 dBA in occupied areas during any hour of operation

**5.507.4.2.1 Site Features.** Exterior features such as sound walls or earth berms may be utilized as appropriate to the building, addition or alteration project to mitigate sound migration to the interior.

**5.507.4.2.2 Documentation of Compliance.** An acoustical analysis documenting complying interior sound levels shall be prepared by personnel approved by the architect or engineer of record.

5.507.4.3 Interior sound transmission. Wall and floor-ceiling assemblies separating tenant spaces and tenant spaces and public places shall have an STC of at least 40.

Note: Examples of assemblies and their various STC ratings may be found at the California Office of Noise Control: www.toolbase.org/PDF/CaseStudies/stc\_icc\_ratings.pdf.

**SECTION 5.508 OUTDOOR AIR QUALITY** 

5.508.1 Ozone depletion and greenhouse gas reductions. Installations of HVAC, refrigeration and fire suppression equipment shall comply with Sections 5.508.1.1 and 5.508.1.2. 5.508.1.1 Chlorofluorocarbons (CFCs). Install HVAC, refrigeration and fire suppression equipment that do not

5.508.1.2 Halons. Install HVAC, refrigeration and fire suppression equipment that do not contain Halons.

5.508.2 Supermarket refrigerant leak reduction. New commercial refrigeration systems shall comply with the provisions of this section when installed in retail food stores 8,000 square feet or more conditioned area, and that utilize either refrigerated display cases, or walk-in coolers or freezers connected to remote compressor units or condensing units. The leak reduction measures apply to refrigeration systems containing high-global-warming potential (high-GWP) refrigerants with a GWP of 150 or greater. New refrigeration systems include both new facilities and the eplacement of existing refrigeration systems in existing facilities.

**Exception:** Refrigeration systems containing low-global warming potential (low-GWP) refrigerant with a GWP value less than 150 are not subject to this section. Low-GWP refrigerants are nonozone-depleting refrigerants that include ammonia, carbon dioxide (CO<sub>2</sub>), and potentially other refrigerants.

5.508.2.1 Refrigerant piping. Piping compliant with the California Mechanical Code shall be installed to be accessible for leak protection and repairs. Piping runs using threaded pipe, copper tubing with an outside diameter (OD) less than 1/4 inch, flared tubing connections and short radius elbows shall not be used in refrigerant systems except as noted below

**5.508.2.1.1 Threaded pipe.** Threaded connections are permitted at the compressor rack.

5.508.2.1.2 Copper pipe. Copper tubing with an OD less than 1/4 inch may be used in systems with a refrigerant charge of 5 pounds or less.

keep vibration levels below 8 mils. 5.508.2.1.3 Flared tubing connections. Double-flared tubing connections may be used for pressure

controls, valve pilot lines and oil. **Exception:** Single-flared tubing connections may be used with a multiring seal coated with

5.508.2.1.2.1 Anchorage. One-fouth-inch OD tubing shall be securely clamped to a rigid base to

industrial sealant suitable for use with refrigerants and tightened in accordance with manufacturer's

**5.508.2.1.4 Elbows.** Short radius elbows are only permitted where space limitations prohibit use of

5.508.2.2 Valves. Valves Valves and fittings shall comply with the California Mechanical Code and as

5.508.2.2.1 Pressure relief valves. For vessels containing high-GWP refrigerant, a rupture disc shall

be installed between the outlet of the vessel and the inlet of the pressure relief valve. **5.508.2.2.1.1 Pressure detection.** A pressure gauge, pressure transducer or other device shall be installed in the space between the rupture disc and the relief valve inlet to indicate a disc

**5.508.2.2.2 Access valves.** Only Schrader access valves with a brass or steel body are

rupture or discharge of the relief valve.

designed to have seal caps.

**5.508.2.2.2.1 Valve caps.** For systems with a refrigerant charge of 5 pounds or more, valve caps shall be brass or steel and not plastic

**5.508.2.2.2.2 Seal caps.** If designed for it, the cap shall have a neoprene O-ring in place. 5.508.2.2.2.1 Chain tethers. Chain tethers to fit ovr the stem are required for valves

**Exception:** Valves with seal caps that are not removed from the valve during stem

5.508.2.3 Refrigerated service cases. Refrigerated service cases holding food products containing vinegar and salt shall have evaporator coils of corrosion-resistant material, such as stainless steel; or be coated to prevent corrosion from these substances.

**5.508.2.3.1 Coil coating.** Consideration shall be given to the heat transfer efficiency of coil coating to maximize energy efficiency.

5.508.2.4 Refrigerant receivers. Refrigerant receivers with capacities greater than 200 pounds shall be fitted with a device tha indicates the level of refrigerant in the receiver.

5.508.2.5 Pressure testing. The system shall be pressure tested during installation prior to evacuation and

**5.508.2.5.1 Minimum pressure.** The system shall be charged with regulated dry nitrogen and appropriate tracer gas to bring system pressure up to 300 psig minimum.

**5.508.2.5.2 Leaks.** Check the system for leaks, repair any leaks, and retest for pressure using the same

**5.508.2.5.3 Allowable pressure change.** The system shall stand, unaltered, for 24 hours with no more than a +/- one pound pressure change from 300 psig, measured with the same gauge.

**5.508.2.6 Evacuation.** The system shall be evacuated after pressure testing and prior to charging.

5.508.2.6.1 First vacuum. Pull a system vacuum down to at least 1000 microns (+/- 50 microns), and

5.508.2.6.2 Second vacuum. Pull a second system vacuum to a minimum of 500 microns and hold for 30

5.508.2.6.3 Third vacuum. Pull a third vacuum down to a minimum of 300 microns, and hold for 24 hours with a maximum drift of 100 microns over a 24-hour period

#### CHAPTER 7 **INSTALLER & SPECIAL INSPECTOR QUALIFICATIONS**

**702 QUALIFICATIONS** 

long radius elbows.

702.1 INSTALLER TRAINING. HVAC system installers shall be trained and certified in the proper nstallation of HVAC systems including ducts and equipment by a nationally or regionally recognized training or certification program. Uncertified persons may perform HVAC installations when under the direct supervision and esponsibility of a person trained and certified to install HVAC systems or contractor licensed to install HVAC systems. Examples of acceptable HVAC training and certification programs include but are not limited to the following:

1. State certified apprenticeship programs. . Public utility training programs.

Training programs sponsored by trade, labor or statewide energy consulting or verification organizations.

Programs sponsored by manufacturing organizations. 5. Other programs acceptable to the enforcing agency.

**702.2 SPECIAL INSPECTION [HCD].** When required by the enforcing agency, the owner or the esponsible entity acting as the owner's agent shall employ one or more special inspectors to provide inspection or other duties necessary to substantiate compliance with this code. Special inspectors shall demonstrate competence to the satisfaction of the enforcing agency for the particular type of inspection or task to be performed. In addition to other certifications or qualifications acceptable to the enforcing agency, the following certifications or education may be

Certification by a national or regional green building program or standard publisher. 2. Certification by a statewide energy consulting or verification organization, such as HERS raters, building

performance contractors, and home energy auditors.

3. Successful completion of a third party apprentice training program in the appropriate trade. 4. Other programs acceptable to the enforcing agency.

considered by the enforcing agency when evaluating the qualifications of a special inspector:

1. Special inspectors shall be independent entities with no financial interest in the materials or the project they are inspecting for compliance with this code. HERS raters are special inspectors certified by the California Energy Commission (CEC) to rate homes in California according to the Home Energy Rating System (HERS).

[BSC-CG] When required by the enforcing agency, the owner or the responsible entity acting as the owner's agent shall employ one or more special inspectors to provide inspection or other duties necessary to substantiate compliance with this code. Special inspectors shall demonstrate competence to the satisfaction of the enforcing agency for the particular type of inspection or task to be performed. In addition, the special inspector shall have a certification from a recognized state, national or international association, as determined by the local agency. The area of certification shall be closely related to the primary job function, as determined by the local agency.

Note: Special inspectors shall be independent entities with no financial interest in the materials or the project they are inspecting for compliance with this code.

#### **703 VERIFICATIONS**

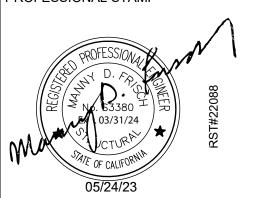
703.1 DOCUMENTATION. Documentation used to show compliance with this code shall include but is not limited to, construction documents, plans, specifications, builder or installer certification, inspection reports, or other methods acceptable to the enforcing agency which demonstrate substantial conformance. When specific documentation or special inspection is necessary to verify compliance, that method of compliance will be specified in the appropriate section or identified applicable checklist.

PROJECT SPECIFIC STATE AGENCY APPROVAL

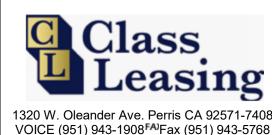
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ORIGINAL PC STATE AGENCY APPROVAL



Revision Schedule

Description

PRE-CHECK (PC) DOCUMENT

A separate project application for construction is required

Code: 2022 CBC

PC 2022 CBC: 24' x 40' **EXPANDABLE TO** 

CAL GREEN CHECKLIST

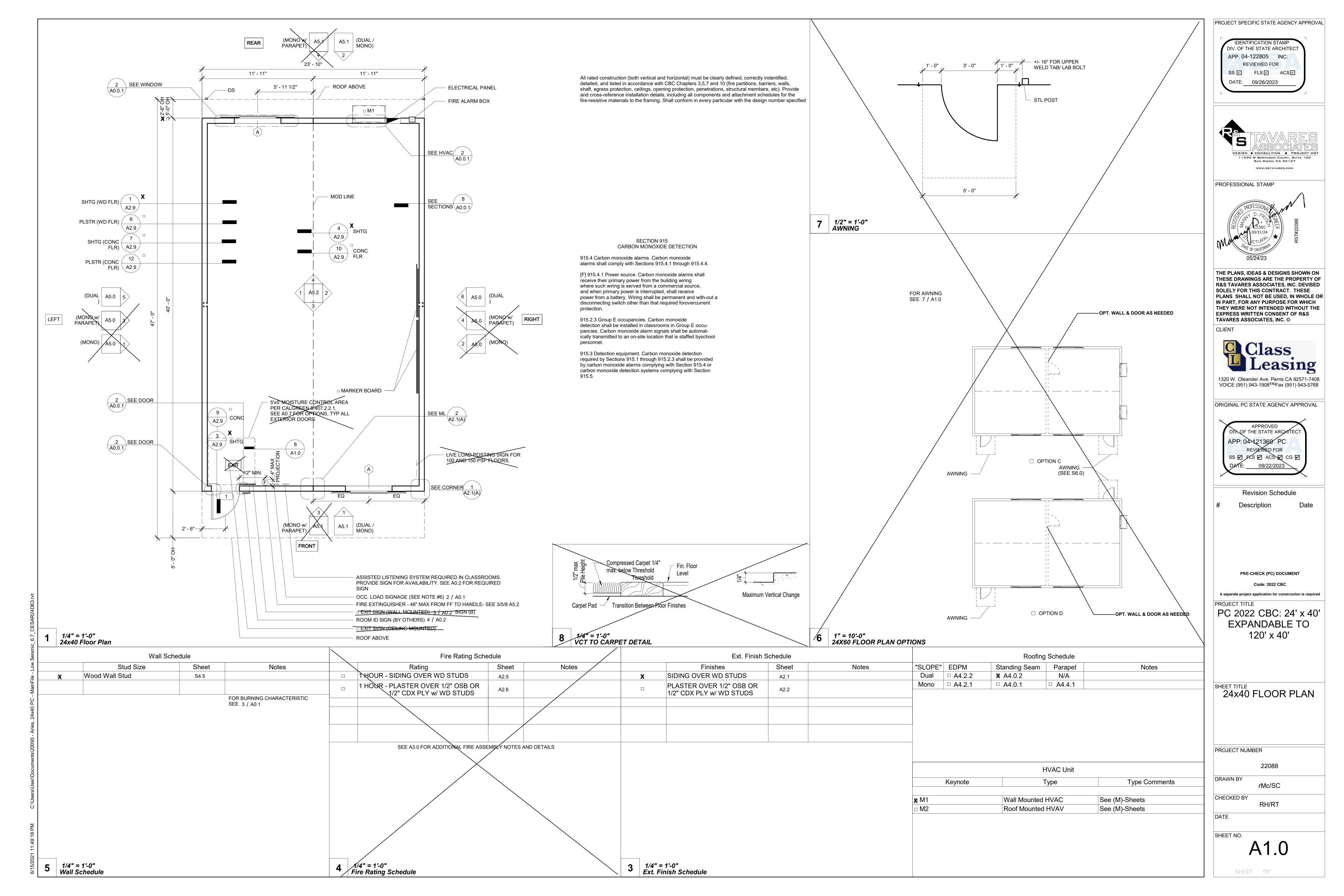
PROJECT NUMBER

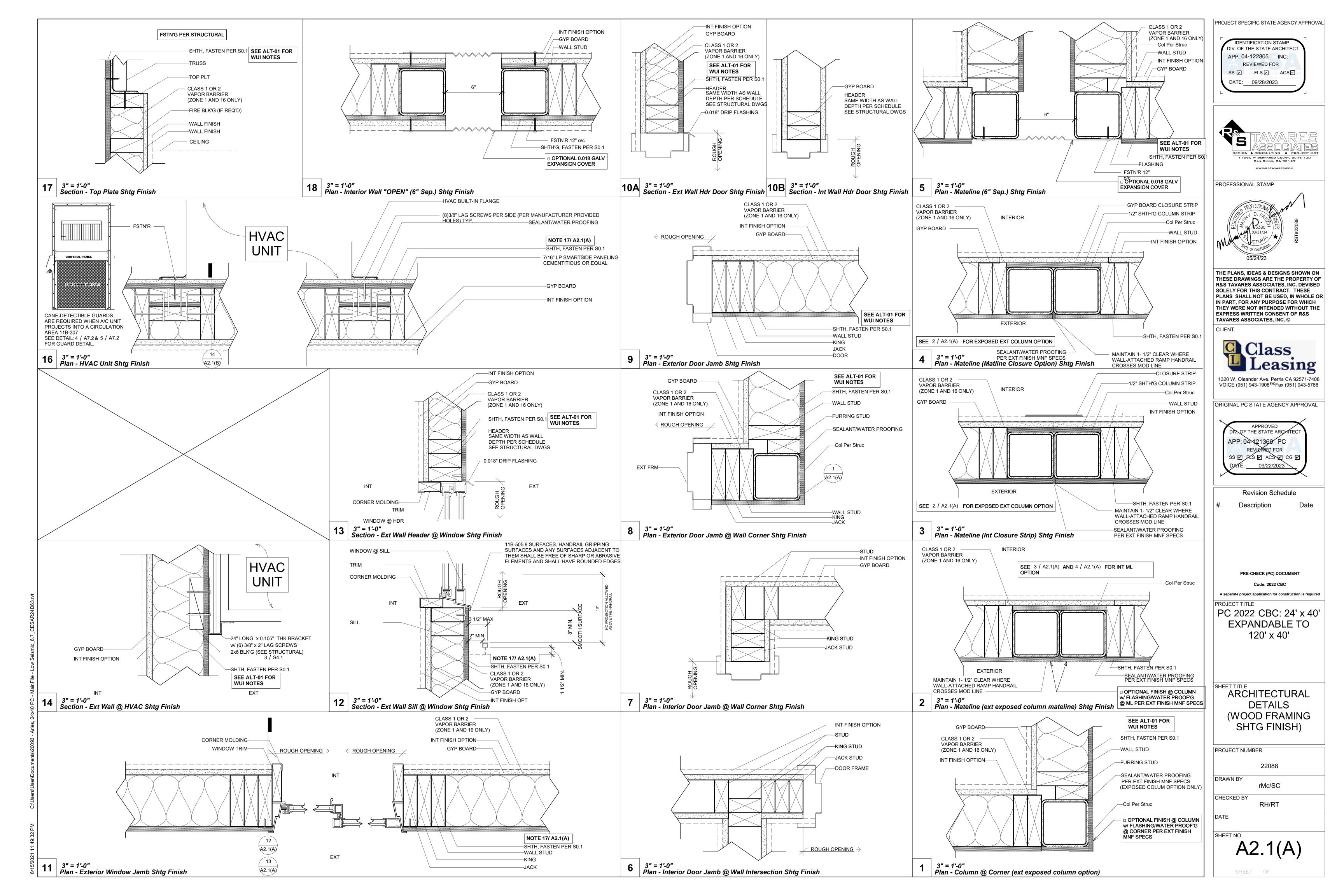
22088 rMc/SC

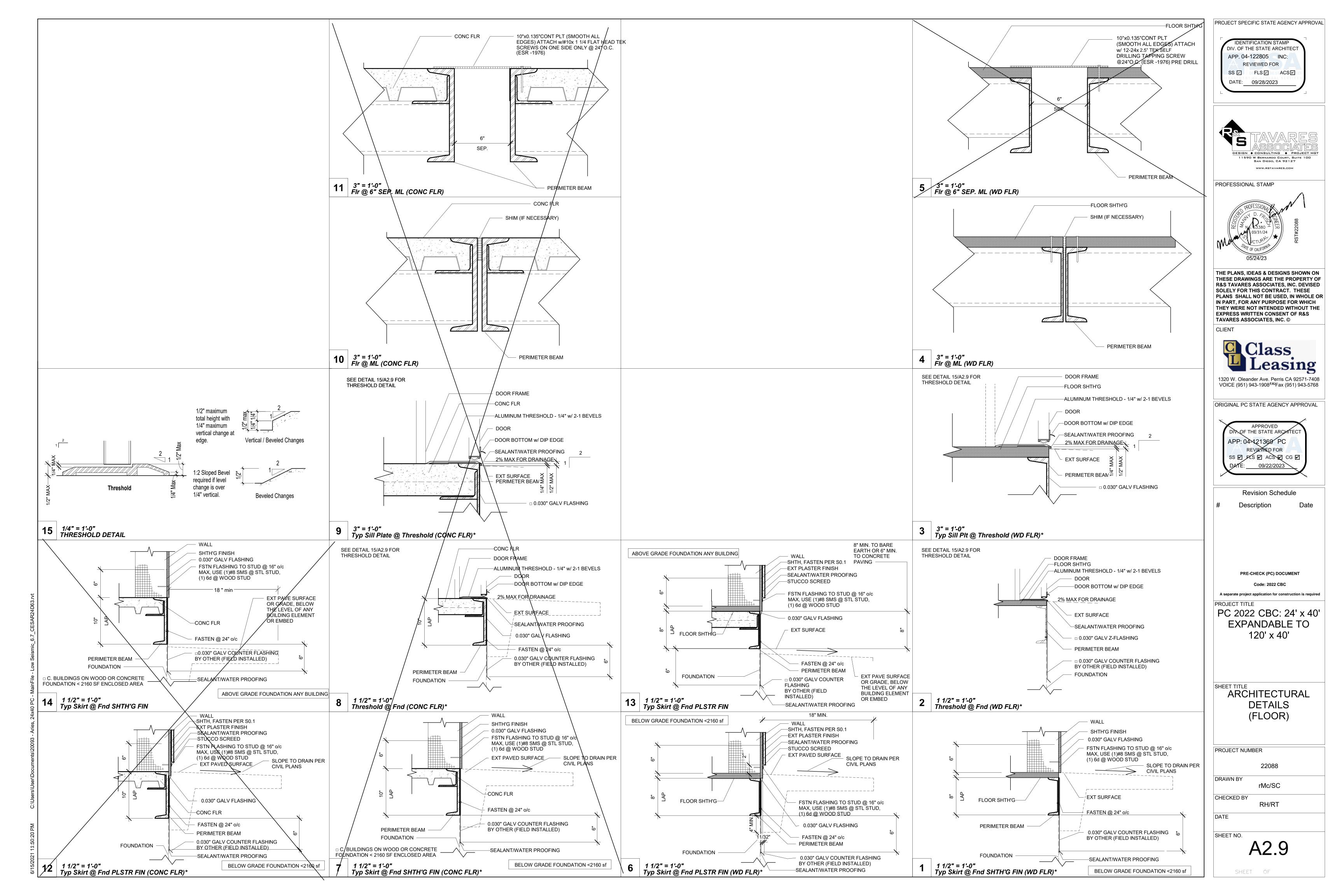
DATE

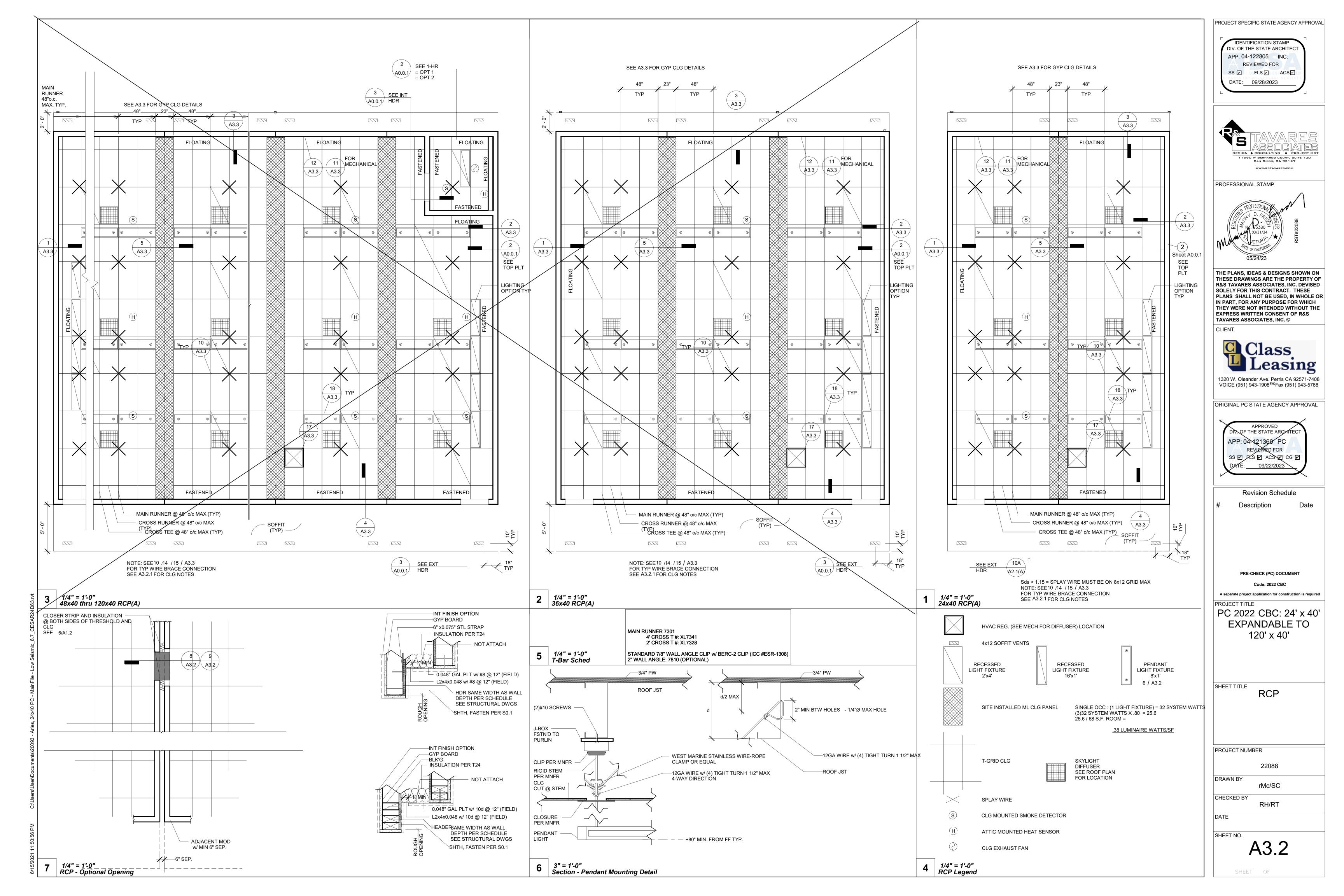
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DISCLAIMER: THIS DOCUMENT IS PROVIDED AND INTENDED TO BE USED AS A MEANS TO INDICATE AREAS OF COMPLIANCE WITH THE CALIFORNIA GREEN BUILDING VERIFICATION WITH THE FULL CODE.









#### 1. CEILING SYSTEM GENERAL NOTES

- 1.01 Ceiling system components shall comply with ASTM C635 and Section 5.1 of ASTM
- 1.02 The ceiling grid system must be rated heavy duty as defined by ASTM C635.
- 1.03 Ceiling systems. The following ceiling system(s) is/are part of the scope of this project: Manufacturer: Product Name: PRELUDE XL AND PRELUDE XL HIGH RECYLED CONTENT(HRC)

Evaluation Report Type and Number: ICC ESR#1308 Main Runner Part, Model, or Catalog Number 7301 Cross Runner Part, Model, Catalog Number: 4" CROSS T # XL7341 / 2" CROSS T # XL7328

1.04 Seismic Wall Clip: STANDARD 7/8" WALL ANGLE CLIP w/ BERC2 CLIP Manufacturer's Model:

#### 1.05 Ceiling panels shall not support any luminaires, air terminals or devices.

1.06 For ceiling installations utilizing acoustical tile panels of mineral or glass fiber, it is not mandatory to provide 3/4" clearance between the acoustical tile panels and the wall on the sides of the ceiling which are free to slip. For all other ceiling panel types, provide 3/4" clearance between the ceiling panel and the wall on the sides of the ceiling free to slip. Clearance between ceiling grid runners/members and walls shall comply with the details on these drawings regardless of ceiling tile material.

#### 2. MATERIALS

2.01 Ceiling wire shall be Class 1 zinc coated (galvanized) carbon steel conforming to ASTM A641. Wire shall be #12 gauge (0.106" diameter) with soft temper and minimum ultimate tensile strength = 70 ksi.

2.02 Galvanized sheet steel (including that used for metal stud and track compression struts/post) shall conform to ASTM A653, or other equivalent sheet steel listed in Section A3.1 of the North American Specification for the Design of Cold-Formed Steel Structural Members, (AISI S100). Material 43 mil (18 gauge) and lighter shall have minimum yield strength of 33 ksi. Material 54 mil (16 gauge) and heavier shall have a minimum yield strength of 50 ksi.

2.03 Electrical metallic tube (EMT) shall be ANSI C80.3/UL 797 carbon steel with G90 galvanizing. EMT shall have minimum yield strength (F<sub>Y</sub>) of 30 ksi and minimum ultimate strength (F<sub>U</sub>) of 48 ksi.

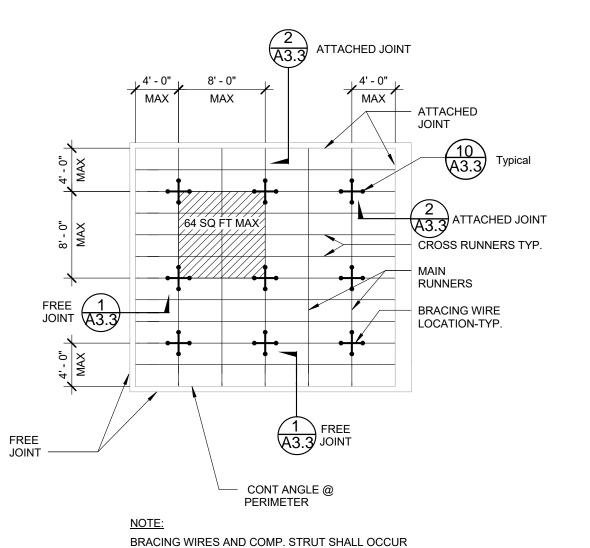
#### 3. ATTACHMENT OF HANGER AND BRACING WIRES

- 3.01 Separate all ceiling hanger and bracing wires at least 6 inches from all unbraced ducts, pipes, conduit, etc.
- 3.02 Hanger and bracing wires shall not attach to or bend around obstructions including but not limited to piping, ductwork, conduit and equipment.

Detail Title:	REV: 09/21/2015	Detail No.
	REV: 03/2022	]
CEILING NOTES		1.00 ∣
02.2020		]

IR 25-2 (Revised 03/18/22) DIVISION OF THE STATE ARCHITECT DEPARTMENT OF GENERAL SERVICES STATE OF CĂLIFORNIA

BERG2 2" BEAM-END RETAINING CLIP -Allows you to create a code-compliant Seismic D, E, F ceiling installation while eliminating the need to use 2" wall molding or spreader bars.



AT EVERY 64 SQ. FT. MAX. IN ROOMS OVER 144 SQ. FT.

3.03 Hanger wires that are more than one (horizontal) in six (vertical) out of plumb shall have counter-sloping wires.

- 3.04 Slack safety wires shall be considered hanger wires for installation and testing requirements.
- 3.05 Hanger and bracing wire anchorage to the structure shall be installed in such a manner that the direction of the anchorage aligns closely with the direction of the wire (e.g., bracing wire ceiling clips must be bent as shown in the details and rotated as required to align closely with the direction of the wire, screw eyes in wood must be installed so they align closely with the direction of the wire, etc.).

#### 4. FASTENERS AND WELDING

- 4.01 Sheet metal screws shall comply with ASTM C1513 and ASME B18.6.3. Penetration of screws through joined material shall not be less than three exposed threads.
- 4.02 Expansion anchors shall be: NA
- 4.03 Power-Actuated Fasteners shall be:
- 4.04 If not otherwise specified in the evaluation report, power-actuated fasteners installed in steel shall be installed so the entire pointed end of the fastener is driven through the steel
- 4.05 Power-actuated fasteners in concrete or masonry are not permitted for bracing wires.
- 4.06 Concrete reinforcement and prestressing tendons shall be located by non-destructive means prior to installing post-installed anchors.
- 4.07 Welding shall be in accordance with AWS D1.3 using E60XX series electrodes.

#### 5. TESTING

IR 25-2

- 5.01 All field testing must be performed in the presence of the project inspector.
- 5.02 Post-installed anchors in concrete used to support hanger wires shall be tested at a frequency of 10 percent. Power-actuated fasteners in concrete shall be field tested for 200 pounds in tension. All other post-installed anchors in concrete shall be tested in accordance with CBC Section 1910A.5.
- 5.03 Post-installed anchors in concrete used to attach bracing wires shall be tested at a frequency of 50 percent in accordance with CBC Section 1910A5.

#### 6. LUMINAIRES

- 6.01 All luminaires shall be positively attached to the ceiling suspension systems by mechanical means to resist a horizontal force equal to the weight of the luminaire. A minimum of two screws or approved fasteners are required at each luminaire, per ASTM E580 Section 5.3.1.
- 6.02 Surface-mounted luminaires shall be attached to the main runner with at least two positive clamping devices. The clamping device shall completely surround the supporting

Detail Title:	REV: 09/21/2015	Detail No.
	REV: 03/2022	
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IR 25-2 (Revised 03/18/22) DIVISION OF THE STATE ARCHITECT DEPARTMENT OF GENERAL SERVICES STATE OF CALIFORNIA

ceiling runner and be made of steel with a minimum thickness of #14 gauge. Rotational spring catches do not comply. A #12 gauge slack safety wire shall be connected from each clamping device to the structure above. Provide additional supports when a

luminaire is 8 feet or longer or exceeds 56 pounds. Maximum spacing between supports shall not exceed 8 feet. 6.03 Luminaires weighing less than or equal to 10 pounds may be supported directly on the

ceiling runners, shall have a minimum of one #12 gauge slack safety wire connected from

the fixture housing to the structure above. 6.04 Luminaires weighing greater than 10 pounds but less than or equal to 56 pounds may be supported directly on the ceiling runners, but they shall have a minimum of two #12 gauge slack safety wires connected from the fixture housing at diagonal corners to the

structure above. **Exception:** All luminaires greater than two by four feet weighing less than 56 pounds shall have a #12 gauge slack safety wire at each corner.

6.05 All luminaires weighing greater than 56 pounds shall be independently supported by not less than four taut #12 gauge hanger wires (one at each corner) attached from the fixture housing to the structure above or other approved hangers. The four taut #12 gauge wires or other approved hangers, including their attachment to the structure above, shall be capable of supporting four times the weight of the fixture.

#### 7. SERVICES WITHIN THE CEILING

IR 25-2

- 7.01 All flexible sprinkler hose fitting mounting brackets, ceiling-mounted air terminals or other services shall be positively attached to the ceiling suspension systems by mechanical means. Screws or approved fasteners are required. A minimum of two attachments are required at each component.
- 7.02 Ceiling-mounted air terminals or other services weighing less than or equal to 20 pounds shall have one #12 gauge slack safety wire attached from the terminal or service to the structure above.
- 7.03 Flexible sprinkler hose fittings, ceiling-mounted air terminals or other services weighing more than 20 pounds but less than or equal to 56 pounds shall have two #12 gauge slack safety wires (at diagonal corners) connected from the terminal or service to the structure above.
- 7.04 Flexible sprinkler hose fittings, ceiling-mounted air terminals or other services weighing more than 56 pounds shall be supported directly from the structure above by not less than four taut #12 gauge hanger wires attached from the terminal or service to the structure above or other approved hangers.

#### 8. OTHER DEVICES WITHIN THE CEILING

8.01 All lightweight miscellaneous devices, such as strobe lights, occupancy sensors, speakers, exit signs, etc., shall be attached to the ceiling grid. In addition, devices weighing more than 10 pounds shall have a #12 gauge slack safety wire anchored to the structure above. Devices weighing more than 20 pounds shall be supported independently from the structure above.

Detail Title:	REV: 09/21/2015	Detail No.
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DIVISION OF THE STATE ARCHITECT DEPARTMENT OF GENERAL SERVICES STATE OF CALIFORNIA

1.ITEMS SHOWN WITH A MFR CALLOUT MAY BE SUBSTITUTED WITH AN OR EQUAL OR GREATER PRODUCT WITH DSA APPROVAL

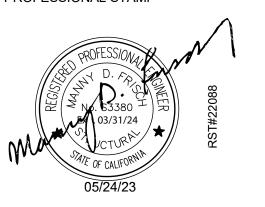
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DATE: 09/28/2023

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ORIGINAL PC STATE AGENCY APPROVAL



Description

Revision Schedule

PRE-CHECK (PC) DOCUMENT

Code: 2022 CBC

A separate project application for construction is require

PC 2022 CBC: 24' x 40' **EXPANDABLE TO** 120' x 40'

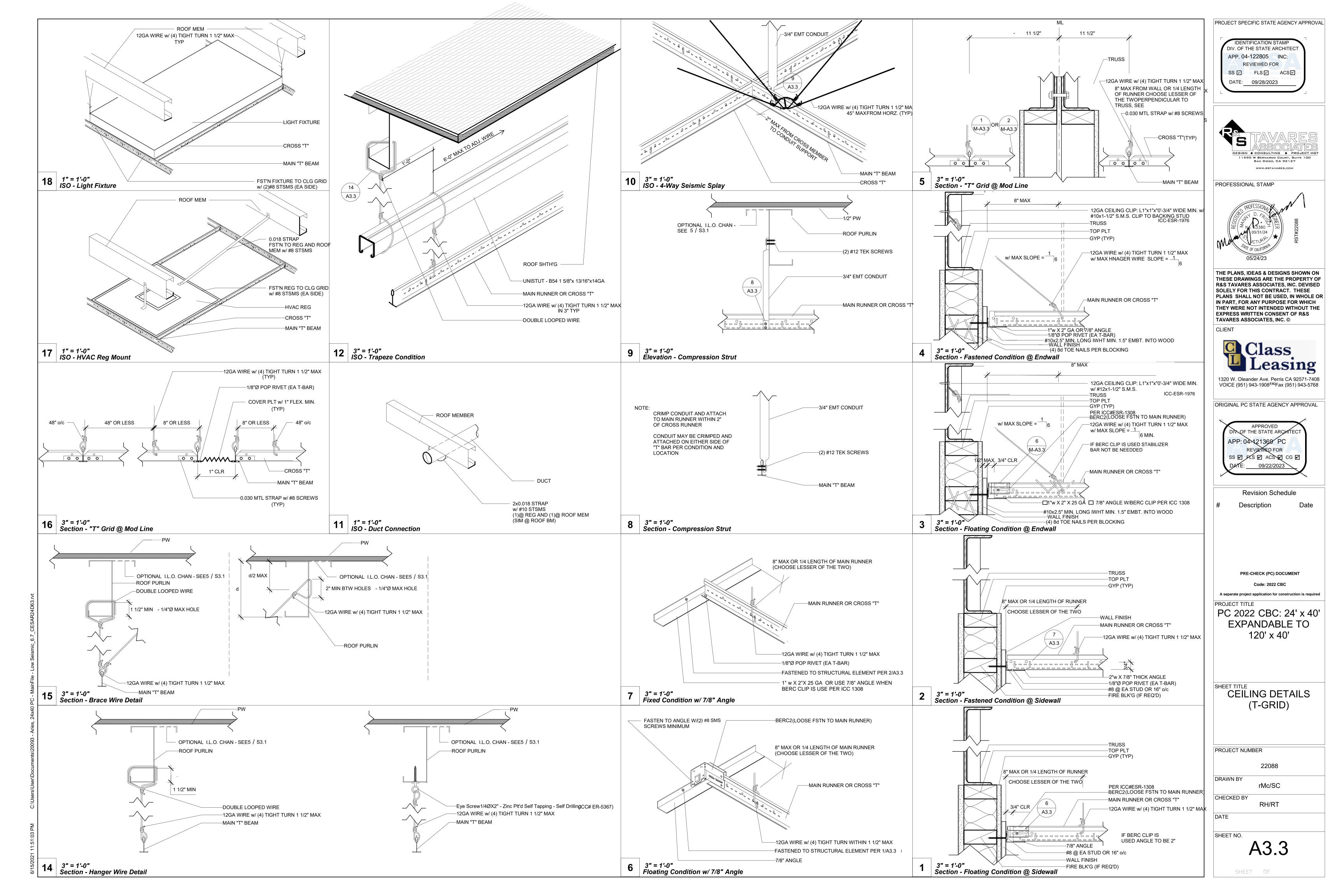
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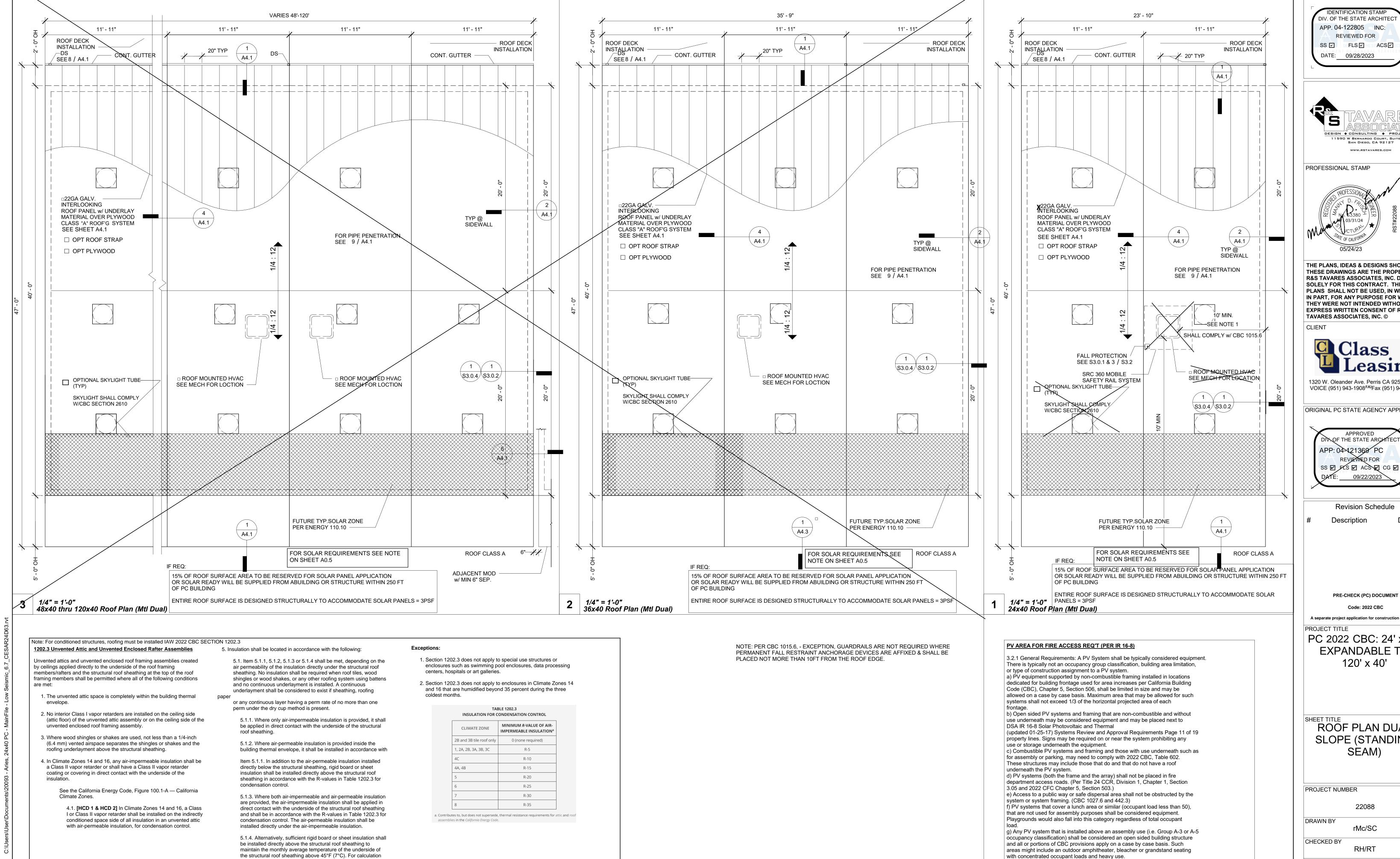
PROJECT NUMBER 22088

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purposes, an interior air temperature of 68°F (20°C) is assumed

and the exterior air temperature is assumed to be the monthly

average outside air temperature of the three coldest months.

air-impermeable insulation layer, it shall be sealed at the perimeter

of each individual sheet interior surface to form a continuous layer.

5.2. Where preformed insulation board is used as the

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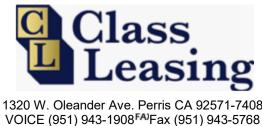
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Revision Schedule

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A separate project application for construction is required

PC 2022 CBC: 24' x 40' **EXPANDABLE TO** 120' x 40'

**ROOF PLAN DUAL** SLOPE (STANDING SEAM)

22088 rMc/SC

DATE

h) Fire Department concern for the installation of roof mounted PV systems will

be addressed by DSA review to the State Fire Marshal Solar Photovoltaic

i) When a PV system, without riser framework, is installed directly on a rated

roof assembly with a required classification greater than "Class C" found in

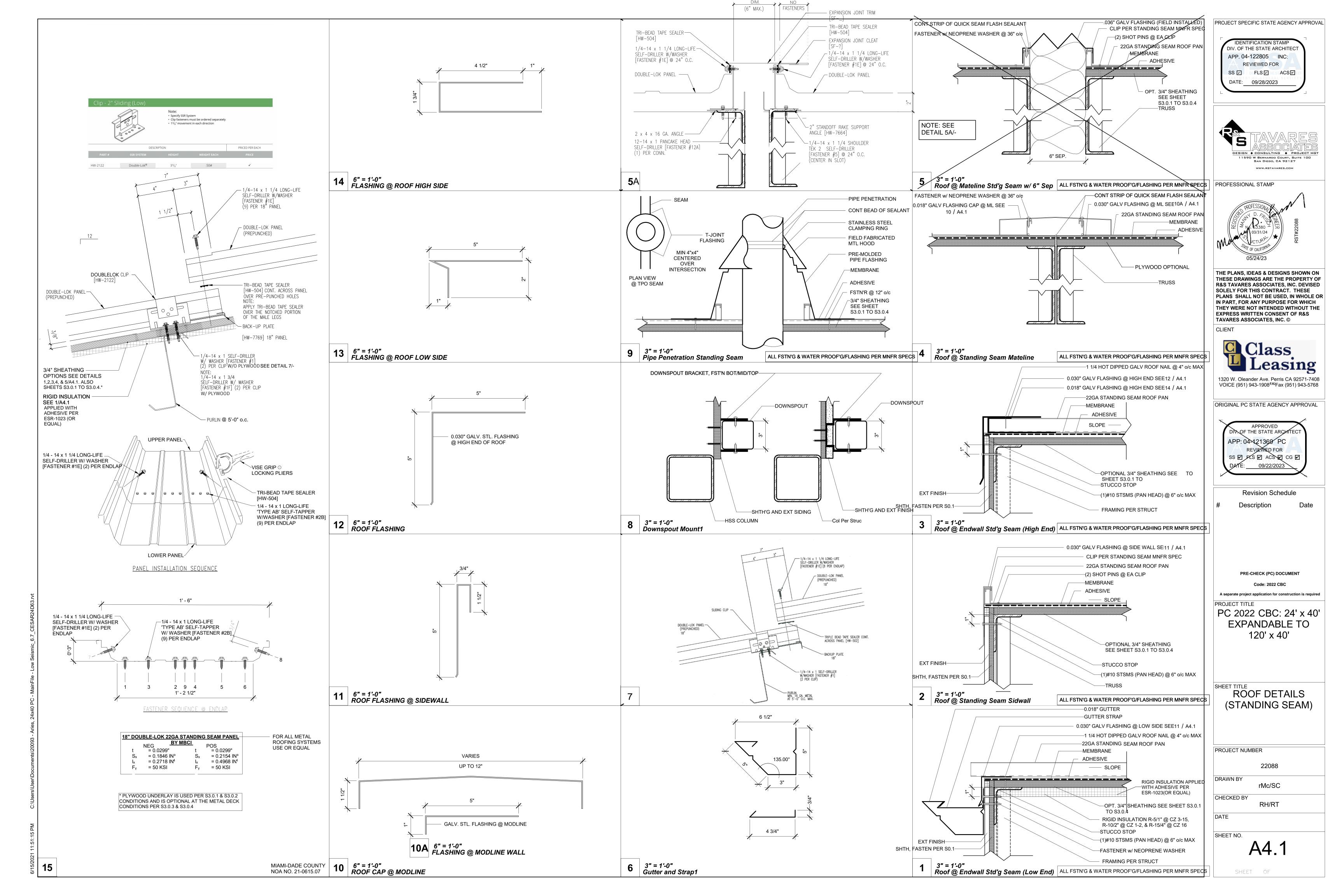
http://osfm.fire.ca.gov/pdf/reports/solarphotovoltaicguideline.pdf

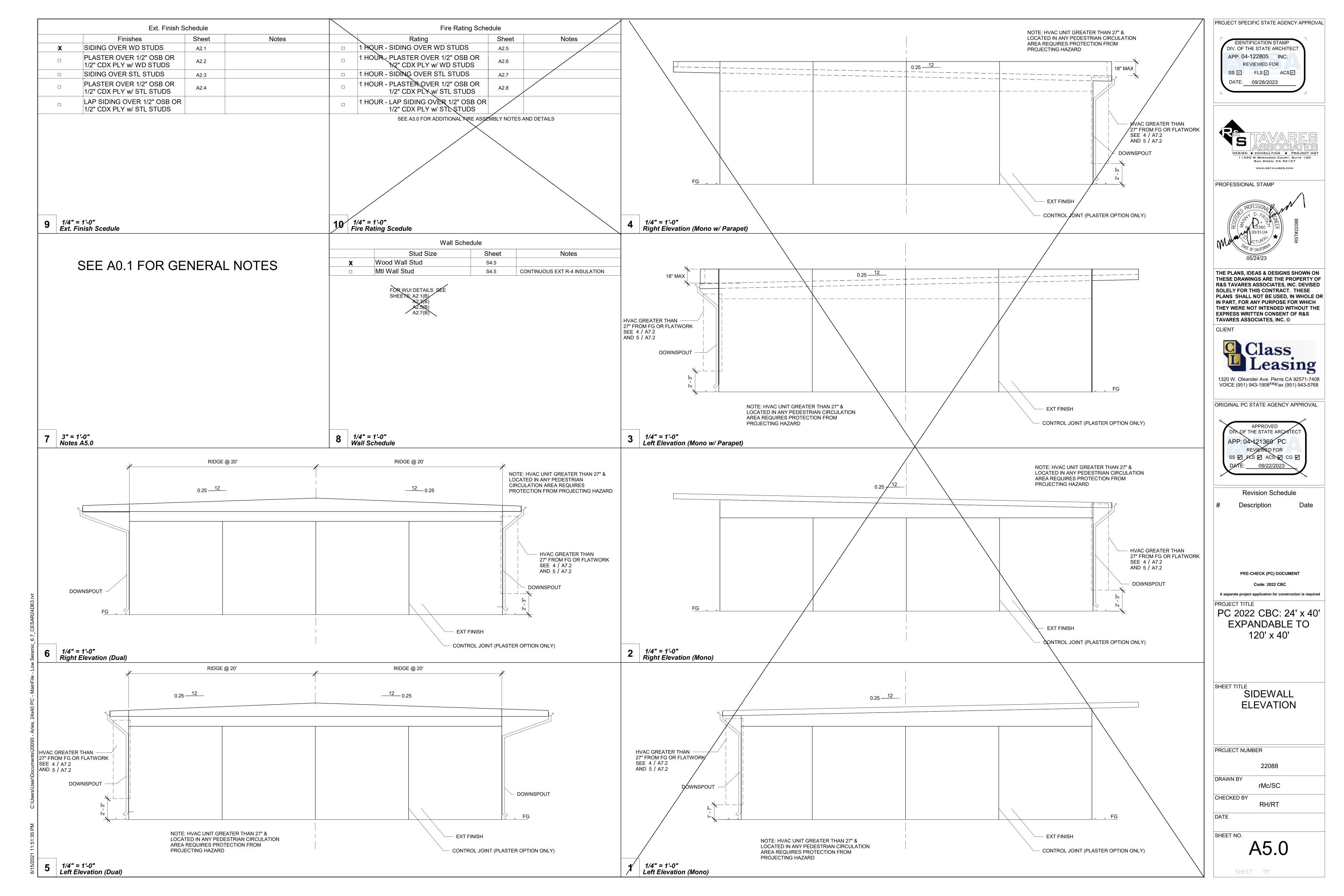
Installation Guideline available at:

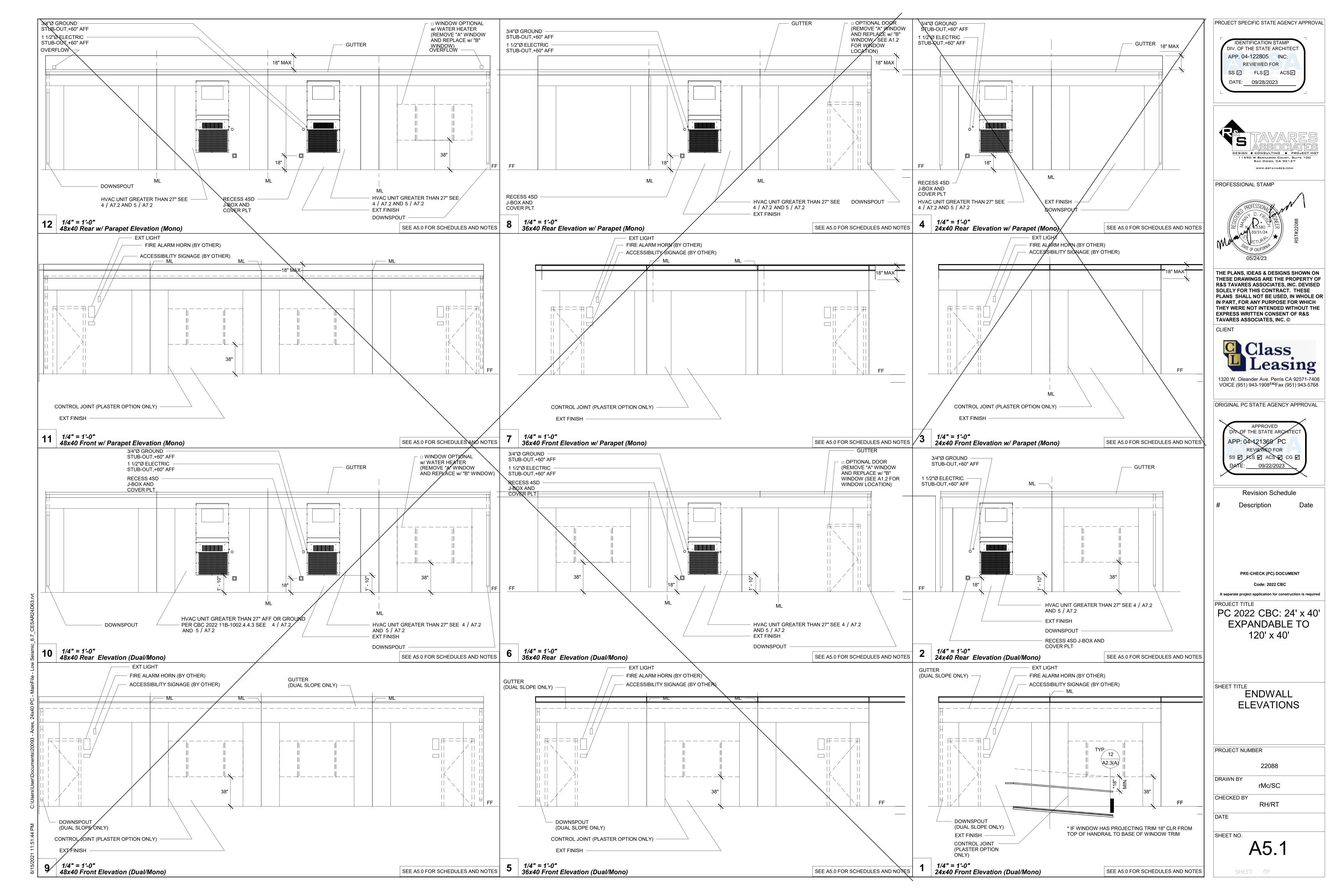
CBC, Chapter 15, and f

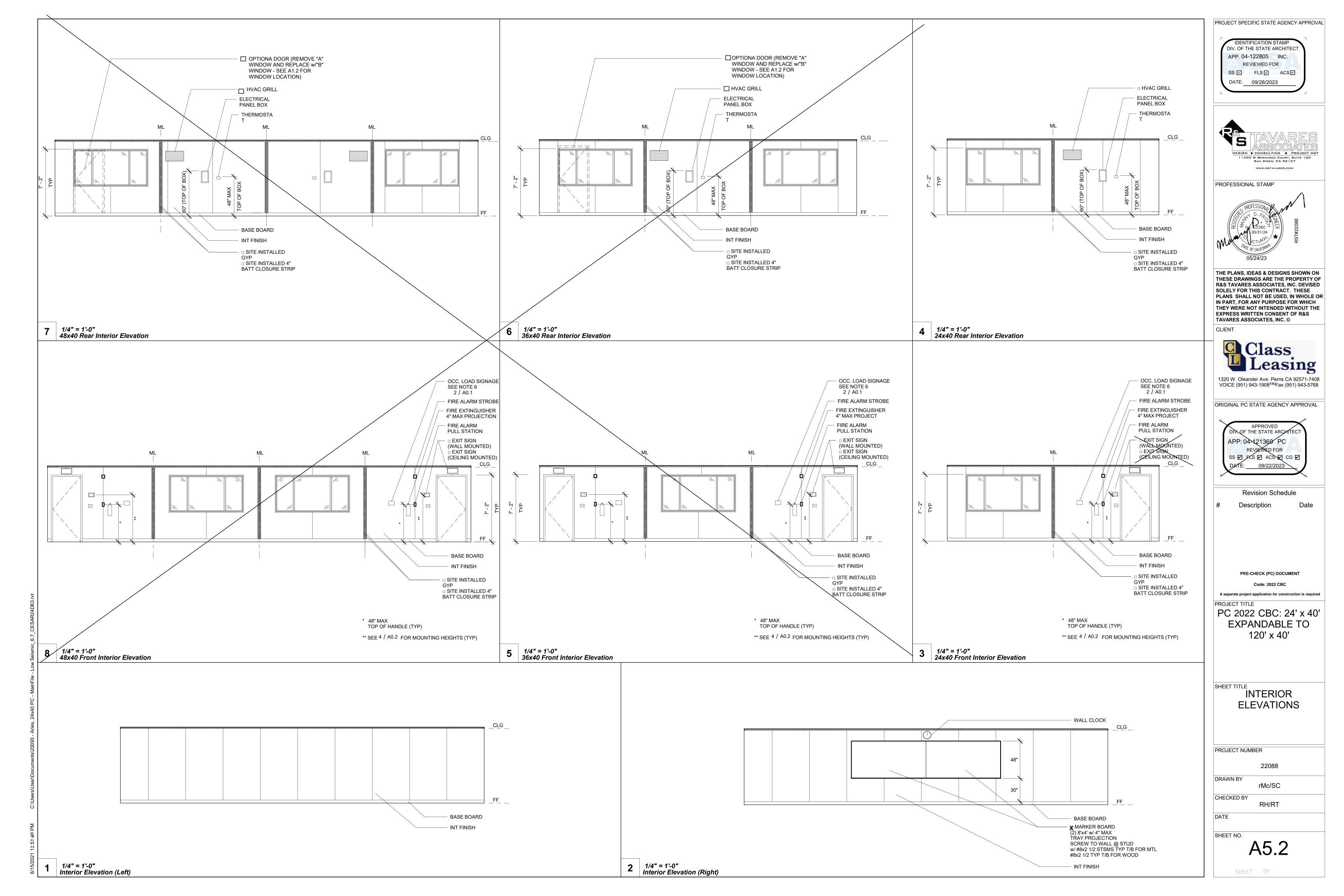
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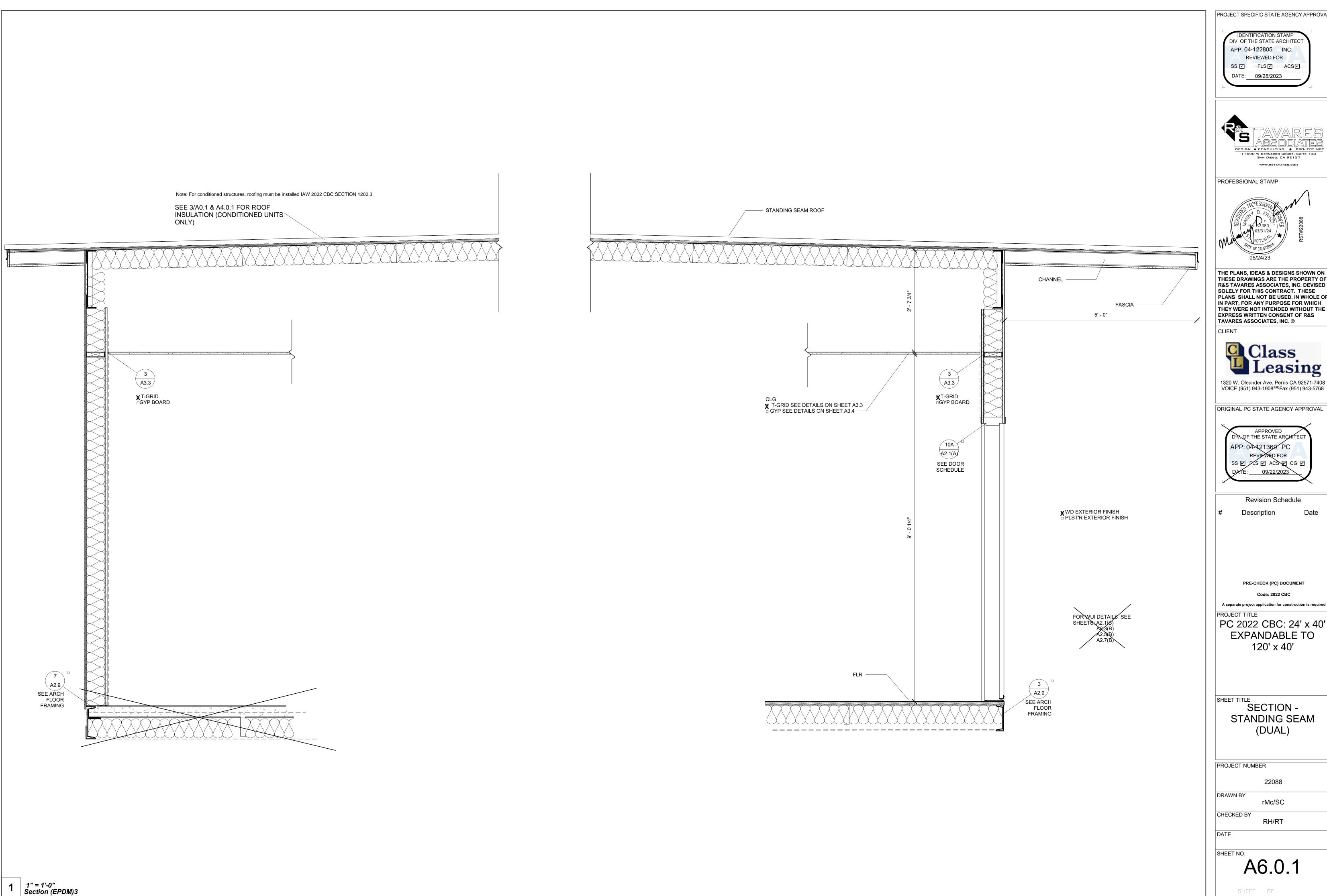
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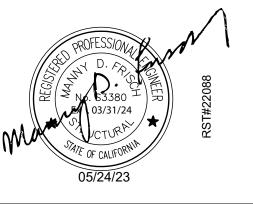




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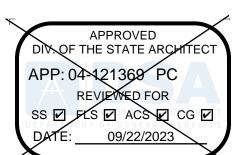




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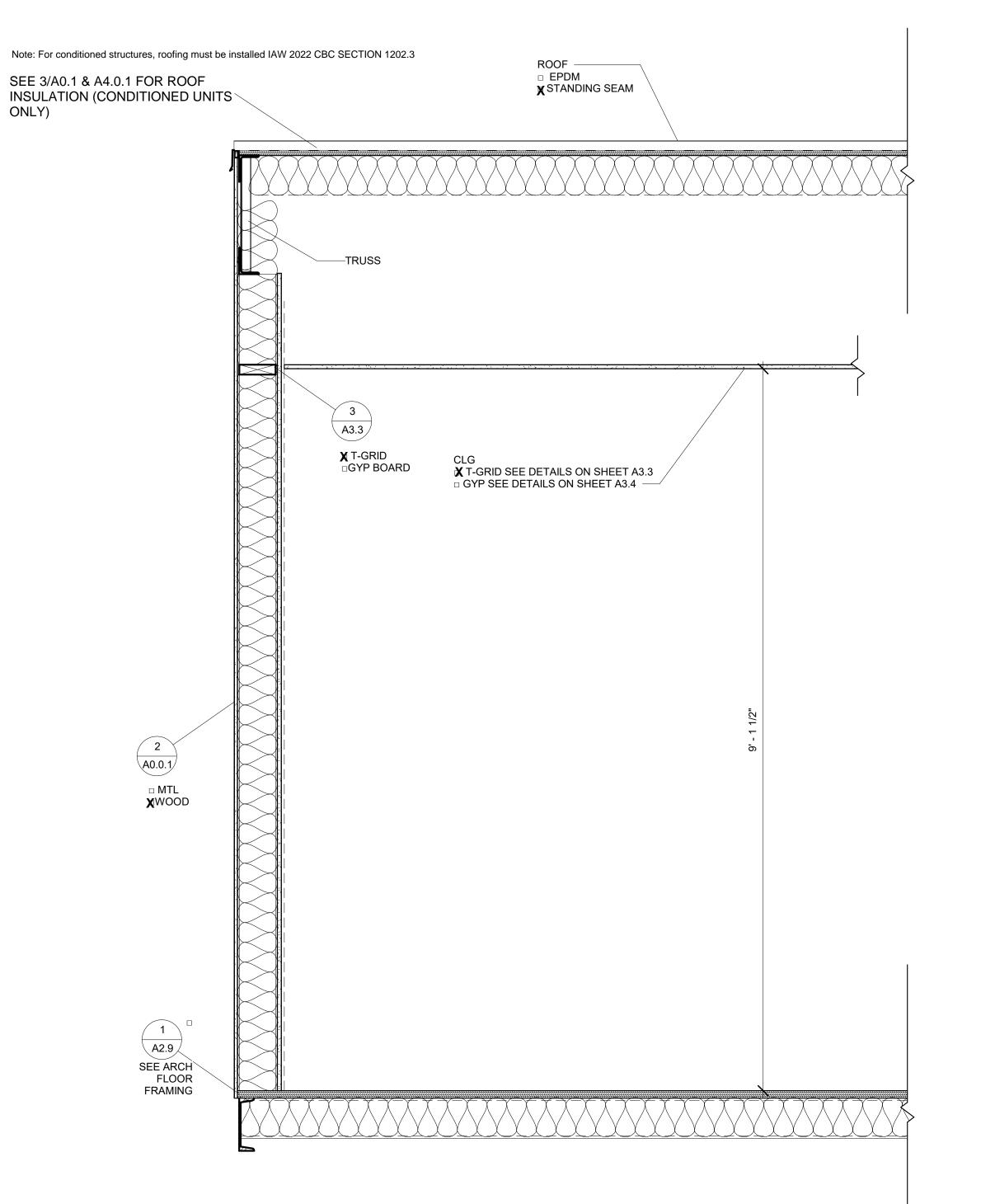
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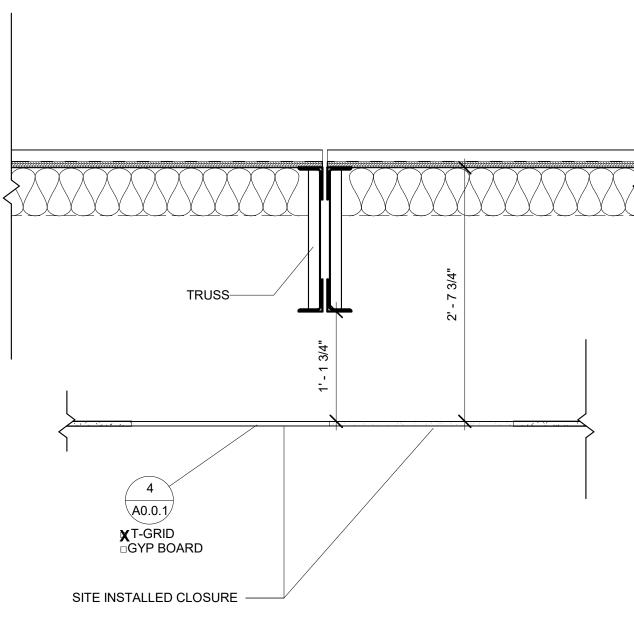
Code: 2022 CBC

PC 2022 CBC: 24' x 40' **EXPANDABLE TO** 

STANDING SEAM (DUAL)

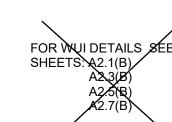
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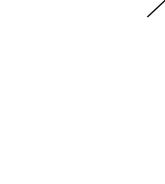




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SEE ARCH FLOOR FRAMING



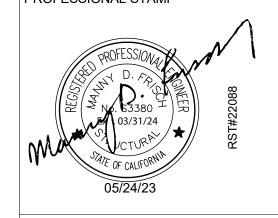


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Description

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PC 2022 CBC: 24' x 40' EXPANDABLE TO 120' x 40'

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PROJECT NUMBER

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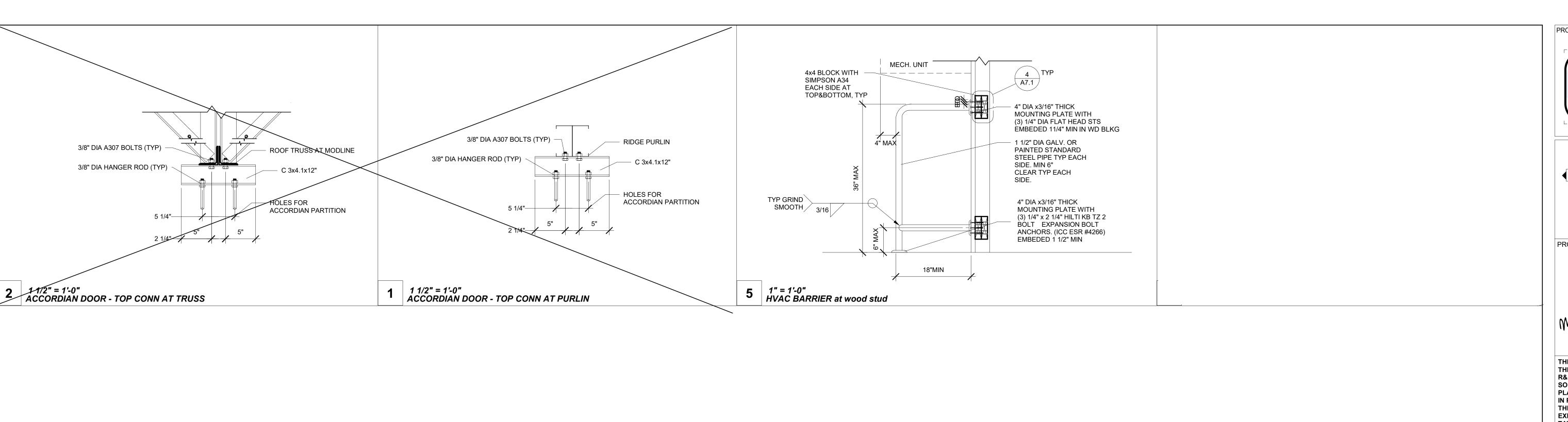
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Revision Schedule

Description Da

PRE-CHECK (PC) DOCUMENT

Code: 2022 CBC

A separate project application for construction is required

PROJECT TITLE

PC 2022 CBC: 24' x 40' EXPANDABLE TO 120' x 40'

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## ADDITIONAL OPTION DETAILS

PROJECT NUMBER
22088

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(ALL CONDUCTORS SHALL BE TYPE THHN/THWN 75 DEG. C. COPPER)

#### CONDUIT FILL AND CONDUCTOR CAPACITY TABLE

DOV	0175		MAX	( NO. OF	CONDUC	TORS
ВОХ	SIZE	SIZE CU. IN.		#10	#8	#6
4SS	1 1/4"x4" SQ	18.0	8	7	6	0
4S	1 1/2"x4" SQ	21.0	9	8	7	0
4SD	2 1/8"x4" SQ	30.3	13	12	10	6
4SX	2 7/8"x4" SQ	43.5	23	21	17	10
5SD	2 1/8"x4-11/16" SQ	42.0	18	16	14	6
5SX	3 7/8"x4-11/16" SQ	86.0	38	34	28	17
664	4"x6" SQ	144.0	64	57	48	28

\* DEDUCT ONE CONDUCTOR FOR (1) OR MORE GROUNDING CONDUCTORS ENTERING THE BOX

#### JUNCTION BOX SIZE TABLE

915.4 CARBON MONOXIDE ALARMS. CARBON MONOXIDE ALARMS SHALL COMPLY WITH SECTIONS 915.4.1 THROUGH 915.4.4.

[F] 915.4.1 POWER SOURCE. CARBON MONOXIDE ALARMS SHALL RECEIVE THEIR PRIMARY POWER FROM THE BUILDING WIRING WHERE SUCH WIRING IS SERVED FROM A COMMERCIAL SOURCE, AND WHEN PRIMARY POWER IS INTERRUPTED, SHALL RECEIVE POWER FROM BATTERY. WIRING SHALL BE PERMANENT AND WITH-OUT A DISCONNECTING SWITCH OTHER THAN REQUIRED FOR OVERCURRENT PROTECTION.

915.2.3 GROUP E OCCUPANCIES. CARBONS MONOXIDE DETECTION SHALL BE INSTALLED IN CLASSROOMS IN GROUP E OCCUPANCIES. CARBON MONOXIDE ALARM SIGNALS SHALL BE AUTOMATICALLY TRANSMITTED TO AN ON-SITE LOCATION THAT IS STAFFED BY SCHOOL PERSONNEL.

915.3 DETECTION EQUIPMENT. CARBON MONOXIDE DETECTION REQUIRED BY SECTIONS 915.1 THROUGH 915.2.3 SHALL BE PROVIDED BY CARBON MONOXIDE DETECTION SYSTEMS COMPLYING WITH SECTION 915.5.

#### **CARBON MONOXIDE DETECTION - SECTION 915**

LOCATION FOR PERPENDICULAR APPROACH

## 25" MAX FOR SIDE APPROACH \* 30"x48" MIN CLR FLOOR SPACE AT EACH OVER OBSTRUCTION

MOUTING ELEV

1. PROVIDE MIN 30"x48" CLR FLOOR SPACE FOR PERPENDICULAR APPROACH AT EACH LOCATION.

THE KNEE/TOE SPACE MUST EXTEND TO THE SAME

ABOVE- 25" MAX 11.B308.2.2

DEPTH AS THE ACCESSIBLE OUTLET/SWITCH LOCATED

\* SEE DETAIL 2/M0.2

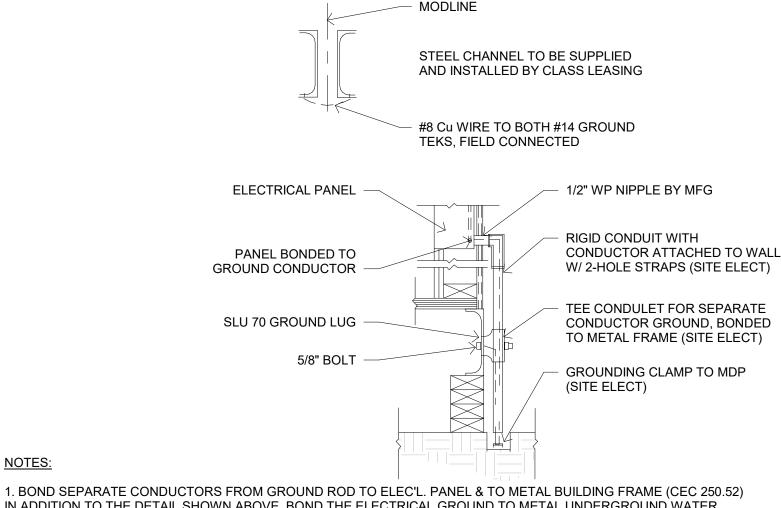
2. THE SWITCH OR SWITCHES INSTALLED IN EMERGENCY LIGHTING CIRCUITS SHALL BE SO ARRANGED THAT ONLY AUTHORIZED PERSONNEL WILL HAVE CONTROL OF EMERGENCY LIGHTING. (CEC art. 700.20)

3. PROVIDE SPACE ON ELECTRICAL PANEL FOR LOCK-ON BREAKER, IDENTIFIED WITH RED MARKING, FOR 120 VOLTS FIRE ALARM CIRCUIT, WITH BREAKER LABELED AS FIRE ALARM CIRCUIT, CEC 760.41 (B). BREAKER AND CIRCUIT PROVIDED AND INSTALLED ON SITE BY OTHERS.

4. SMOKE AND HEAT DETECTOR CONDUIT AND DEVICES TO BE PROVIDED AND INTERCONNECTED TO THE FIRE ALARM SYSTEMS ON

5. APPROVAL OF THIS PLAN DOES NOT CONSTITUTE APPROVAL OF THIS FIRE ALARM SYSTEM FOR ALL SITES. THE FIRE ALARM SYSTEM AND COMPONENTS MAYBE REQUIRED TO BE CHANGED DUE TO EXISTING CONDITIONS OR INCOMPATIBLE COMPONENTS.

ACCEPTANCE TESTS BE COMPLETED ON NEWLY INSTALLED OR REPLACEMENT OF LIGHTING CONTROLS BEFORE PROJECT COMPLETION PER THE CALIFORNIA ENERGY CODE SECTION 10-103. ACCEPTANCE TESTS MUST BE PERFORMED BY A CERTIFIED ACCEPTANCE TEST TECHNICIAN (ATT). THE ACCEPTANCE TESTING PROCEDURES MUST BE REPEATED, AND DEFICIENCES CORRECTED UNTIL THE INSTALLATION OF THE SPECIFIED SYSTEMS CONFORM AND PASS THE REQUIRED ACCEPTANCE CRITERIA. COMPLETED NRCA FORMS SHALL BE SUBMITTED TO THE PROJECT INSPECTOR AND THE DISTRICT



IN ADDITION TO THE DETAIL SHOWN ABOVE. BOND THE ELECTRICAL GROUND TO METAL UNDERGROUND WATER PIPE IN DIRECT CONTACT WITH THE EARTH FOR 10 FT. OR MORE, IF AVAILABLE (CEC 250.52)

2. TESTING FOR RESISTANCE TO GROUND, IF RESISTANCE EXCEEDS 25 OHMS INSTALL ADDITIONAL GROUND RODS SEPARATED AT LEAST 6 FEET, UNTIL RESISTANCE REDUCES TO 25 OHMS OR LESS. GROUND TEST MUST BE DONE IN THE PRESENCE OF THE PROJECT INSPECTOR AND ALL GROUNDING SHALL BE IN ACCORDANCE WITH CEC ARTICLE

3. ELEC. TRADE SHALL CHECK AREA FOR EXISTING CONDUITS, SEWER, GAS & WATER PIPING BEFORE DRIVING GROUND RODS.

4. ALL MODULES OF STEEL FRAME BLDGS. SHALL BE ELECTRICALLY BONDED TOGETHER (BOLTING ONLY IS NOT ACCEPTABLE BONDING). BONDING SHALL INCLUDE METAL RAMP & STAIRS.

5. SIZE OF CONDUCTORS SHALL COMPLY WITH CEC TABLE 250.66

6. EACH BUILDING SHALL BE GROUNDED SEPARARELY WITH A 3/4" ROUND X 8 FEET COPPERCLAD STEEL GROUND ROD. WHERE ROCK BOTOOM IS FOUND, DRIVE ROD AT 45 DEGREES MAXIMUM FROM THE VERTICAL OR HAVE IT BURIED IN A TRENCH 30" DEEP MINIMUM.

ACCEPTANCE TESTS BE COMPLETED ON NEWLY INSTALLED OR REPLACEMENT OF LIGHTING CONTROLS BEFORE PROJECT COMPLETION PER THE CALIFORNAI ENERGY CODE SECTION 10-103. ACCEPTANCE TESTS MUST BE PERFORMED BY A CERTIFIED ACCEPTANCE TEST TECHNICIAN (ATT). THE ACCEPTANCE TESTING PROCEDURES MUST BE REPEATED, AND DEFICIENCIES CORRECTED UNTIL THE INSTALLATION OF THE SPECIFIED SYSTEMS CONFORM AND PASS THE REQUIRED ACCEPTANCE CRITERIA. COMPLETED NRCA FORMS SHALL BE SUBMITTED TO THE PROJECT INSPECTOR AND THE DISTRICT.

#### TYPICAL GROUNDING DETAILS

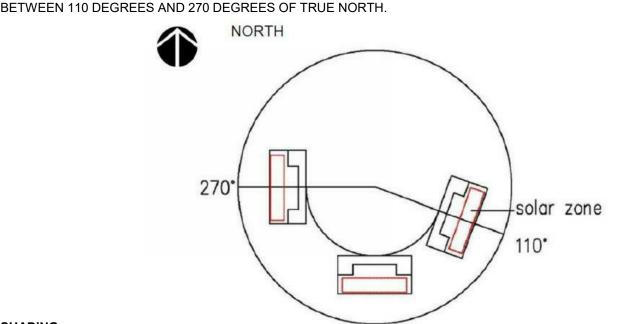
REFER TO DSA IR 16-8 & STATE FIRE MARSHAL SOLAR PHOTOVOLTAIC INSTALLATION GUIDELINE

REFER TO SECTION 110.10 - MANDATORY REQUIREMENTS FOR SOLAR READY BUILDINGS SOLAR ZONE AREAS WILL VARY DEPENDING ON PC BUILDING LOCATION.

#### MINIMUM AREA:

15% OF ROOF AREA (EXCLUDING ANY SKYLIGHT AREA) TO BE RESERVED FOR SOLAR PANEL APPLICATION OR SOLAR READY WILL BE SUPPLIED FROM A BUILDING OR STRUCTURE WITHIN 250 FT OF PC BUILDING.

ALL SECTIONS OF THE SOLAR ZONE LOCATED ON STEEP-SLOPED ROOFS GREATER THAN 2:12 SHALL BE ORIENTED



 $D \ge 2 \times H$ 

ANY OBSTRUCTION, LOCATED ON THE ROOF OR ANY OTHER PART OF THE BUILDING THAT PROJECTS ABOVE THE SOLAR ZONE SHALL BE LOCATED AT A SUFFICIENT HORIZONTAL DISTANCE AWAY FROM THE SOLAR ZONE, IN ORDER TO REDUCE THE RESULTING SHADING OF THE SOLAR ZONE. FOR EACH OBSTRUCTION, THE HORIZONTAL DISTANCE ("D") FROM THE OBSTRUCTION TO THE SOLAR ZONE SHALL BE AT LEAST TWO TIMES THE HEIGHT DIFFERENCE ("H") BETWEEN THE HIGHEST POINT OF THE OBSTRUCTION AND THE HORIZONTAL PROJECTION OF THE NEAREST POINT OF THE SOLAR ZONE.

SOURCE: CALIFORNIA ENERGY COMMISSION

#### STRUCTURAL DESIGN LOADS:

ENTIRE ROOF SURFACE IS DESIGNED STRUCTURALLY TO ACCOMMODATE SOLAR PANELS = 3 PSF

#### **INTERCONNECTION PATHWAYS:**

THE LOCATION FOR INVERTERS AND METERING EQUIPMENT AND A PATHWAY FOR ROUTING OF CONDUIT FROM THE SOLAR ZONE TO THE POINT OF INTERCONNECTION WITH THE ELECTRICAL SERVICE WILL VARY DEPENDING ON PC BUILDING LOCATION.

SOLAR ZONE AREA

#### LEGEND

ELECTRICAL PANEL AT +60" AFF TO TOP OF ELECTRICAL PANEL WITH 1 1/2" DIA POWER STUB OUT ROOF MOUNTED HVAC UNIT-SEE MECHANICAL DWGS

WALL MOUNTED HVAC UNIT, SEE MECHANICAL DWGS

100 CFM CEILING MOUNTED EXHAUST FAN. INTERLOCKED WITH LIGHT SWITCH

4SD J-BOX FOR WATER HEATER LOCATE ABOVE CEILING W/ COVER PLATE, HARD WIRE TO UNIT 4SD J-BOX IN ATTIC FOR ATTIC MOUNTED HEAT DETECTOR (DEVICE BY OTHERS). MAXIMUM 35'-0" FROM ANY POINT IN ATTIC BUT NOT MORE THAN 25'-0" FROM TWO PERPENDICULAR WALL AND 50'-0" BETWEEN THEM. PROVIDE A 6'-0" CONDUIT FROM EACH J-BOX TO HEAT DETECTOR LOCATION. CONDUIT & CONNECTION TO CEILING DEVICE & DEVICE BY OTHERS (ALARM NOTE #1)

4SD J-BOX IN ATTIC FOR CEILING MOUNTED SMOKE DETECTOR (DEVICE BY OTHERS). MAXIMUM 21'-0" FROM ANY POINT IN ROOM BUT NOT MORE THAN 15'-0" TO A PERPENDICULAR WALL AND 30'-0" BETWEEN THEM. PROVIDE A 6'-O" CONDUIT FROM EACH J-BOX TO SMOKE DETECTOR LOCATION. CONDUIT & CONNECTION TO CEILING DEVICE & DEVICE BY OTHERS (ALARM NOTE #1)

RECESSED 4SD J-BOX W/ COVER PLATE FOR FUTURE FIRE ALARM SYSTEM BY OTHERS, MOUNT AT +18" AFF U.O.N. TO CENTERLINE OF BOX AND PROVIDE 1" CO STUB TO ATTIC SPACE WITH PULLSTRING

4SD J-BOX FOR EXTERIOR FIRE ALARM HORN (DEVICE BY OTHERS). MOUNT AT +90" AFF TO TOP OF DEVICE WITH 3/4" CONDUIT STUBBED TO ATTIC WITH PULLSTRING

4SD J-BOX/SINGLE GANG MUD RING FOR FIRE ALARM STROBE (DEVICE BY OTHERS). BOTTOM OF LENS 80" MIN TOP OF LENS 96" MAX AFF WITH 3/4"CONDUIT TO EXTERIOR FIRE ALARM HORN WITH PULLSTRING

4SD J-BOX/ SINGLE GANG MUD RING FOR FIRE ALARM PULL STATION (DEVICE BY OTHERS). MOUNT AT +48" AFF TO TOP OF CONTROL BOX WITH 3/4" CONDUIT TO FIRE ALARM STROBE WITH PULLSTRING

EXIT SIGN WITH BATTERY BACK UP. EXIT SIGN REQUIRED FOR CLASSROOMS WITH TWO OR MORE EXTERIOR DOORS. FLS 90' BACK UP. CLASSROOMS WITH ONE EXTERIOR DOOR-OPTIONAL

ТО ВОТТОМ

OF BOX

CLOCK OUTLET AT +90" AFF TO CENTERLINE OF DEVICE

EXTERIOR LED LIGHT FIXTURE. 30w MAX WITH PHOTOCELL MOUNT AT +93" AFF

ROOF MOUNTED WEATHER PROOF GFI RECEPTACLE GROUND FAULT CIRCUIT INTERRUPT RECEPTACLE WITHIN 6'-0" OF ALL SINKS

> EXTERIOR WEATHER PROOF GFI RECEPTACLE AT +24" AFF FOR A/C SERVICES (MAX 25'-0" FROM UNITS)

DUPLEX (WALL MOUNTED) RECEPTACLE 15A-125V-3 WIRE. MOUNT AT +15" AFF U.O.N. TO BOTTOM OF OUTLET BOX

LIGHT SWITCH. MOUNT AT+48" AFF TO TOP OF SWTICH BOX

3-WAY LIGHT SWITCH. MOUNT AT+48" AFF TO TOP OF SWITCH BOX

SINGLE BUTTON DIMMER SWITCH, AT +48" AFF, TO TOP OF SWITCH

BOX, WATTSTOPPER #LMDM-101 OR EQUAL

<u>SINGLE SWITCH WALL OCCUPANCY SENSOR</u> WATTSTOPPER PW-100 OR EQUAL. SENSOR TO BE

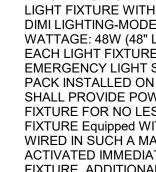
AT +44" AFF AND USE FOR OPEN ROOM (OR RESTROOM) LESS THAN 100 SQ FT W/ (1) CIRCUIT. **ULTRASONIC CEILING OCCUPANCY SENSOR** 

WATTSTOPPER W-500A OR EQUAL. SENSOR TO BE CONNECTED TO KEYED LIGHT SWITCHES FOR MANUAL OVERRIDE AND USE FOR RESTROOM W/ PARTITIONS.

CEILING MOUNTED PHOTOCELL, WATTSTOPPER #LMLS-500 OR EQUAL

#### CEILING MOUNTED OCCUPANCY SENSOR. WATTSTOPPER #LMPC-100 OR EQUAL.

2x4 CEILING LIGHT WITH (3) LED PANELIGHT, LAY-IN LIGHT FIXTURE WITH DIMMABLE BALLAST DIMI LIGHTING-MODEL DM-P72448W-40K-ZZ WATTAGE: 48W (48" LG) OR EQUAL



2x4 CEILING LIGHT WITH (3) LED PANELIGHT, LAY-IN LIGHT FIXTURE WITH DIMMABLE BALLAST DIMI LIGHTING-MODEL DM-P72448W-40K-ZZ WATTAGE: 48W (48" LG) OR EQUAL EACH LIGHT FIXTURE WHICH IS INDICATED AS BEING AN EMERGENCY LIGHT SHALL HAVE A BALLAST BATTERY PACK INSTALLED ON THE FIXTURE. THE BATTERY PACK SHALL PROVIDE POWER TO A SINGLE LAMP WITHIN THE FIXTURE FOR NO LESS THAN 90 MINUTES. ANY LIGHT FIXTURE Equipped WITH A BATTERY PACK SHALL BE WIRED IN SUCH A MANNER THAT THE BATTERY WILL BE ACTIVATED IMMEDIATELY UPON LOSS OF POWER TO THE FIXTURE. ADDITIONALLY THE BATTERY PACK SHALL BE OPERATED USING BATTERY POWER LIGHTING CONTROL SWITCHES AND SENSORS SHALL NOT BE ABLE TO SHUT THE FIXTURE OFF.

NOTE: SEE 4/A3.2 FOR PHOTOMETRIC DATA 8 1" = 1'-0"
ELECTRICAL LEGEND

INSTALLATION SHALL BE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (NEC) -2020 EDITION AND NATIONAL FIRE PROTECTION ASSOCIATION FIRE CODES (NFPA). AND 2022 CBC ELECTRICAL CODE.

ELECTRICAL EQUIPMENT LOCATIONS INDICATED ARE SHOWN DIAGRAMMATICALLY, EXACT

LOCATION SHALL BE VERIFIED AND ADJUSTED FOR FIELD CONDITIONS.

RECEPTACLES AND TELEPHONE/DATA OUTLETS SHALL BE INSTALLED 18" AFF TO THE CENTER OF THE DEVICE, UNLESS NOTED OTHERWISE.

CONTRACTOR SHALL FIELD TEST AND PROVIDE TEST REPORT VERIFYING THAT RECEPTACLES ARE WIRED AND FUCTION PROPERLY.

CONTRACTOR SHALL LABEL EACH RECEPTACLE, LIGHT FIXTURE, TOGGLE SWITCH, SAFETY SWITCH AND OCCUPANCY SENSOR WITH PANEL NAME AND BRANCH CIRCUIT ID.

WEATHERPROOF RECEPTACLES SHALL BE TYPE TO PROTECT RECEPTACLE FROM WEATHER WHEN PLUG INSERTED.

THE MATERIAL REQUIRED FOR THE WORK SHALL BE CONTRACTOR FURNISHED AND CONTRACTOR INSTALLED, UNLESS SPECIFICALLY NOTED OTHERWISE. CONTRACTOR SHALL ASSUME NOTES LISTING MATERIAL AND/OR EQUIPMENT BEGIN WITH THE WORDS "SUPPLY AND INSTALL" U.O.N.".

CONTRACTOR SHALL VERIFY EXISTING CONDITIONS BEFORE SUBMITTING MATERIAL AND BECOME THOROUGHLY FAMILIAR WITH ACTUAL EXISTING CONDITIONS AT THE SITE. BY THE ACT OF SUBMITTING PROPOSED MATERIALS FOR THE WORK, THE CONTRACTOR SHALL BE DEEMED TO HAVE MADE SUCH STUDY AND EXAMINATION AND TO ACCEPT ALL CONDITIONS RESENT AT THE SITE. NO REQUEST FOR ADDITIONAL PAYMENT WILL BE CONSIDERED AS VALID, DUE TO FAILURE TO ALLOW FOR CONDITIONS, WHICH MAY EXIST

CONTRACTOR'S SCOPE SHALL INCLUDE ALL WORK SHOWN ON THE PLANS AND SPECIFICATIONS. SUBSTITUTION REQUESTS FOR EQUIPMENT SPECIFIED SHALL BE SUBMITTED FOR CONSIDERATION TO THE OWNER AND ENGINEER IN WRITING. ALL SUBSTITUTIONS MUST BE REVIEWED BY THE ENGINEER. SUCH REVIEW SHALL NOT RELIEVE THE CONTRACTOR COMPLYING WITH THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS, AND THE CONTRACTOR SHALL BE RESPONSIBLE AT HIS OWN EXPENSE FOR ANY CHARGES RESULTING FROM HIS PROPOSED SUBSTITUTIONS WHICH AFFECT OTHER PARTS OF HIS OWN WORK, THE OWNER, ENGINEER OF RECORD, OR THE WORK OF OTHER CONTRACTORS.

COORDINATE ALL WORK WITH OTHER TRADES. OBTAIN ALL DRAWINGS THAT WILL REQUIRE COORDINATION AND PROVIDE ALL ELECTRICAL CONNECTIONS REQUIRED WHETHER SHOWN ON ELECTRICAL DRAWINGS OR NOT.

UNINTERRUPTED EXISTING ELECTRICAL POWER SHALL BE MAINTAINED TO OTHER TRADES FOR TEMPORARY POWER AREAS OF THE SITE DURING CONSTRUCTION. PROVIDE ANY TEMPORARY SERVICES AS MAY BE REQUIRED. IDENTIFY AT BID TIME.

ALL PENETRATIONS IN RATED WALLS (INDICATED IN ARCHITECTURAL LIFE SAFETY PLANS), ARE TO BE INSTALLED USING THE APPROPRIATE UL RATED PENETRATION ASSEMBLIES.

EQUIPMENT SHALL BE LISTED, LABELED OR CERTIFIED FOR ITS USE BY A NATIONALLY RECOGNIZED TESTING LABORATORY (NRTL) AS RECOGNIZED BY THE U.S. DEPARTMENT OF LABOR, OCCUPATIONAL SAFETY AN HEALTH ADMINISTRATION.

14. ALL ELECTRICAL EQUIPMENT CONNECTORS SHALL BE 75° RATED.

ALL ELECTRICAL COMPONENTS SHALL BE ANCHORED AND INSTALLED PER THE DETAILS ON THE DSA APPROVED CONSTRUCTION DOCUMENTS. WHERE NO DETAIL IS INDICATED, THE FOLLOWING COMPONENTS SHALL BE ANCHORED OR BRACED TO MEET THE FORCE AND DISPLACEMENT REQUIREMENTS PRESCRIBED IN THE 2022 CBC, SECTIONS 1616A.1.18 THROUGH 1616A.1.26 AND ASCE 7-10 CHAPTER 13, 26 AND 30.

A. ALL PERMANENT EQUIPMENT AND COMPONENTS. B. TEMPORARY OR MOVABLE EQUIPMENT THAT IS PERMANENTLY ATTACHED (E.G. HARD WIRED) TO THE BUILDING UTILITY SERVICES SUCH AS ELECTRICITY, GAS OR WATER C. MOVABLE EQUIPMENT WHICH IS STATIONED IN ONE PLACE FOR MORE THAN 8 HOURS AND HEAVIER THAN 400 POUNDS ARE REQUIRED TO BE ANCHORED WITH TEMPORARY

THE ATTACHMENT OF THE FOLLOWING ELECTRICAL COMPONENTS SHALL BE POSITIVELY ATTACHED TO THE STRUCTURE, BUT NEED NOT BE DETAILED ON THE PLANS. THESE COMPONENTS SHALL HAVE FLEXIBLE CONNECTIONS PROVIDED BETWEEN THE COMPONENT AND ASSOCIATED DUCTWORK, PIPING, AND CONDUIT.

A. COMPONENTS WEIGHING LESS THAN 400 POUNDS AND HAVE A CENTER OF MASS LOCATED 4 FEET OR LESS ABOVE THE ADJACENT FLOOR OR ROOF LEVEL THAT DIRECTLY B. COMPONENTS WEIGHING LESS THAN 20 POUNDS, OR IN THE CASE OF DISTRIBUTED SYSTEMS, LESS THAN 5 POUNDS PER FOOT, WHICH ARE SUSPENDED FROM A ROOF OR

FLOOR OR HUNG FROM A WALL FOR THOSE ELEMENTS THAT DO NOT REQUIRE DETAILS ON THE APPROVED DRAWINGS, THE INSTALLATION SHALL BE SUBJECT TO THE APPROVAL OF THE STRUCTURAL ENGINEER OF

RECORD AND THE DSA DISTRICT STRUCTURAL ENGINEER. THE PROJECT I NSPECTOR WILL VERIFY THAT ALL COMPONENTS AND EQUIPMENT HAVE BEEN ANCHORED IN ACCORDANCE WITH ABOVE REQUIREMENTS.

ELECTRICAL DISTRIBUTION SYSTEMS SHALL BE BRACED TO COMPLY WITH THE FORCES AND DISPLACEMENTS PRESCRIBED IN ASCE 7-10 SECTION 13.3 AS DEFINED IN ASCE 7-10 SECTION 13.6.8, 13.6.7, 13.6.5.6 AND 2022 CBC SECTIONS 1616A.1.23, 1616A.1.24, 1616A.1.25 AND

THE BRACING AND ATTACHMENTS TO THE STRUCTURE SHALL BE DETAILED ON THE APPROVED DRAWINGS OR THEY SHALL COMPLY WITH ONE OF THE OSHPD PRE-APPROVALS

(OPA #) AS MODIFIED TO SATISFY ANCHORAGE REQUIREMENTS OF ACI 318, APPENDIX D. COPIES OF THE MANUAL SHALL BE AVAILABLE ON THE JOBSITE PRIOR TO THE START OF

HANGING AN BRACING OF THE PIPE, DUCTWORK AND ELECTRICAL DISTRIBUTION SYSTEMS. THE STRUCTURAL ENGINEER OF RECORD SHALL VERIFY THE ADEQUACY OF THE STRUCTURE TO SUPPORT THE HANGER AND BRACE LOADS.

ELEC. TRADE SHALL CHECK AREA FOR EXISTING CONDUITS, SEWER, GAS & WATER PIPING BEFORE DRIVING GROUND RODS.

NON-CURRENT CARRYING METAL PARTS OF THE SYSTEM SHALL BE PROPERLY GROUNDED TO COMPLY WITH NEC REQUIREMENTS.

EACH BUILDING SHALL BE GROUNDED SEPARARELY WITH A ¾" ROUND X 8 FEET COPPERCLAD STEEL GROUND ROD. WHERE ROCK BOTOOM IS FOUND, DRIVE ROD AT 45 DEGREES MAXIMUM FROM THE VERTICAL OR HAVE IT BURIED IN A TRENCH 30" DEEP

TESTING FOR RESISTANCE TO GROUND, IF RESISTANCE EXCEEDS 25 OHMS INSTALL ADDITIONAL GROUND RODS SEPARATED AT LEAST 6 FEET, UNTIL RESISTANCE REDUCES TO 25 OHMS OR LESS. GROUND TEST MUST BE DONE IN THE PRESENCE OF THE PROJECT INSPECTOR AND ALL GROUNDING SHALL BE IN ACCORDANCE WITH CEC ARTICLE 250

PROVIDE A GREEN WIRE GROUND CONDUCTOR IN ALL CONDUITS WITH POWER OR LIGHTING CONDUCTORS.

BOND SEPARATE CONDUCTORS FROM GROUND ROD TO ELEC'L. PANEL & TO METAL BUILDING FRAME (CEC 250.52) IN ADDITION TO THE DETAIL SHOWN ABOVE. BOND THE ELECTRICAL GROUND TO METAL UNDERGROUND WATER PIPE IN DIRECT CONTACT WITH THE EARTH FOR 10 FT. OR MORE, IF AVAILABLE (CEC 250.52)

CHECK RESISTANT TO GROUND ROD. IF RESISTANCE EXCEEDS 25 OHMS. INSTALL ADDITIONAL GROUND RODS WITH CONDUCTORS AS SHOWN SEPARATED AT LEAST 6'-0" UNTIL RESISTANCE IS REDUCED TO 25 OHMS OR LESS (CEC 250.56).

ALL MODULES OF STEEL FRAME BLDGS. SHALL BE ELECTRICALLY BONDED TOGETHER (BOLTING ONLY IS NOT ACCEPTABLE BONDING). BONDING SHALL INCLUDE METAL RAMP &

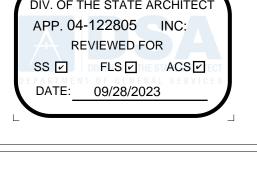
SIZE OF CONDUCTORS SHALL COMPLY WITH CEC TABLE 250.66

PER CEC210.8(B) ALL RECEPTACLES AT THE FOLLOWING LOCATIONS SHALL HAVE GROUND-FAULT CIRCUIT INTERRUPTER (GFCI) - (1) BATHROOMS, (2) KITCHENS, (3) SINKS (WITHIN 6 FT), (4) INDOOR WET AREAS, (5) LOCKER ROOMS, (6) GARAGE, SERVICE BAYS OR SIMILAR, (7) ROOFTOPS, (8) OUTDOORS.

IF CLOSED BY GWB INSTALL ONE ATTIC HEAT DETECTOR PER MODULE: WHEN STANDARD OPEN WEB TRUSS SYSTEM IS USED ADDITIONAL ATTIC HEAT DETECTORS ARE NOT

**ELECTRICAL GENERAL NOTES** 

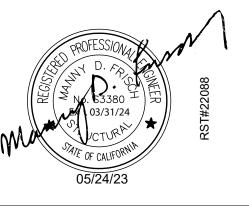
IDENTIFICATION STAMP DIV. OF THE STATE ARCHITECT APP. 04-122805 INC: REVIEWED FOR SS 🗹 FLS 🗹 ESTACS 🗹



PROJECT SPECIFIC STATE AGENCY APPROVAL

DESIGN ♦ CONSULTING ♦ PROJECT MG 11590 W. BERNARDO COURT, SUITE 100 SAN DIEGO, CA 92127 WWW.RSTAVARES.COM

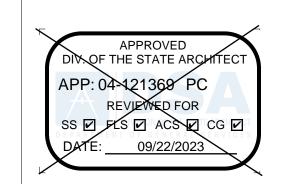
PROFESSIONAL STAMP



THE PLANS, IDEAS & DESIGNS SHOWN ON THESE DRAWINGS ARE THE PROPERTY OF R&S TAVARES ASSOCIATES, INC. DEVISED SOLELY FOR THIS CONTRACT. THESE PLANS SHALL NOT BE USED, IN WHOLE OR IN PART, FOR ANY PURPOSE FOR WHICH THEY WERE NOT INTENDED WITHOUT THE EXPRESS WRITTEN CONSENT OF R&S TAVARES ASSOCIATES, INC. ©



Perris, CA 92571 ORIGINAL PC STATE AGENCY APPROVAL



Revision Schedule Description

PRE-CHECK (PC) DOCUMENT

A separate project application for construction is required

PROJECT TITLE PC 2022 CBC: 24' x 40' **EXPANDABLE TO** 120' x 40'

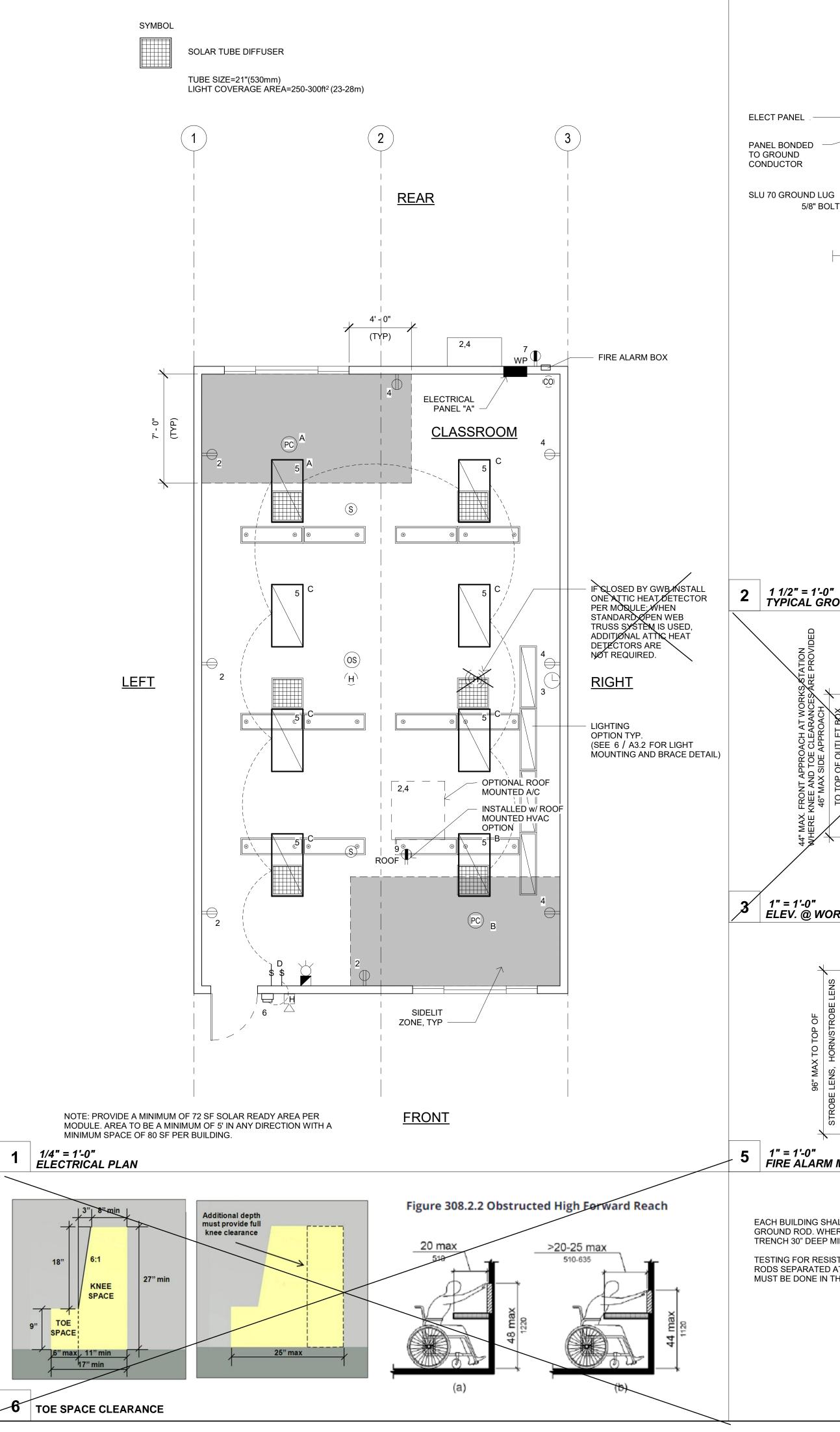
**ELECTRICAL** 

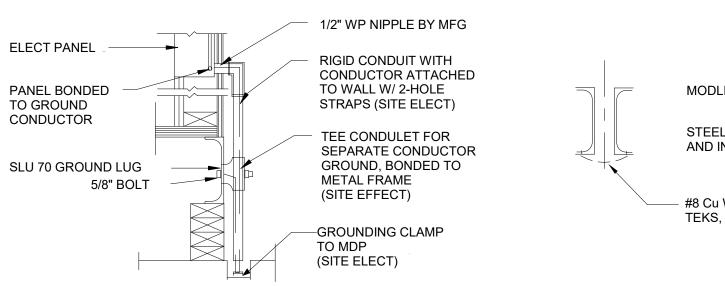
**GENERAL NOTES** 

PROJECT NUMBER 22088

CHECKED BY DATE

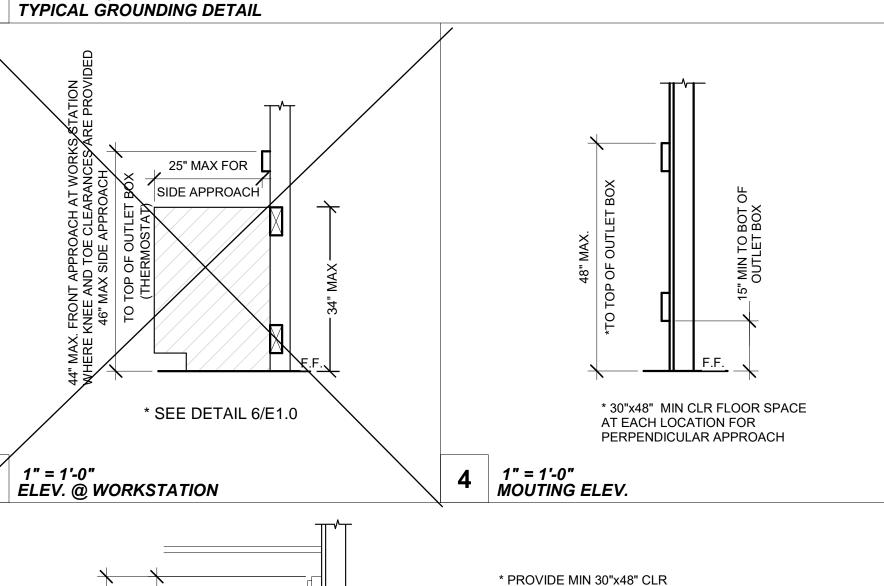
FIRE ALARM MOUNTING HEIGHTS





NOTES:

- 1. BOND SEPARATE CONDUCTORS FROM GROUND ROD TO ELEC'L. PANEL & TO METAL BUILDING FRAME (CEC 250.52) IN ADDITION TO THE DETAIL SHOWN ABOVE. BOND THE ELECTRICAL GROUND TO METAL UNDERGROUND WATER PIPE IN DIRECT CONTACT WITH THE EARTH FOR 10 FT. OR MORE, IF AVAILABLE (CEC 250.52)
- 2. CHECK RESISTANT TO GROUND ROD. IF RESISTANCE EXCEEDS 25 OHMS. INSTALL ADDITIONAL GROUND RODS WITH CONDUCTORS AS SHOWN SEPARATED AT LEAST 6'-0" UNTIL RESISTANCE IS REDUCED TO 25 OHMS OR LESS (CEC 250.56).
- 3. ELEC. TRADE SHALL CHECK AREA FOR EXISTING CONDUITS, SEWER, GAS & WATER PIPING BEFORE DRIVING GROUND RODS.
- 4. ALL MODULES OF STEEL FRAME BLDGS. SHALL BE ELECTRICALLY BONDED TOGETHER (BOLTING ONLY IS NOT ACCEPTABLE BONDING). BONDING SHALL INCLUDE METAL RAMP & STAIRS.
- 5. SIZE OF CONDUCTORS SHALL COMPLY WITH CEC TABLE 250.66



MODLINE

STEEL CHANNEL TO BE SUPPLIED AND INSTALLED BY CLASS LEASING.

#8 Cu WIRE TO BOTH #14 GROUND TEKS, FIELD CONNECTED

EMERGENCY LIGHTING CIRCUITS SHALL BE SO ARRANGED THAT ONLY AUTHORIZED PERSONNEL WILL HAVE CONTROL OF EMERGENCY LIGHTING.

(CEC art. 700.20)

FLOOR SPACE FOR

AT EACH LOCATION

PERPENDICULAR APPROACH

THE SWITCH OR SWITCHES INSTALLED IN

FIRE ALARM MOUNTING HEIGHTS

## GENERAL GROUNDING NOTES

EACH BUILDING SHALL BE GROUNDED SEPARARELY WITH A ¾" ROUND X 8 FEET COPPERCLAD STEEL GROUND ROD. WHERE ROCK BOTOOM IS FOUND, DRIVE ROD AT 45 DEGREES MAXIMUM FROM THE VERTICAL OR HAVE IT BURIED IN A TRENCH 30" DEEP MINIMUM.

TESTING FOR RESISTANCE TO GROUND, IF RESISTANCE EXCEEDS 25 OHMS INSTALL ADDITIONAL GROUND RODS SEPARATED AT LEAST 6 FEET, UNTIL RESISTANCE REDUCES TO 25 OHMS OR LESS. GROUND TEST MUST BE DONE IN THE PRESENCE OF THE PROJECT INSPECTOR AND ALL GROUNDING SHALL BE IN ACCORDANCE WITH CEC ARTICLE 250

#### MEP COMPONENT ANCHORAGE NOTE

ALL MECHANICAL, PLUMBING, AND ELECTRICAL COMPONENTS SHALL BE ANCHORED AND INSTALLED PER THE DETAILS ON THE DSA-APPROVED CONSTRUCTION DOCUMENTS. THE FOLLOWING COMPONENTS SHALL BE ANCHORED OR BRACED TO MEET THE FORCE AND DISPLACEMENT REQUIREMENTS PRESCRIBED IN THE 2022 CBC SECTIONS 1617A.1.18 THROUGH 1617A.1.26 AND ASCE 7-16 CHAPTERS 13, 26, AND 30:

ALL PERMANENT EQUIPMENT AND COMPONENTS.
 TEMPORARY, MOVABLE OR MOBILE EQUIPMENT THAT IS PERMANENTLY ATTACHED (E.G., HARD WIRED) TO THE BUILDING UTILITY SERVICES SUCH AS ELECTRICITY, GAS OR WATER. "PERMANENTLY ATTACHED" SHALL INCLUDE ALL ELECTRICAL CONNECTIONS EXCEPT PLUGS FOR 110/220 VOLT RECEPTACLES HAVING A FLEXIBLE CABLE. TEMPORARY, MOVABLE OR MOBILE EQUIPMENT WHICH IS HEAVIER THAN
 400 POUNDS OR HAS A CENTER OF MASS LOCATED 4 FEET OR

3. 400 POUNDS OR HAS A CENTER OF MASS LOCATED 4 FEET OR MORE ABOVE THE ADJACENT FLOOR OR ROOF LEVEL THAT DIRECTLY SUPPORT THE COMPONENT IS REQUIRED TO BE RESTRAINED IN A MANNER APPROVED BY DSA.

THE FOLLOWING MECHANICAL AND ELECTRICAL COMPONENTS SHALL BE POSITIVELY ATTACHED TO THE STRUCTURE BUT NEED NOT DEMONSTRATE DESIGN COMPLIANCE WITH THE REFERENCES NOTED ABOVE. THESE COMPONENTS SHALL HAVE FLEXIBLE CONNECTIONS PROVIDED BETWEEN THE COMPONENT AND ASSOCIATED DUCTWORK, PIPING, AND CONDUIT. FLEXIBLE CONNECTIONS MUST ALLOW MOVEMENT IN BOTH TRANSVERSE AND LONGITUDINAL DIRECTIONS:

A. COMPONENTS WEIGHING LESS THAN 400 POUNDS AND HAVING A CENTER OF MASS LOCATED 4 FEET OR LESS ABOVE THE ADJACENT FLOOR OR ROOF LEVEL THAT DIRECTLY SUPPORT THE COMPONENT.
B. COMPONENTS WEIGHING LESS THAN 20 POUNDS, OR IN THE CASE OF DISTRIBUTED SYSTEMS, LESS THAN 5 POUNDS PER FOOT, WHICH ARE SUSPENDED FROM A ROOF OR FLOOR OR HUNG FROM A WALL.

THE ANCHORAGE OF ALL MECHANICAL, ELECTRICAL AND PLUMBING COMPONENTS SHALL BE SUBJECT TO THE APPROVAL OF THE DESIGN PROFESSIONAL IN GENERAL RESPONSIBLE CHARGE OR STRUCTURAL ENGINEER DELEGATED RESPONSIBILITY AND ACCEPTANCE BY DSA. THE PROJECT INSPECTOR WILL VERIFY THAT ALL COMPONENTS AND EQUIPMENT HAVE BEEN ANCHORED IN ACCORDANCE WITH THE ABOVE REQUIREMENTS.

#### PIPING, DUCTWORK, AND ELECTRICAL DISTRIBUTION SYSTEM BRACING

PIPING, DUCTWORK, AND ELECTRICAL DISTRIBUTION SYSTEMS SHALL BE BRACED TO COMPLY WITH THE FORCES AND DISPLACEMENTS PRESCRIBED IN ASCE 7-16 SECTION 13.3 AS DEFINED IN ASCE 7-16 SECTIONS 13.6.5, 13.6.6, 13.6.7, 13.6.8; AND 2022 CBC, SECTIONS 1617A.1.24, 1617A.1.25 AND 1617A.1.26.

THE METHOD OF SHOWING BRACING AND ATTACHMENTS TO THE STRUCTURE FOR THE IDENTIFIED DISTRIBUTION SYSTEM ARE AS NOTED BELOW. WHEN BRACING AND ATTACHMENTS ARE BASED ON A PREAPPROVED INSTALLATION GUIDE (E.G., HCAI OPM FOR 2013 CBC OR LATER), COPIES OF THE BRACING SYSTEM INSTALLATION GUIDE OR MANUAL SHALL BE AVAILABLE ON THE JOBSITE PRIOR TO THE START OF AND DURING THE HANGING AND BRACING OF THE DISTRIBUTION SYSTEMS. THE STRUCTURAL ENGINEER OF RECORD SHALL VERIFY THE ADEQUACY OF THE STRUCTURE TO SUPPORT THE HANGER AND BRACE

MECHANICAL PIPING (MP), MECHANICAL DUCTS (MD), PLUMBING PIPING (PP), ELECTRICAL DISTRIBUTION SYSTEMS (E):

MP☐ MD ☐ PP☐ E ☐ OPTION 1: DETAILED ON THE APPROVED DRAWINGS WITH PROJECT SPECIFIC NOTES AND DETAILS.

MP☐ MD ☐ PP☐ E ☐ OPTION 2: SHALL COMPLY WITH HCAI PREAPPROVAL (OPM #) #\_\_\_\_\_.

#### FIRE ALARM NOTES

PROVIDE SPACE ON ELECTRICAL PANEL FOR LOCK-ON BREAKER, IDENTIFIED WITH RED MARKING, FOR 120 VOLTS FIRE ALARM CIRCUIT, WITH BREAKER LABELED AS FIRE ALARM CIRCUIT, CEC 760.41 (B).
BREAKER AND CIRCUIT PROVIDED AND INSTALLED ON SITE BY OTHERS.

SMOKE AND HEAT DETECTOR CONDUIT AND DEVICES TO BE PROVIDED AND INTERCONNECTED TO THE FIRE ALARM SYSTEMS ON SITE BY OTHERS

APPROVAL OF THIS PLAN DOES NOT CONSTITUTE APPROVAL OF THIS FIRE ALARM SYSTEM FOR ALL SITES, THE FIRE ALARM SYSTEM AND COMPONENTS MAYBE REQUIRED TO BE CHANGED DUE TO EXISTING CONDITIONS OR INCOMPATIBLE

#### CONDUIT FILL AND CONDUCTOR CAPACITY TABLE

(ALL CONDUCTORS SHALL BE TYPE THHN/THWN 75 DEG. C. COPPER)

WIRE	CAPACITY	WIRE	NO. OF CONDUCTOR				
SIZE		TYPE	1/2" C	3/4" C:MI	TT1" C	1 1/4" C	
#12	20A	THHN	9	16	25	45	
#10	30A	THHN	5	10	16	28	
#8	45A	THHN	2	5	8	14	
#6	65A	THHN	1	3	5	10	
#4	85A	THHN	1	2	4	7	

#### JUNCTION BOX SIZE TABLE

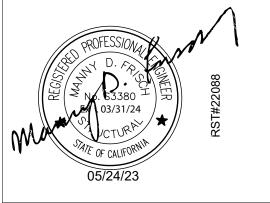
вох	SIZE	CU. IN.	MAX NO. OF CONDUCTORS					
ВОХ	SIZL	CO. IIV.	#12	#10	#8	#6		
4SS	1 1/4"x4" SQ	18.0	8	7	6	0		
4S	1 1/2"x4" SQ	21.0	9	8	7	0		
4SD	2 1/8"x4" SQ	30.3	13	12	10	6		
4SX	2 7/8"x4" SQ	43.5	23	21	17	10		
5SD	2 1/8"x4-11/16" SQ	42.0	18	16	14	6		
5SX	3 7/8"x4-11/16" SQ	86.0	38	34	28	17		
664	4"x6" SQ	144.0	64	57	48	28		

\* DEDUCT ONE CONDUCTOR FOR (1) OR MORE GROUNDING CONDUCTORS ENTERING THE BOX PROJECT SPECIFIC STATE AGENCY APPROVAL

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ORIGINAL PC STATE AGENCY APPROVAL

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DIV. OF THE STATE ARCHITECT
APP: 04-121369 PC
REVIEWED FOR
SS PLS ACS CG D
DATE: 09/22/2023

Revision Schedule

# Description

PRE-CHECK (PC) DOCUMENT

RE-CHECK (PC) DOCUMENT

Code: 2022 CBC

A separate project application for construction is required

PROJECT TITLE
PC 2022 CBC: 24' x 40'

EXPANDABLE TO 120' x 40'

ELECTRICAL PLAN
24x40

PROJECT NUMBER

22088

rMc/SC

DATE

E1.0

SHEET OF

RH/RT

DANIEL A 048 408	120/208 VOLTS, 1φ, 3 WIRE				MAIN LUGS ONLY PA		PANEL B	IEL BOX= 100A										
PANEL A 24" x40"	LOADCEN	LOADCENTER			SURFACE MOUNTED			GRD & NEUTRAL BARS		AMP BUS								
	VOL	TAMPS	10000 F		10000		10000		10000		10000 AI		10000 AIC		AIC VO		OLTAMPS	
DESCRIPTION	φА	φВ	C/B	СКТ	ф	СКТ	C/B	φА	φВ	DESCRIPTION								
AC WALL MOUNTED	6670		30	1	Α	2	20	720		OUTLETS								
		6670	30	3	В	4	20		720	OUTLETS								
GENERAL LIGHTING	720		20	5	Α	6	20	40		EXTERIOR LIGHT								
EXTERIOR GFI/WP		180	20	7	В	8	20											
			20	9	Α	10	20	40		FIRE ALARM								
DED SOLAR READY																		
DED SOLAR READY																		
SUBTOTAL	ф A 7390	φB 6850						фА 800	φB 720	SUBTOTAL								
TOTAL	8190	7570	8190 /120 VOLTS= 68.25 76.25 AMPS + .94= 77.19 AMPS				9 AMPS											

120/208 VOLTS, 1 \( \phi \), 3 WIRE MAIN LUGS ONLY PANEL BOX= 100A PANEL A 24" x40" SURFACE MOUNTED GRD & NEUTRAL BARS AMP BUS LOADCENTER **VOLTAMPS** 10000 AIC VOLTAMPS DESCRIPTION φB C/B CKT Φ CKT C/B ΦA DESCRIPTION φА φВ 7360 30 | 1 | A | 2 | 20 | 720 AC Roof Mounted OUTLETS 7360 30 3 B 4 20 720 OUTLETS 720 SENERAL LIGHTING 20 5 A 6 20 40 EXTERIOR LIGHT EXTERIOR GFI/WP 20 7 B 8 20 20 | 9 | A | 10 | 20 | 40 FIRE ALARM DED SOLAR READY DED SOLAR READY **\**8080 720 7540 SUBTOTAL SUBTOTAL 8880 /120 VOLTS= 74 TOTAL 8880 74 AMPS + 18.5= 92.5 AMPS

ELECTRICAL PANEL WALL MOUNTED

ELECTRICAL PANEL ROOF MOUNTED

LEGEND

ELECTRICAL PANEL AT +60" AFF TO TOP OF ELECTRICAL PANEL WITH 1 1/2" DIA POWER STUB OUT

ROOF MOUNTED HVAC UNIT-SEE MECHANICAL DWGS

WALL MOUNTED HVAC UNIT, SEE MECHANICAL DWGS

100 CFM CEILING MOUNTED EXHAUST FAN. INTERLOCKED WITH LIGHT SWITCH

4SD J-BOX FOR WATER HEATER LOCATE ABOVE CEILING
W/ COVER PLATE, HARD WIRE TO UNIT
4SD J-BOX IN ATTIC FOR ATTIC MOUNTED HEAT DETECTOR
(DEVICE BY OTHERS). MAXIMUM 35'-0" FROM ANY POINT IN
ATTIC BUT NOT MORE THAN 25'-0" FROM TWO PERPENDICULAR WALL
AND 50'-0" BETWEEN THEM. PROVIDE A 6'-0" CONDUIT
FROM EACH J-BOX TO HEAT DETECTOR LOCATION. CONDUIT &
CONNECTION TO CEILING DEVICE & DEVICE BY OTHERS
(ALARM NOTE #1)

4SD J-BOX IN ATTIC FOR CEILING MOUNTED SMOKE
DETECTOR (DEVICE BY OTHERS). MAXIMUM 21'-0" FROM ANY
POINT IN ROOM BUT NOT MORE THAN 15'-0" TO A PERPENDICULAR
WALL AND 30'-0" BETWEEN THEM. PROVIDE A 6'-0"
CONDUIT FROM EACH J-BOX TO SMOKE DETECTOR
LOCATION. CONDUIT & CONNECTION TO CEILING DEVICE &
DEVICE BY OTHERS (ALARM NOTE #1)

RECESSED 4SD J-BOX W/ COVER PLATE FOR FUTURE FIRE ALARM SYSTEM BY OTHERS. MOUNT AT +18" AFF U.O.N. TO CENTERLINE OF BOX AND PROVIDE 1" CO STUB TO ATTIC SPACE WITH PULLSTRING

4SD J-BOX FOR EXTERIOR FIRE ALARM HORN (DEVICE BY OTHERS). MOUNT AT +90" AFF TO TOP OF DEVICE WITH 3/4" CONDUIT STUBBED TO ATTIC WITH PULLSTRING

4SD J-BOX/SINGLE GANG MUD RING FOR FIRE ALARM STROBE (DEVICE BY OTHERS). BOTTOM OF LENS 80" MIN TOP OF LENS 96" MAX AFF WITH 3/4"CONDUIT TO EXTERIOR FIRE ALARM HORN WITH PULLSTRING

4SD J-BOX/ SINGLE GANG MUD RING FOR FIRE ALARM PULL STATION (DEVICE BY OTHERS). MOUNT AT +48" AFF TO TOP OF CONTROL BOX WITH 3/4" CONDUIT TO FIRE ALARM STROBE WITH PULLSTRING

EXIT SIGN WITH BATTERY BACK UP. EXIT SIGN REQUIRED FOR CLASSROOMS WITH TWO OR MORE EXTERIOR DOORS. FLS 90' BACK UP. CLASSROOMS WITH ONE EXTERIOR DOOR-OPTIONAL.

TO BOTTOM OF BOX

CLOCK OUTLET AT +90" AFF TO CENTERLINE OF DEVICE

EXTERIOR LED LIGHT FIXTURE. 30w MAX WITH PHOTOCELL

MOUNT AT +93" AFF

ROOF MOUNTED WEATHER PROOF GFI RECEPTACLE

GROUND FAULT CIRCUIT INTERRUPT RECEPTACLE
WITHIN 6'-0" OF ALL SINKS

EXTERIOR WEATHER PROOF GFI RECEPTACLE AT +24" AFF FOR A/C SERVICES (MAX 25'-0" FROM UNITS)

DUPLEX (WALL MOUNTED) RECEPTACLE 15A-125V-3 WIRE. MOUNT AT +15" AFF U.O.N. TO BOTTOM OF OUTLET BOX

3-WAY LIGHT SWITCH. MOUNT AT+48" AFF TO TOP OF SWITCH BOX \$ 3

€ LIGHT SWITCH. MOUNT AT+48" AFF TO TOP OF SWTICH BOX

SINGLE BUTTON DIMMER SWITCH, AT +48" AFF, TO TOP OF SWITCH BOX, WATTSTOPPER #LMDM-101 OR EQUAL

WS-1

SINGLE SWITCH WALL OCCUPANCY SENSOR.
WATTSTOPPER PW-100 OR EQUAL. SENSOR TO BE
MOUNTED
AT +44" AFF AND USE FOR OPEN ROOM (OR RESTROOM)

LESS THAN 100 SQ FT W/ (1) CIRCUIT.

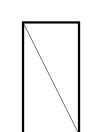
<u>ULTRASONIC CEILING OCCUPANCY SENSOR.</u>

WATTSTOPPER W-500A OR EQUAL. SENSOR TO BE
CONNECTED TO KEYED LIGHT SWITCHES FOR MANUAL

OVERRIDE AND USE FOR RESTROOM W/ PARTITIONS.

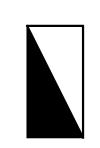
CEILING MOUNTED PHOTOCELL, WATTSTOPPER #LMLS-500 OR EQUAL

OS CEILING MOUNTED OCCUPANCY SENSOR. WATTSTOPPER #LMPC-100 OR EQUAL.



EXIT

2x4 CEILING LIGHT WITH (3) LED PANELIGHT, LAY-IN LIGHT FIXTURE WITH DIMMABLE BALLAST DIMI LIGHTING-MODEL DM-P72448W-40K-ZZ WATTAGE: 48W (48" LG) OR EQUAL



3 | 1" = 1'-0" | LEGEND

2x4 CEILING LIGHT WITH (3) LED PANELIGHT, LAY-IN LIGHT FIXTURE WITH DIMMABLE BALLAST DIMI LIGHTING-MODEL DM-P72448W-40K-ZZ WATTAGE: 48W (48" LG) OR EQUAL EACH LIGHT FIXTURE WHICH IS INDICATED AS BEING AN EMERGENCY LIGHT SHALL HAVE A BALLAST BATTERY PACK INSTALLED ON THE FIXTURE. THE BATTERY PACK SHALL PROVIDE POWER TO A SINGLE LAMP WITHIN THE FIXTURE FOR NO LESS THAN 90 MINUTES. ANY LIGHT FIXTURE Equipped WITH A BATTERY PACK SHALL BE WIRED IN SUCH A MANNER THAT THE BATTERY WILL BE ACTIVATED IMMEDIATELY UPON LOSS OF POWER TO THE FIXTURE. ADDITIONALLY THE BATTERY PACK SHALL BE OPERATED USING BATTERY POWER LIGHTING CONTROL SWITCHES AND SENSORS SHALL NOT BE ABLE TO SHUT THE FIXTURE OFF.

NOTE: SEE 4/A3.2 FOR PHOTOMETRIC DATA

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Revision Schedule

Description

PRE-CHECK (PC) DOCUMENT

Code: 2022 CBC

A separate project application for construction is required PROJECT TITLE

PC 2022 CBC: 24' x 40' EXPANDABLE TO 120' x 40'

HEET TITLE

ELECTRICAL SCHEDULES 24x40

PROJECT NUMBER
22088

DRAWN BY rMc/SC

CHECKED BY RH/RT

DATE

SHEET NO. **E1.1** 

SHEET OF

E1.1