2023
ELECTRIC VEHICLE SUPPLY EQUIPMENT STANDARDS

Historical Record: 1/20/2023
External Version

SDGE™

ATTENTION:

THESE STANDARDS WERE DEVELOPED FOR MAINTAINING SAFETY AND RELIABILITY OF THE ELECTRIC DISTRIBUTION AND SERVICE SYSTEMS.

THE INTENT OF THIS STANDARD IS TO GUIDE ENGINEERS, DESIGNERS/PLANNERS AND CONSTRUCTION PERSONNEL AND PROVIDE TYPICAL CONSTRUCTION METHODS FOR ELECTRIC DISTRIBUTION. NOT ALL ARRANGEMENTS ARE DEPICTED AND IT IS THE USER'S RESPONSIBILITY TO APPLY THESE STANDARDS APPROPRIATELY. ALL USERS MUST USE GOOD JUDGMENT. STANDARDS ARE UPDATED AS NEEDED. CONSULT EDE FOR LATEST VERSION. SDG&E STANDARDS MUST BE APPLIED. PRE-CONSTRUCTION APPROVAL OF A "DEVIATION REQUEST" IS REQUIRED FOR ANY EXCEPTION TO THESE STANDARDS. ANY ALTERATIONS, MODIFICATIONS OR IMPROVEMENTS TO THIS AND ALL STANDARDS MUST BE REVIEWED, APPROVED AND DOCUMENTED BY EDE-CONSTRUCTION STANDARDS AND DISTRICT C&O'S.

THE CPUC'S GENERAL ORDER 95 RULES/REQUIREMENTS ARE NOT INTENDED FOR USE AS COMPLETE CONSTRUCTION SPECIFICATIONS BUT EMPLOY ONLY THE MINUMUM REQUIREMENTS WHICH ARE MOST IMPORTANT FROM THE STANDPOINT OF **SAFETY AND RELIABILITY.** SDG&E MAY IMPOSE STRICTER RULES AND REQUIREMENT IN THE INTREST MAINTANANING SAFETY AND RELIABILTY OF OUR ELECTRICAL SYSTEM.

CONSTRUCTION SHALL BE ACCORDING TO ACCEPTED GOOD PRACTICE FOR GIVEN LOCAL CONDITIONS IN ALL SITUATIONS NOT SPECIFIED IN THE STANDARD.

SDG&E WILL NOT ACCEPT ANY SYSTEM DESIGN OR INSTALLATION WHICH DOES NOT CONFORM TO THESE STANDARDS

DEVIATIONS CANNOT BE GRANTED WHICH CONFLICT WITH THE CPUC GENERAL ORDERS OR OTHER GOVERNING AGENCIES. THESE MAY INCLUDE SEPARATION FROM ENERGIZED FACILITIES AND WORKING CLEARANCES.

BASED ON UNUSUAL OR UNSAFE SITE CONDITIONS SDG&E MAY IN THE INTEREST OF SAFETY OR RELIABILITY REQUIRE CONSTRUCTION MEASURES BEYOND THOSE SPECIFICALLY STATED IN THIS MANUAL.

EXCEPT FOR A REQUIREMENT TO IMMEDIATELY ADOPT NEWLY PUBLISHED STANDARDS, THE APPLICATION OF NEWLY PUBLISHED STANDARDS IS REQUIRED FOR ALL WORK UP TO THE 30% PROJECT DESIGN APPROVAL LEVEL. ALL DESIGN AND CONSTRUCTION WORK AFTER 30% PROJECT DESIGN APPROVAL MAY USE CONSTRUCTION STANDARDS THAT IMMEDIATELY PRECEDE THE NEWLY UPDATED STANDARD, UNLESS THE IMMEDIATE ADOPTION OF NEWLY PUBLISHED STANDARDS IS MANDATED.

USE OF "BLOCK STOCK" MUST BE COORDINATED WITH INVENTORY & LOGISTICS AND IS GENERALLY ONLY APPLIED AS A "LAST RESORT" AFTER CONSULTATION AND AGREEMENT WITH STAKEHOLDERS AND AN ALTERNATE SOLUTION, SUPPLIER, MATERIAL OR METHOD IS DEEMED ACCEPTABLE AND AVAILABLE.

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IF YOU HAVE ANY QUESTIONS REGARDING THE CONTENT OF THESE MANUALS PLEASE EMAIL CONSTRUCTIONSTANDARDSADMINISTRATORS@SEMPRAUTILITIES.COM OR CONTACT:

MANUAL	CONTACT	EMAIL ADDRESS	PHONE
Electric Distribution Design Manual	Martha Lachmayr	mlachmayr@sdge.com	(858) 654-8245
Overhead Construction Standards	Mike Forchette	mforchette@sdge.com	(619) 244-7495
Service Standards & Guide	Israel Juarez	ijuarez@sdge.com	(858) 636-3941
Electric Vehicle Supply Equipment Standards	Israel Juarez	ijuarez@sdge.com	(858) 636-3941
Underground Construction Standards	Eddie Alcobia	ealcobia@sdge.com	(619) 574-4988
Electric Standard Practices	Joey Kucharyski	jkucharyski@sdge.com	(760) 566-5919
Tool Catalog	Roy Guilao	rguilao@sdge.com	(760) 672-6211

PRINTED COPIES:

FOR PRINTED VERSIONS, WITH BINDER AND TAPS, OF THE **OVERHEAD CONSTRUCTION STANDARDS** PLEASE CONTACT CONSTRUCTIONSTANDARDSADMINISTRATORS@SEMPRAUTILITIES.COM. THESE WILL BE PROVIDED AT THE COST OF YOUR DEPARTMENT. PLEASE INCLUDE IN THE EMAIL:

- NAME, COST CENTER #, I/O #, MAIL STOP #

SUMMARY OF CHANGES

DATE	STANDARD PAGES	FILE NAME
01/20/23	Cover Page, Disclaimer	EVSE2023v0120.pdf
09/23/22	1.00, 2.00, 2.10, 2.11, 2.12, 2.20, 2.30, 2.40, 2.50, 2.60, 2.70, 3.00, 3.10, 3.11, 3.20, 3.21, 3.30, 3.40, 3.50, 3.60, 4.00, 4.10, 4.20, 4.30, 4.40, 4.41, 4.50, 4.51, 5.00, 5.10, 5.20, 5.30, 5.40, 5.50, 5.60, 6.00, 6.10, 6.11, 6.20, 6.30, 7.00, 7.10, 7.11, 7.12, 7.13, 7.20, 7.21, 7.22, 7.23, 7.24, 7.30, 7.40, 8.00, 8.10, (8.11 Removed), 8.20, 8.30, 9.00, 9.10, 10.00, 10.10, 10.20, 11.00, 11.10, 11.20, 11.30, 12.00, 12.10, 12.20, 13.00, 13.10, 13.20, 13.30, 14.00, 14.10, 14.11, 14.12, 15.00, 15.10, 15.11, 15.20, 15.21, 15.22, 15.30, 15.31, 15.32, 15.33, 15.34, 15.40, 15.41, 15.42, 15.50, 15.51	EVSE2022v0923.pdf
10/09/20	Completely Revised	EVSE2020v1029.pdf
12/07/17	Original Edition	EVSE2017v1207.pdf

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ARCHIVED BOOKS AVAILABLE ON THE INTERNAL VERSION

PURPOSE:

THE ELECTRIC VEHICLE CHARGING STATION STANDARD CONTAINS INFORMATION ESSENTIAL TO THE ESTABLISHMENT OF NEW ELECTRIC VEHICLE CHARGING STATIONS OR TO REMODEL OR EXPAND EXISTING ELECTRIC VEHICLE CHARGING STATIONS IN TERRITORIES SERVICED BY SAN DIEGO GAS & ELECTRIC (SDG&E). THIS INFORMATION IS INTENDED FOR USE BY ALL INTERESTED CUSTOMERS**** AND MEMBERS OF TECHNICAL AND PROFESSIONAL TRADES CONCERNED WITH THE DESIGN AND CONSTRUCTION OF FACILITIES TO SERVE ELECTRIC VEHICLE CHARGING STATIONS.

SCOPE:

THE ELECTRIC VEHICLE CHARGING STATION STANDARD PRESENTS GENERAL INFORMATION TO HELP ENSURE THAT AN INSTALLATION WILL BE ADEQUATE FOR PRESENT AND FUTURE NEEDS. THIS MANUAL SEEKS TO OUTLINE REQUIREMENTS IN ACCORDANCE WITH THE REGULATIONS OF BOTH STATE & LOCAL AGENCIES WHO WILL CONDUCT A DETAILED PLAN REVIEW PRIOR TO PERMITTING. THIS MANUAL SERVES AS A GUIDE ONLY AND DOES NOT INCLUDE ALL REQUIREMENTS FOR PERMITTING. THIS MANUAL DETAILS FULL SDG&E PROJECT INSTALLATION, AND SOME OF THESE SECTIONS MAY NOT APPLY TO EVERY SPECIFIC EV PROJECT. APPLY AS MANY OF THESE SECTIONS AS PRACTICAL TO REFLECT SITE CONDITIONS. ALL PLANS MUST BE DESIGNED AND STAMPED BY A LICENSED PROFESSIONAL ENGINEER PRIOR TO PERMITTING. THESE STANDARDS ARE BASED ON SDG&E STANDARDS, SAFETY PRACTICES, AND ELECTRICAL CODES ENFORCED BY THE AUTHORITY HAVING JURISDICTION. GENERAL REFERENCES SHOWN BELOW** (WHEN APPLICABLE):

-2020 CALIFORNIA ELECTRICAL CODE (CEC)
-2020 CEC ARTICLE 210 (BRANCH CIRCUITS)
-2020 CEC ARTICLE 240 (OVERCURRENT PROTECTION)
-2020 CEC ARTICLE 250 (GROUNDING AND BONDING)
-2020 CEC ARTICLE 300 (GENERAL REQUIREMENTS FOR WIRING METHODS AND MATERIALS)
-2020 CEC ARTICLE 310 (CONDUCTORS FOR GENERAL WIRING)
-2020 CEC ARTICLE 400 (FLEXIBLE CORDS AND FLEXIBLE CABLES)
-2020 CEC ARTICLE 625 (ELECTRIC VEHICLE CHARGING SYSTEM)
-2019 TITLE 24, PART 6 CALIFORNIA ENERGY CODE (T24 CEC)
-2019 CALIFORNIA BUILDING CODE (CBC)
-2020 NATIONAL ELECTRIC CODE (NEC)
-2021 STANDARD FOR ELECTRICAL SAFETY IN THE WORKPLACE (NFPA 70E)
-ELECTRIC VEHICLE GUIDELINES - CAL-OPR (EVG)-250.1 (PLUG-IN ELECTRIC VEHICLES: UNIVERSAL CHARGING ACCESS GUIDELINES AND BEST PRACTICES)*
-ELECTRIC VEHICLE GUIDELINES - CAL-OPR (EVG)-812 (ON-SITE ELECTRIC VEHICLE CHARGING STATION SPACES)*
-SAE J1772 - SOCIETY OF AUTOMOTIVE ENGINEERS (SAE) ELECTRIC VEHICLE CONDUCTIVE CHARGE COUPLER
-SAE J1772 CCS1 - SOCIETY OF AUTOMOTIVE ENGINEERS (SAE) ELECTRIC VEHICLE CONDUCTIVE CHARGE COUPLER
-CHARGE DE MOVE (CHAdeMO) - ELECTRIC VEHICLE CONDUCTIVE CHARGE COUPLER
-UNDERWRITERS LABORATORIES CERTIFICATIONS
-SDG&E SERVICE STANDARD AND GUIDE MANUAL***
-SDG&E CONSTRUCTION STANDARDS: UNDERGROUND***
-SDG&E CONSTRUCTION STANDARDS: OVERHEAD***
-SDG&E ELECTRIC DISTRIBUTION AND DESIGN MANUAL***
-SDG&E ELECTRIC TARIFF BOOK ELECTRIC RULES
https://www.sdge.com/builder-services

* ALL ACCESSIBILITY STANDARDS MUST BE FOLLOWED PER THE LATEST EDITION OF CBC CODE AS WELL AS LOCAL GOVERNING CODES.

**SEE CONSTRUCTION DRAWINGS FOR ADDITIONAL LOCAL CODE REFERENCES AS NECESSARY. CONSTRUCTION DRAWINGS SHALL BE DONE IN ACCORDANCE WITH THE LATEST EDITION OF THE CEC AND STATE AND LOCAL CODES AS THEY APPLY.

***SEE MOST RECENT EDITION OF SDG&E STANDARDS AT THE LINK: WWW.SDGE.COM/CONSTRUCTION-TOOLBOX

****CUSTOMERS MAY DESIGN AND INSTALL EV FACILITIES AFTER THE SDG&E SERVICE METER.

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B	COMPLETELY REVISED	-	JES	JES	CZH	10/09/2020	E						
A	ORIGINAL EDITION	-	JK	JS	MDJ	12/7/2017	D						

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SDG&E ELECTRIC VEHICLE CHARGING STATION STANDARDS

CODE COMPLIANCES

EV1.00

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EV2.40	TYPICAL CHARGERS
EV2.50	METERING PRACTICES
EV2.60	CUSTOMER GENERATION
EV2.70	SHORT CIRCUIT RATING

DRAWINGS:

ALL DRAWINGS CONTAINED WITHIN THIS DOCUMENT ARE FOR ILLUSTRATION ONLY. THE CONSTRUCTION DRAWINGS ARE USED TO SPECIFY REQUIREMENTS BASED ON ACTUAL SITE CONDITIONS AND MATERIAL/EQUIPMENT TO BE USED OR SELECTED BY CUSTOMER.

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SDG&E ELECTRIC VEHICLE CHARGING STATION STANDARDS

EVSE SPECIFICATIONS

DEFINITIONS

THESE DEFINITIONS PROVIDE ADDITIONAL CLARIFICATION TO SOME OF THE TERMINOLOGY USED FREQUENTLY THROUGHOUT THESE STANDARDS.

AUTHORITY HAVING JURISDICTION (AHJ): AN ORGANIZTION, OFFICE, OR INDIVIDUAL RESPONSIBLE FOR ENFORCING THE REQUIREMENTS OF A CODE, OR STANDARD, OR FOR APPROVING EQUIPMENT, MATERIALS, AN INSTALLATION, OR A PROCEDURE.

COMMERCIAL VEHICLE: A VEHICLE WHICH IS USED OR MAINTAINED FOR THE TRANSPORTATION OF PERSONS FOR HIRE, COMPENSATION, OR PROFIT OR DESIGNED, USED, OR MAINTAINED PRIMARILY FOR THE TRANSPORTATION OF PROPERTY.

CURRENT CARRYING CONDUCTOR: A CONDUCTOR WITHIN THE ELECTRICAL SYSTEM THAT IS DESIGNATED TO NORMALLY CARRY CURRENT FROM SOURCE TO LOAD. THIS INCLUDES THE LINE WIRES OF ANY INSTALLATION, THE NEUTRAL OF A 3 PHASE 4 WIRE SYSTEM WITH HIGH HARMONIC LOADS, THE NEUTRAL WIRE OF A 1 POLE, OR 2 POLE CIRCUIT OF A 3 PHASE 4 WIRE SYSTEM.

DESIGN MANUAL (DM): SDG&E MANUAL FOR DESIGN.

DIRECT CURRENT FAST CHARGER (DCFC): AN EV CHARGER THAT CONVERTS AC POWER TO DC WITHIN THE CHARGING STATION AND DELIVERS DC POWER DIRECTLY TO THE BATTERY.

DISCONNECTING MEANS: A DEVICE, OR GROUP OF DEVICES, OR OTHER MEANS BY WHICH THE CONDUCTORS OF A CIRCUIT CAN BE DISCONNECTED FROM THEIR SOURCE OF SUPPLY.

DUAL: AN EVSE WITH TWO OUTPUT CONNECTIONS.

ELECTRIC VEHICLE (EV): ANY VEHICLE WHICH USES ONE, OR MORE ELECTRIC MOTORS FOR PROPULSION.

ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE): EQUIPMENT DEDICATED TO SUPPLYING ELECTRIC ENERGY TO RECHARGE THE BATTERIES OF AN ELECTRIC VEHICLE.

EVSE LEVEL: A RATING OF EVSE'S, INDICATING VOLTAGE AND AMPERAGE RATINGS OF THE EQUIPMENT RANGING FROM LEVELS 1, 2, AND DC FAST CHARGER. SEE SPECIFIC EVSE LEVEL SPECIFICATIONS FOR ADDITIONAL DETAILS.

GATEWAY: A COMMUNICATION HUB OFTEN REQUIRED BY EVSE MANUFACTURERS TO COLLECT AGGREGATE USAGE DATA FROM A GROUP OF CHARGERS. SEE SPECIFIC MANUFACTURER'S RECOMMENDATIONS FOR GATEWAY INSTALLATION AND LOCATIONS.

GROUNDED (GROUNDING): CONNECTED (CONNECTING) TO GROUND OR TO A CONDUCTIVE BODY THAT EXTENDS THE GROUND CONNECTION.

HANDHOLE: AN ENCLOSURE FOR USE IN UNDERGROUND SYSTEM, PROVIDED WITH AN OPEN OR CLOSED BOTTOM, AND SIZED TO ALLOW PERSONNEL TO REACH INTO, BUT NOT ENTER, FOR THE PURPOSE OF INSTALLING, OPERATING, OR MAINTAINING EQUIPMENT OR WIRING OR BOTH.

KILO AMPERE INTERRUPTING CAPACITY (KAIC) RATING: REFERS TO THE MEASUREMENTS OF THE ABILITY OF AN OCPD TO WITHSTAND A SHORT CIRCUIT, OR GROUND FAULT.

LOAD CENTER: PLUG IN BREAKER PANEL THAT OPERATES AT UP TO 240V 1 PHASE OR 3 PHASE, RATED UP TO 600A.

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METER PEDESTAL/PANEL: FREE STANDING EQUIPMENT (PEDESTAL) OR WALL MOUNTED PANEL THAT INCLUDES A METERING COMPARTMENT WITH CURRENT TRANSFORMERS AS NECESSARY AND A MAIN SERVICE RATED OCPD. PEDESTAL MAY HAVE AN INTEGRAL PANELBOARD DISTRIBUTION SECTION, PANEL MAY REQUIRE A SEPERATE PANELBOARD. OPERATES AT UP TO 600V, AND WILL TYPICALLY BE RATED AT UP TO 600A.

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA): DEFINES STANDARDS USED IN NORTH AMERICA FOR VARIOUS GRADES OF ELECTRICAL ENCLOSURES TYPICALLY USED IN INDUSTRIAL APPLICATIONS.

OVERCURRENT: ANY CURRENT IN EXCESS OF THE RATED CURRENT OF EQUIPMENT OR THE AMPACITY OF A CONDUCTOR. IT MAY RESULT FROM OVERLOAD, SHORT CIRCUIT, OR GROUND FAULT.

OVERCURRENT PROTECTION DEVICE (OCPD): A DEVICE CAPABLE OF PROVIDING PROTECTION FOR SERVICE, FEEDER, AND BRANCH CICUITS AND EQUIPMENT OVER THE FULL RANGE OF OVERCURRENTS BETWEEN ITS RATED CURRENTS AND ITS INTERRUPTING RATING.

OVERHEAD (OH): STANDARDS FOR CONSTRUCTION ABOVE GROUND.

PANELBOARD: WALL MOUNTED, FLUSH MOUNTED, OR FLOOR MOUNTED ELECTRICAL PANEL WITH BOLT ON BREAKER CONSTRUCTION. OPERATES AT UP TO 600V, AND CAN BE RATED UP TO 1200A ALTHOUGH TYPICALLY EVSE PROJECTS WILL USE NO HIGHER THAN 600A FOR THIS CONSTRUCTION.

PASSENGER VEHICLE: A PASSENGER CAR IS A ROAD MOTOR VEHICLE, OTHER THAN A MOTOR CYCLE, INTENDED FOR THE CARRIAGE OF PASSENGERS AND DESIGNED TO SEAT NO MORE THAN NINE PERSONS (INCLUDING THE DRIVER).

POINT OF CONNECTION (POC): THE LOCATION AT WHICH A PROJECT ESTABLISHES ELECTRICAL CONNECTION TO THE EXISTING UTILITY POWER GRID.

POWER CENTER: ELECTRICAL EQUIPMENT DEDICATED TO HOUSING SERVICE METERING, DISTRIBUTION SECTIONS, OCPD'S, OR ALL OF THESE FOR THE PURPOSE OF DISTRIBUTING POWER TO INDIVIDUAL EVSE'S. TYPICAL CONSTRUCTIONS INCLUDE LOAD CENTERS, PANEL BOARDS, METER PEDESTALS AND SWITCHBOARDS.

PULL BOX (JUNCTION BOX): A SURFACE MOUNTED ENCLOSURE FOR USE IN AN ELECTRICAL SYSTEM, PROVIDED WITH AN OPEN FACE, AND SIZED TO ALLOW PERSONNEL TO REACH INTO FOR THE PURPOSE OF INSTALLING, OPERATING, OR MAINTAINING EQUIPMENT OR WIRING OR BOTH.

SERVICE STANDARDS & GUIDE (SG): GUIDE THAT CONTAINS INFORMATION ESSENTIAL TO THE ESTABLISHMENT OF SERVICE TO NEW FACILITIES, OR TO REMODEL OR EXPAND FACILITIES WHERE LOAD HAS BEEN ADDED.

SINGLE: AN EVSE WITH A SINGLE OUTPUT CONNECTION, INTENDED TO CHARGE ONE VEHICLE AT A TIME.

SWITCHBOARD: FREE STANDING BOARD CONSTRUCTION CONTAINING SERVICE METERING COMPARTMENT, SERVICE RATED MAIN OCPD, AND DISTRIBUTION SECTIONS WITH BOLT ON BREAKERS OR FUSED DISCONNECTS AS REQUIRED. OPERATES AT UP TO 600V AND IS RATED AS LOW AS 800A AND UP TO 4000A.

UNDERGROUND (UG): STANDARDS FOR CONSTRUCTION BELOW GROUND.

WORKING SPACE: ACCESS AND WORKING SPACE SHALL BE PROVIDED AND MAINTAINED ABOUT ALL ELECTRICAL EQUIPMENT TO PERMIT READY AND SAFE OPERATION AND MAINTENANCE OF SUCH EQUIPMENT.

REFERENCES:

a. SEE CEC ARTICLE 100 DEFINITIONS, MOST RECENT EDITION.

b. SEE CEC ARTICLE 110 REQUIREMENTS FOR ELECTRICAL INSTALLATIONS, MOST RECENT EDITION.

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c. SEE SDG&E STANDARD OH 102 PEDESTRIAN PATH OF TRAVEL AND ACCESSIBILITY.

d. SEE SDG&E STANDARD UG 3002 PEDESTRIAN PATH OF TRAVEL AND ACCESSIBILITY.

EVSE SYMBOL LEGEND:

- LEVEL 2 EVSE
- DC FAST CHARGER EVSE
- UTILITY/ DRY-TYPE TRANSFORMER 3 PHASE
- UTILITY/ DRY-TYPE TRANSFORMER 1 PHASE
- POWER CENTER PEDESTAL
- POWER CENTER FREE STANDING GEAR
- POWER CENTER WALL MOUNTED
- CLEAR AND LEVEL WORKING SPACE
- GROUNDING
- CIRCUIT BREAKER
  - XP — #OF POLES
  - XXXAT — AMPS TRIP
  - XXXAF — AMPS FRAME
- DISCONNECT SWITCH
- – — — – EXISTING EQUIPMENT/LINEWORK
- ———— NEW EQUIPMENT/LINEWORK
- OR EVSE WITH INTERNAL GATEWAY
- EXTERNAL GATEWAY
- CELLULAR REPEATER
- RECEIVING ANTENNA
- TRANSMITTING ANTENNA
- CELLULAR MODEM & ETHERNET SWITCH
- Ø PHASE
- INTERNATIONAL SYMBOL OF ACCESSIBILITY

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LEVEL 2 ELECTRICAL VEHICLE SERVICE EQUIPMENT (EVSE):

LEVEL 2 ELECTRIC VEHICLE SERVICE EQUIPMENT UTILIZES TYPICAL VOLTAGE RATING OF 208 VOLTS AC (VAC) 1-PHASE AND 240 VOLTS AC (VAC) 1-PHASE. BRANCH CIRCUIT RATING SUPPLYING LEVEL 2 ELECTRIC VEHICLE SERVICE EQUIPMENT MUST BE RATED AT A MINIMUM OF 40 AMPS (MAXIMUM CURRENT DRAW OF 32 AMPS) AND MAY REACH AS HIGH AS 80 AMPS. SEE CONSTRUCTION DRAWINGS FOR SITE SPECIFIC DETAILS RELATED TO WIRE SIZE & BREAKER RATING (BASED ON VOLTAGE DROP & DERATING CALCULATIONS). SEE MANUFACTURER'S SPECIFICATIONS.

LEVEL 2 ELECTRIC VEHICLE SERVICE EQUIPMENT TECHNICAL SPECIFICATIONS:

SERVICE VOLTAGE:	240 VAC, SINGLE PHASE, 3-WIRE / 208V THREE PHASE 4-WIRE. (240V 3-PHASE DELTA NOT TO BE USED DUE TO HIGH LEG ON ONE PHASE)
CHARGER VOLTAGE:	240 VAC, SINGLE PHASE, 3-WIRE - LINE 1, LINE 2 AND GROUND OR 208 VAC, SINGLE PHASE, 3-WIRE - ANY TWO PHASES AND GROUND (REFER TO CONSTRUCTION DRAWINGS FOR BALANCE DETAILS)
INPUT FREQUENCY:	60 Hz
INCOMING CURRENT:	30 AMPS - 80 AMPS (CHARGER SPECIFIC)
OUTPUT VOLTAGE:	240V AC / 208V AC
OUTPUT FREQUENCY:	60 Hz
OUTPUT CURRENT:	30 - 80 AMPS (MAXIMUM, CONTINUOUS). 60 AMPS OR MORE REQUIRES A READILY ACCESSIBLE DISCONNECTING MEANS. SEE CEC ARTICLE 625.43 - DISCONNECTING MEANS.
INTERLOCKED POWER OUTPUT:	YES
STATUS INDICATORS:	YES - POWER, CHARGING, FAULT, SERVICE (ADDITIONAL INDICATORS VARY BY MFG.)
ELECTRIC VEHICLE CONNECTOR:	J1772, CONNECTER SHALL BE GROUNDED IN ACCORDANCE WITH CEC ARTICLES 250, AND 625.
CORD LENGTH:	18 FEET MINIMUM, 25 FEET MAXIMUM.
ENVIRONMENT:	OPERATING TEMPERATURE: -30 TO 50 CELSIUS (-22 TO 122 FAHRENHEIT) STORAGE TEMPERATURE: -40 TO 70 CELSIUS (-40 TO 158 FAHRENHEIT) ENCLOSURE RATING: MINIMUM NEMA 3R

REFERENCES:

a. SEE CEC ARTICLE 250 GROUNDING AND BONDING, MOST RECENT EDITION.

b. SEE CEC ARTICLE 625 ELECTRIC VEHICLE POWER TRANSFER SYSTEM, MOST RECENT EDITION.

c. SOCIETY OF AUTOMOB1ILE ENGINEERS (SAE) J1772.

d. UNDERWRITERS LABORATORIES (UL) 2231 PERSONNEL PROTECTION SYSTEMS FOR ELECTRIC VEHICLE CHARGING CIRCUITS.

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DC FAST CHARGER ELECTRICAL VEHICLE SERVICE EQUIPMENT (EVSE):

DC FAST CHARGER ELECTRIC VEHICLE SERVICE EQUIPMENT UTILIZES TYPICAL VOLTAGE RATING OF 480 VOLTS, OR 208 VOLTS AC (VAC) 3-PHASE. BRANCH CIRCUIT RATING SUPPLYING DC FAST CHARGER ELECTRIC VEHICLE SERVICE EQUIPMENT MUST BE RATED AT A MINIMUM OF 30 AMPS (MAXIMUM CURRENT DRAW OF 24 AMPS) AND MAY REACH AS HIGH AS 422 AMPS. SEE CONSTRUCTION DRAWINGS FOR SITE SPECIFIC DETAILS RELATED TO WIRE SIZE & BREAKER RATING (BASED ON VOLTAGE DROP & DERATING CALCULATIONS). SEE MANUFACTURER'S SPECIFICATIONS.

DC FAST CHARGER ELECTRIC VEHICLE SERVICE EQUIPMENT TECHNICAL SPECIFICATIONS:

SERVICE VOLTAGE:	480 VAC, THREE PHASE, 4-WIRE/ 208V THREE PHASE 4-WIRE.
CHARGER VOLTAGE:	480 VAC, THREE PHASE, 3-WIRE - LINE 1, LINE 2, LINE 3 AND GROUND OR 208 VAC, THREE PHASE, 3-WIRE - LINE 1, LINE 2, LINE 3 AND GROUND (NEUTRAL CONFIGURATION NOT TYPICALLY REQUIRED, CHARGER SPECIFIC) READILY ACCESSIBLE DISCONNECTING MEANS AS REQUIRED EV-11.30.
INPUT FREQUENCY:	60 Hz
INCOMING CURRENT:	24 AMPS - 422 AMPS (CHARGER SPECIFIC)
OUTPUT VOLTAGE:	200V-1000V DC (TYPICAL RANGE, SEE SPECIFIC CHARGERS).
OUTPUT FREQUENCY:	NA
OUTPUT CURRENT:	20 - 1000 AMPS (TYPICAL VALUES, SEE SPECIFIC CHARGER CUTSHEETS). 60 AMPS OR MORE REQUIRES A READILY ACCESSIBLE DISCONNECTING MEANS. SEE CEC ARTICLE 625.43 - DISCONNECTING MEANS.
INTERLOCKED POWER OUTPUT:	YES
STATUS INDICATORS:	YES - POWER, CHARGING, FAULT, SERVICE (ADDITIONAL INDICATORS VARY BY MFG.)
ELECTRIC VEHICLE CONNECTOR:	J1772 CCS, CHADEMO CONNECTER SHALL BE GROUNDED IN ACCORDANCE WITH CEC ARTICLES 250, AND 625.
CORD LENGTH:	18 FEET MINIMUM, 25 FEET MAXIMUM.
ENVIRONMENT:	OPERATING TEMPERATURE: -30 TO 50 CELSIUS (-22 TO 122 FAHRENHEIT) STORAGE TEMPERATURE: -40 TO 70 CELSIUS (-40 TO 158 FAHRENHEIT) ENCLOSURE RATING: MINIMUM NEMA 3R

REFERENCES:

a. SEE CEC ARTICLE 250 GROUNDING AND BONDING, MOST RECENT EDITION.

b. SEE CEC ARTICLE 625 ELECTRIC VEHICLE POWER TRANSFER SYSTEM, MOST RECENT EDITION.

c. SOCIETY OF AUTOMOBILE ENGINEERS (SAE) J1772.

d. CHARGE DE MOVE (CHADEMO) CONNECTOR.

e. UNDERWRITERS LABORATORIES (UL) 2231 PERSONNEL PROTECTION SYSTEMS FOR ELECTRIC VEHICLE CHARGING CIRCUITS.

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TYPICAL CHARGERS:

THE FOLLOWING LINK IS A LIST OF APPROVED EVSE MAKES, AND MODELS, AND THEIR LOAD CHARACTERISTICS. THESE CHARGERS WILL BE THE BASIS OF EVSE DESIGNS, AND THIS LIST SHOULD BE REFERENCED BY THOSE INTERESTED IN INSTALLATIONS, OR DESIGNS OF THIS TYPE.

REFERENCES:

a. APPROVED LIST OF LEVEL 2 AND DC FAST CHARGER MAKES AND MODELS BY SDG&E.

https://www.sdge.com/node/1606

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METERING PRACTICES

THESE ARE THE DIFFERENT METHODS AND COMBINATIONS OF METERING THAT WILL BE SEEN ON TYPICAL EV PROJECTS.

GROUP CHECK METER: THE GROUP CHECK METER OPTION IS REQUIRED FOR INSTALLATIONS IN WHICH CASE SDG&E HAS AN AGREEMENT WITH THE CHARGER MANUFACTURER, WHICH ALLOWS INDIVIDUAL CHARGER'S POWER CONSUMPTION TO BE RECORDED, AND SUBMITTED BACK TO SDG&E FOR DATA COLLECTION.

PRIMARY METERING: PRIMARY METERING WILL BE CONSIDERED FOR SITES WITH LARGE NUMBERS OF EVSE. SEE EV-3.10 FOR A BREAKDOWN OF THE CONDITIONS REQUIRED TO BEGIN CONSIDERING THIS OPTION. PROVISIONS FOR THE FUTURE ADDITIONS OF PRIMARY METERING MAY BE ADDED ON SITE, TO BE ENERGIZED AND IN SERVICE NO LATER THAN 10 YEARS IN THE FUTURE.

REFERENCES:

a. SEE SDG&E STANDARD SG 500 ELECTRIC SERVICE AND METERING EQUIPMENT.

b. SEE SDG&E STANDARD EV-2.40 TYPICAL CHARGERS

c. SEE SDG&E STANDARD EV-3.10 - EV-3.11 LOAD SUMMARY GUIDE

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CUSTOMER GENERATION:

EVSE CUSTOMER GENERATION CHARGES ELECTRIC VEHICLES DURING OFF PEAK HOURS, AND TO DISCHARGE AN ELECTRIC VEHICLES BATTERY CAPACITY DURING HOURS OF VEHICLE NON-USAGE AND ON PEAK DEMAND HOURS BACK TO THE GRID. ENERGY MANAGEMENT SCHEMES WILL VARY BASED ON THE MANUFACTURER, THESE ARE TO BE COORDINATED WITH THE CUSTOMERS BY THE MANUFACTURER. THE CUSTOMER GENERATION SHALL COMPLY WITH THE FOLLOWING:

A. CUSTOMER SERVICE TRANSFORMERS MAY NOT HAVE MORE THAN ONE MEANS OF GENERATION. IF A CUSTOMER HAS EXISTING PHOTOVOLTAIC, OR ADDITIONAL CO-GENERATION ON SITE, AN ADDITIONAL TRANSFORMER WILL BE REQUIRED.

B. SDG&E SERVICE GUIDE 800.

C. SDG&E ELECTRIC TARIFF BOOK ELECTRIC RULE 21.

D. SERVICE EQUIPMENT MUST BE FULLY RATED FOR THE SUM OF MAXIMUM AVAILABLE SECONDARY FAULT CURRENT OF DESIGN MANUAL TABLE 1, OR 2 AS APPLICABLE, AND THE MAXIMUM AVAILABLE FAULT CURRENTS OF THE AC SIDE OF CUSTOMER GENERATION EVSE (INFORMATION FROM MANUFACTURER).

E. CUSTOMER GENERATION APPLICATION WITH NET ENERGY METERING.

REFERENCES:

a. SEE SDG&E STANDARD SG 800 CUSTOMER GENERATION.

b. SEE SDG&E ELECTRIC TARIFF BOOK ELECTRIC RULE 21.

c. SEE SDG&E STANDARD DM 6100 SECTIONALIZING AND PROTECTION.

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EVSE SHORT CIRCUIT RATING:

ELECTRIC VEHICLE CHARGING STATIONS SHALL BE EQUIPPED TO HANDLE THE AVAILABLE FAULT CURRENTS IN THE ELECTRICAL SYSTEM THAT POWERS THEM BY ONE OF THE FOLLOWING METHODS:

A. EVSE SHALL BE FULLY RATED TO THE POWER CENTER SERVICE RATING AS DEFINED IN DM 6142.

B. EVSE SHALL BE SERIES RATED TO THE BRANCH OCPD IN THE ASSOCIATED POWER CENTER AS DEFINED BY CEC SECTION 240.86.

C. THE ENGINEER OF RECORD SHALL PROVIDE A CALCULATION DONE BY AN APPROPRIATE SOFTWARE OR OTHER MEANS TO SHOW THAT AVAILABLE FAULT CURRENTS AT THE CHARGER LOCATIONS IS LOWER THAN THE RATING OF SAID EVSE. SUBJECT TO REVIEW AND APPROVAL BY THE AHJ.

D. THE EVSE MANUFACTURER SHALL PROVIDE PROOF THAT EVSE EQUIPMENT IS RATED TO WITHSTAND AVAILABLE FAULT CURRENTS.

REFERENCES:

a. SEE SDG&E STANDARD DM 6142 SECONDARY FAULT CURRENT CALCULATIONS.

b. SEE CEC 240 OVERCURRENT PROTECTION, MOST RECENT EDITION.

c. SEE SDG&E STANDARD EV-5.00 SINGLE LINE DIAGRAMS.

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EV3.50	LOAD SUMMARY LEVEL 2 & DC FAST CHARGER 208V
EV3.60	LOAD SUMMARY LEVEL 2 & DC FAST CHARGER 480V

DRAWINGS:

ALL DRAWINGS CONTAINED WITHIN THIS DOCUMENT ARE FOR ILLUSTRATION ONLY. THE CONSTRUCTION DRAWINGS ARE USED TO SPECIFY REQUIREMENTS BASED ON ACTUAL SITE CONDITIONS AND MATERIAL/EQUIPMENT TO BE USED OR SELECTED BY CUSTOMER.

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SDG&E ELECTRIC VEHICLE CHARGING STATION STANDARDS

EVSE LOAD SUMMARY

EV3.00

EVSE LOAD SUMMARY GUIDE:

THIS GUIDE ILLUSTRATES THE MAXIMUM CONNECTED LOAD OF EVSE. THE SELECTION AND COUNT OF DIFFERENT EVSE WILL DETERMINE THE SIZE AND CONSTRUCTION OF THE REQUIRED POWER CENTER. IF THE CUSTOMER DESIRES PROVISIONS FOR FUTURE INSTALLATIONS OUT TO 10 YEARS AWAY THESE LOADS MAY BE TAKEN INTO CONSIDERATION WHEN SIZING THE POWER CENTERS AS WELL, WITH THE APPROVAL AND AGREEMENT OF SDG&E. MAIN CIRCUIT BREAKERS OF POWER CENTERS SHALL MATCH AMPERE RATING AND AIC RATING OF POWER CENTERS WITH 80% RATED BREAKERS BEING STANDARD BUT CAN BE UPSIZED TO 100% WITH THE APPROVAL AND AGREEMENT OF SDG&E TO AVOID INCREASING POWER CENTER SIZE.

TABLE EV-3.10

POWER CENTER VOLTAGE	POWER CENTER AMPERAGE	TOTAL MAX CONNECTED AMPS	TOTAL MAX CONNECTED KVA	POWER CENTER CONSTRUCTION
240V 1Ø 3W	200A	160A	38.40KVA	PEDESTAL/WALL
	400A	320A	76.80KVA	PEDESTAL/WALL
208V 3Ø 4W	200A	160A	57.64KVA	PEDESTAL/WALL
	400A	320A	115.28KVA	PEDESTAL/WALL
	600A	480A	172.93KVA	PEDESTAL/WALL
	800A	640A	230.57KVA	FREESTANDING GEAR
	1200A	960A	345.85KVA	FREESTANDING GEAR
	1600A	1280A	460.80KVA	FREESTANDING GEAR
	2000A	1600A	576.42KVA	FREESTANDING GEAR
	2500A	2000A	720.00KVA	FREESTANDING GEAR
	3000A	2400A	864.64KVA	FREESTANDING GEAR
	3500A	2800A	1008.00KVA	FREESTANDING GEAR
	4000A	3200A	1152.85KVA	FREESTANDING GEAR
480V 3Ø 4W	200A	160A	133.02KVA	PEDESTAL/WALL
	400A	320A	266.04KVA	PEDESTAL/WALL
	600A	480A	399.06KVA	PEDESTAL/WALL
	800A	640A	532.08KVA	FREESTANDING GEAR
	1200A	960A	798.12KVA	FREESTANDING GEAR
	1600A	1280A	1063.68KVA	FREESTANDING GEAR
	2000A	1600A	1330.21KVA	FREESTANDING GEAR
	2500A	2000A	1662.00KVA	FREESTANDING GEAR
	3000A	2400A	1995.32KVA	FREESTANDING GEAR
	3500A	2800A	2326.80KVA	FREESTANDING GEAR
	4000A	3200A	2660.43KVA	FREESTANDING GEAR

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DESIGN:

THE MAXIMUM KVA CALCULATED WITHIN THIS SECTION SHALL BE USED TO SIZE BOTH THE TRANSFORMER REQUIRED PER DM 5621, AS WELL AS THE ASSOCIATED POWER CENTERS. THERE IS NO APPLICABLE DEMAND FACTOR TO USE ON EVSE LOADS, AS IT IS HIGHLY LIKELY THAT DURING PEAK USAGE ALL OF THE CHARGERS SHALL BE FULLY UTILIZED. BOTH TRANSFORMERS AND POWER CENTERS SHALL BE SIZED TO FULLY CARRY THE CONNECTED EVSE LOADS.

WHEN CALCULATING THE KVA OF INDIVIDUAL CHARGERS THE AMPS CONSUMED IS TYPICALLY CONSTANT. FOR EXAMPLE A CHARGER WITH A 30A LOAD AT 208V WILL USE 6.24 KVA, WHILE THAT SAME CHARGER AT 240V WILL USE 7.2KVA.

FOR EVSE POWER FACTOR IS TYPICALLY VERY CLOSE TO 1 (>0.95). IN THIS CASE KW AND KVA ARE ALMOST INTERCHANGEABLE, AND USING KVA WILL GIVE NEGLIGIBLE DIFFERENCE IN CALCULATIONS.

THESE MAY VARY FROM MANUFACTURER TO MANUFACTURER AND IF EVER IN QUESTION CONSULT THEM DIRECTLY.

PRIMARY METERING:

CONTACT SERVICE STANDARDS PRIOR TO PROJECT START. PRIMARY METERING, OR FUTURE PROVISIONS TO INSTALL SUCH IN THE NEXT 10 YEARS MAY BE CONSIDERED PER THE PROVISIONS OF SG 012.

REFERENCES:

a. SEE SDG&E STANDARD SG 012 ELECTRIC SERVICE POLICIES NEW PROJECT TYPES.

b. SEE SDG&E STANDARD SG 504 ELECTRIC METER AND SERVICE LOCATION - COMMERCIAL & RESIDENTIAL.

c. SEE SDG&E STANDARD SG 517 STANDARD SWITCHBOARD SERVICE SECTIONS.

d. SEE SDG&E STANDARD SG 519 COMMERCIAL METER PEDESTALS

e. SEE SDG&E STANDARD DM 5621 INITIAL TRANSFORMER DESIGN LOADING FOR BALANCED LOADS.

f. SEE SDG&E STANDARD DM 6100 SECTIONALIZING AND PROTECTION.

g. SEE SDG&E STANDARD EV-6.30 PRIMARY METERING.

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EVSE LOAD SUMMARY GUIDE:

THE FOLLOWING IS AN EXAMPLE OF POSSIBLE COMBINATIONS OF AN SDG&E INSTALLATION WITH PUBLIC ACCESS WITH LEVEL 2 EVSE ONLY. THERE ARE MULTIPLE COMBINATIONS AND AS SUCH THE SPECIFIC CHARGERS TO BE USED FOR ANY PROJECT MUST BE USED WHEN CALCULATING THE REQUIRED POWER CENTER, AND TRANSFORMER SIZES AS REQUIRED.

EXAMPLE: TABLE EV-3.20

EVSE LEVEL 2 (240V) MANUFACTURER	EVSE LEVEL 2 (240V) MODEL	CHARGER TOTAL COUNT	KVA PER CHARGER	KVA SUMMATION
CHARGEPOINT	CT4000	1	7.2KVA	7.2KVA
CHARGEPOINT	CT4000	2	7.2KVA	14.4KVA
CHARGEPOINT	CT4000	3	7.2KVA	21.6KVA
CHARGEPOINT	CT4000	4	7.2KVA	28.8KVA
CHARGEPOINT	CT4000	5	7.2KVA	36KVA
CHARGEPOINT	CPF50	6	12KVA	48KVA
CHARGEPOINT	CPF50	7	12KVA	60KVA
CHARGEPOINT	CPF50	8	12KVA	72KVA
TOTAL FOR ALL 8 CHARGERS				72KVA
72 KVA / 240V = 300.00A				
BASED ON THE ABOVE CALCULATION, AND THE TABLE IN EV-3.10, THE MINIMUM POWER CENTER REQUIRED TO SERVICE THESE CHARGERS IS A 400A 240V 1Ø 3W.				

REFERENCES:

a. SEE SDG&E STANDARD DM 5621 INITIAL TRANSFORMER DESIGN LOADING FOR BALANCED LOADS.

b. SEE SDG&E STANDARD EV-2.20 LEVEL 2 SPECIFICATIONS, EV-2.30 DC FAST CHARGER SPECIFICATIONS, EV-2.40 TYPICAL CHARGERS.

c. SEE SDG&E STANDARD EV-3.10 LOAD SUMMARY GUIDE.

d. SEE SDG&E STANDARD EV-6.00 OVERALL EQUIPMENT LAYOUT.

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EXAMPLE: TABLE EV-3.21

EVSE LEVEL 2 (208V) MANUFACTURER	EVSE LEVEL 2 (208V) MODEL	CHARGER TOTAL COUNT	KVA PER CHARGER	KVA SUMMATION
CHARGEPOINT	CPF50	1	10.4KVA	10.4KVA
CHARGEPOINT	CPF50	2	10.4KVA	20.8KVA
CHARGEPOINT	CPF50	3	10.4KVA	31.2KVA
CHARGEPOINT	CPF50	4	10.4KVA	41.6KVA
CHARGEPOINT	CPF50	5	10.4KVA	52.0KVA
CHARGEPOINT	CPF50	6	10.4KVA	62.4KVA
CHARGEPOINT	CPF50	7	10.4KVA	72.8KVA
CHARGEPOINT	CPF50	8	10.4KVA	83.2KVA
CHARGEPOINT	CPF50	9	10.4KVA	93.6KVA
CHARGEPOINT	CPF50	10	10.4KVA	104.0KVA
TOTAL FOR ALL 8 CHARGERS				104.0KVA
104.0KVA / (√3 * 208V) = 288.67A				
BASED ON THE ABOVE CALCULATION, AND THE TABLE IN EV-3.10 THE POWER CENTER REQUIRED TO SERVICE THESE CHARGERS IS A 400A 208V 3Ø 4W.				

REFERENCES:

a. SEE SDG&E STANDARD DM 5621 INITIAL TRANSFORMER DESIGN LOADING FOR BALANCED LOADS.

b. SEE SDG&E STANDARD EV-2.20 LEVEL 2 SPECIFICATIONS, EV-2.30 DC FAST CHARGER SPECIFICATIONS, AND EV-2.40 TYPICAL CHARGERS.

c. SEE SDG&E STANDARD EV-3.10 LOAD SUMMARY GUIDE.

d. SEE SDG&E STANDARD EV-6.00 OVERALL EQUIPMENT LAYOUT.

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EVSE LOAD SUMMARY GUIDE:

THE FOLLOWING IS AN EXAMPLE OF POSSIBLE COMBINATIONS OF AN SDG&E INSTALLATION WITH PRIVATE ACCESS WITH DC FAST CHARGERS ONLY. THERE ARE MULTIPLE COMBINATIONS AND AS SUCH THE SPECIFIC CHARGERS TO BE USED FOR ANY PROJECT MUST BE USED WHEN CALCULATING THE REQUIRED POWER CENTER, AND TRANSFORMER SIZES AS REQUIRED.

EXAMPLE: TABLE EV-3.30

DCFC (208V) MANUFACTURER	DCFC (208V) MODEL	CHARGER TOTAL COUNT	KVA PER CHARGER	KVA SUMMATION
BTCPOWER	L3R-25-208-CS	1	25KVA	25KVA
BTCPOWER	L3R-25-208-CS	2	25KVA	50KVA
BTCPOWER	L3R-25-208-CS	3	25KVA	75 KVA
BTCPOWER	L3R-25-208-CS	4	25KVA	100KVA
BTCPOWER	L3R-50-208-CS	5	50KVA	150KVA
BTCPOWER	L3R-50-208-CS	6	50KVA	200KVA
TOTAL FOR ALL 6 CHARGERS				200KVA
200KVA / (√3 * 208V) = 555.14A				
BASED ON THE ABOVE CALCULATION, AND THE TABLE IN EV-3.10 THE POWER CENTER REQUIRED TO SERVICE THESE CHARGERS IS AN 800A 208V 3Ø 4W.				

REFERENCES:

a. SEE SDG&E STANDARD DM 5621 INITIAL TRANSFORMER DESIGN LOADING FOR BALANCED LOADS.

b. SEE SDG&E STANDARD EV-2.20 LEVEL 2 SPECIFICATIONS, EV-2.30 DC FAST CHARGER SPECIFICATIONS, AND EV-2.40 TYPICAL CHARGERS.

c. SEE SDG&E STANDARD EV-3.10 LOAD SUMMARY GUIDE.

d. SEE SDG&E STANDARD EV-6.00 OVERALL EQUIPMENT LAYOUT.

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SDG&E ELECTRIC VEHICLE CHARGING STATION STANDARDS

LOAD SUMMARY DC FAST CHARGER 208V

EVSE LOAD SUMMARY GUIDE:

THE FOLLOWING IS AN EXAMPLE OF POSSIBLE COMBINATIONS OF AN SDG&E INSTALLATION WITH PRIVATE ACCESS WITH DC FAST CHARGERS ONLY. THERE ARE MULTIPLE COMBINATIONS AND AS SUCH THE SPECIFIC CHARGERS TO BE USED FOR ANY PROJECT MUST BE USED WHEN CALCULATING THE REQUIRED POWER CENTER, AND TRANSFORMER SIZES AS REQUIRED.

EXAMPLE: TABLE EV-3.40

DCFC (480V) MANUFACTURER	DCFC (480V) MODEL	CHARGER TOTAL COUNT	KVA PER CHARGER	KVA SUMMATION
ABB	TERRA HP 350KW	1	350KVA	350KVA
ABB	HVC-150C	2	100KVA	450KVA
ABB	HVC-150C	3	100KVA	550KVA
ABB	TERRA 54	4	50KVA	600KVA
ABB	TERRA 54	5	50KVA	650KVA
ABB	TERRA 54	6	50KVA	700KVA
ABB	TERRA 54	7	50KVA	750KVA
ABB	TERRA 54	8	50KVA	800KVA
ABB	TERRA 54	9	50KVA	850KVA
ABB	TERRA 54	10	50KVA	900KVA
TOTAL FOR ALL 10 CHARGERS				900KVA
900KVA / (√3 * 480V) = 1082.53A				
BASED ON THE ABOVE CALCULATION, AND THE TABLE IN EV-3.10 THE POWER CENTER REQUIRED TO SERVICE THESE CHARGERS IS A 1600A 480V 3Ø 4W.				

REFERENCES:

a. SEE SDG&E STANDARD DM 5621 INITIAL TRANSFORMER DESIGN LOADING FOR BALANCED LOADS

b. SEE SDG&E STANDARD EV-2.20 LEVEL 2 SPECIFICATIONS, EV-2.30 DC FAST CHARGER SPECIFICATIONS, AND EV-2.40 TYPICAL CHARGERS.

c. SEE SDG&E STANDARD EV-3.10 LOAD SUMMARY GUIDE.

d. SEE SDG&E STANDARD EV-6.00 OVERALL EQUIPMENT LAYOUT.

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SDG&E ELECTRIC VEHICLE CHARGING STATION STANDARDS

LOAD SUMMARY DC FAST CHARGER 480V

EV3.40

EVSE LOAD SUMMARY GUIDE:

THE FOLLOWING IS AN EXAMPLE OF POSSIBLE COMBINATIONS OF AN SDG&E INSTALLATION WITH PRIVATE ACCESS WITH LEVEL 2 & DC FAST CHARGERS. THERE ARE MULTIPLE COMBINATIONS AND AS SUCH THE SPECIFIC CHARGERS TO BE USED FOR ANY PROJECT MUST BE USED WHEN CALCULATING THE REQUIRED POWER CENTER, AND TRANSFORMER SIZES AS REQUIRED.

EXAMPLE: EV-3.50

DCFC (208V) MANUFACTURER	DCFC (208V) MODEL	CHARGER TOTAL COUNT	KVA PER CHARGER	KVA SUMMATION
BTCPOWER	L3R-50-208-CS	1	50KVA	50.00KVA
BTCPOWER	L3R-50-208-CS	2	50KVA	100.00KVA
BTCPOWER	L3R-50-208-CS	3	50KVA	150.00KVA
BTCPOWER	L3R-50-208-CS	4	50KVA	200.00KVA
LEVEL 2 (208V) MANUFACTURER	LEVEL 2 (208V) MODEL	CHARGER TOTAL COUNT	KVA PER CHARGER	KVA SUMMATION
BTCPOWER	L2W-70-240-16	5	14.56KVA	214.56KVA
BTCPOWER	L2W-70-240-16	6	14.56KVA	229.12KVA
BTCPOWER	L2W-70-240-16	7	14.56KVA	243.68KVA
BTCPOWER	L2W-70-240-16	8	14.56KVA	258.24KVA
BTCPOWER	L2W-70-240-16	9	14.56KVA	272.80KVA
BTCPOWER	L2W-70-240-16	10	14.56KVA	287.36KVA
TOTAL FOR ALL 10 CHARGERS				287.36KVA
287.36KVA / ($\sqrt{3}$ * 208V) = 797.63A				
BASED ON THE ABOVE CALCULATION, AND THE TABLE IN EV-3.10 THE POWER CENTER REQUIRED TO SERVICE THESE CHARGERS IS A 1200A 480V 3Ø 4W.				

REFERENCES:

a. SEE SDG&E STANDARD DM 5621 INITIAL TRANSFORMER DESIGN LOADING FOR BALANCED LOADS.

b. SEE SDG&E STANDARD EV-2.20 LEVEL 2 SPECIFICATIONS, EV-2.30 DC FAST CHARGER SPECIFICATIONS, AND EV-2.40 TYPICAL CHARGERS.

c. SEE SDG&E STANDARD EV-3.10 LOAD SUMMARY GUIDE.

d. SEE SDG&E STANDARD EV-6.00 OVERALL EQUIPMENT LAYOUT.

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EXAMPLE: TABLE EV-3.60

DCFC (480V) MANUFACTURER	DCFC (480V) MODEL	CHARGER TOTAL COUNT	KVA PER CHARGER	KVA SUMMATION
CHARGEPOINT	CPE250C	1	62.5KVA	62.5KVA
CHARGEPOINT	CPE250C	2	62.5KVA	125.0KVA
CHARGEPOINT	CPE250C	3	62.5KVA	187.5KVA
CHARGEPOINT	CPE250C	4	62.5KVA	250KVA
LEVEL 2 (208V) MANUFACTURER	LEVEL 2 (208V) MODEL	CHARGER TOTAL COUNT	KVA PER CHARGER	KVA SUMMATION
CHARGEPOINT	CP50	5	10.4KVA	260.4KVA
CHARGEPOINT	CP50	6	10.4KVA	270.8KVA
CHARGEPOINT	CP50	7	10.4KVA	281.2KVA
CHARGEPOINT	CP50	8	10.4KVA	291.6KVA
CHARGEPOINT	CP50	9	10.4KVA	302.0KVA
CHARGEPOINT	CP50	10	10.4KVA	312.4KVA
TOTAL FOR ALL 10 CHARGERS				312.4KVA
312.4KVA / (√3 * 480V) = 375.76A				
62.4KVA / (√3 * 208V) = 173.2A				
NOTE THERE ARE CHARGERS AT 480V AND 208V, WHICH WILL REQUIRE A STEP DOWN TRANSFORMER, SEE EV-11.00. BASED ON THE ABOVE CALCULATIONS, AND THE TABLE IN EV-3.10 THE POWER CENTER REQUIRED TO SERVICE THESE 480V CHARGERS IS A 600A 480V 3Ø 4W. THE POWER CENTER REQUIRED FOR THE 208V CHARGERS WILL BE A SUB-FEED STEPPED DOWN 400A 208V 3Ø 4W.				

REFERENCES:

a. SEE SDG&E STANDARD DM 5621 INITIAL TRANSFORMER DESIGN LOADING FOR BALANCED LOADS.

b. SEE SDG&E STANDARD EV-2.20 LEVEL 2 SPECIFICATIONS, EV-2.30 DC FAST CHARGER SPECIFICATIONS, AND EV-2.40 TYPICAL CHARGERS.

c. SEE SDG&E STANDARD EV-3.10 LOAD SUMMARY GUIDE.

d. SEE SDG&E STANDARD EV-6.00 OVERALL EQUIPMENT LAYOUT.

e. SEE SDG&E STANDARD EV-11.00 DRY-TYPE TRANSFORMERS.

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B	COMPLETELY REVISED	-	JES	JES	CZH	10/09/2020	E						
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EV4.50 - 4.51	HARD WIRED COMMUNICATIONS

DRAWINGS:

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SDG&E ELECTRIC VEHICLE CHARGING STATION STANDARDS

COMMUNICATION BLOCK DIAGRAMS

EV4.00

COMMUNICATIONS:

SDG&E SERVICE METERING EQUIPMENT, AND EVSE REQUIRE ADEQUATE SIGNAL COVERAGE TO REMOTELY REPORT RESPECTIVE RECORDED AGGREGATE USAGE DATA. THIS IS ACHIEVED THROUGH MEANS OF EITHER CELLULAR MODEMS 3G/4G, OR GATEWAY CONFIGURATIONS AS SHOWN IN EV-4.20 TO EV-4.50. SEE MANUFACTURER'S SPECIFICATIONS FOR APPROVED CHARGER SIGNAL CONNECTIONS.

THE BEST WAY TO ENSURE THAT SERVICE METERING EQUIPMENT, AND EVSE HAVE ADEQUATE COVERAGE IS TO LOCATE ALL OF THE EQUIPMENT OUTSIDE AS MUCH AS POSSIBLE. IF THE EQUIPMENT IS LOCATED INDOORS, ESPECIALLY BELOW GRADE LEVEL CELLULAR COVERAGE MAY NOT BE ADEQUATE. INDOOR CONFIGURATIONS FOR EVSE ARE SHOWN EV-7.40.

FOR SDG&E PROGRAMS WHETHER EVSE ARE LOCATED INDOORS, OR OUTDOORS THE RELATIVE CELLULAR SIGNAL QUALITY AND STRENGTH ARE TO BE MEASURED DURING THE INITIAL SITE VISIT BY THE PROJECT FCA USING A SQUID, OR OTHER DESIGNATED CELLULAR TESTING DEVICE. IF THE DESIRED LOCATIONS OF EVSE ARE LACKING IN EITHER SIGNAL QUALITY OR STRENGTH THE TEAM MUST FIND A LOCATION ON SITE TO HOST A CELLULAR REPEATER, OR HARD WIRED COMMUNICATIONS SITE CONTROLLER.

REFERENCES:

a. SEE SDG&E STANDARD UG 3370 UNDERGROUND DISTRIBUTION (UD) TRENCHES AND UTILITY POSITIONING - S.D. COUNTY.

b. SEE SDG&E STANDARDS EV-4.20 INTERNAL GATEWAY - MODEM, EV-4.30 EXTERNAL GATEWAY - MODEM, EV-4.40 CELLULAR REPEATERS, AND EV-4.50 HARD WIRED COMMUNICATIONS.

c. SEE SDG&E STANDARD EV-7.40 PARKING LAYOUT - PARKING GARAGE.

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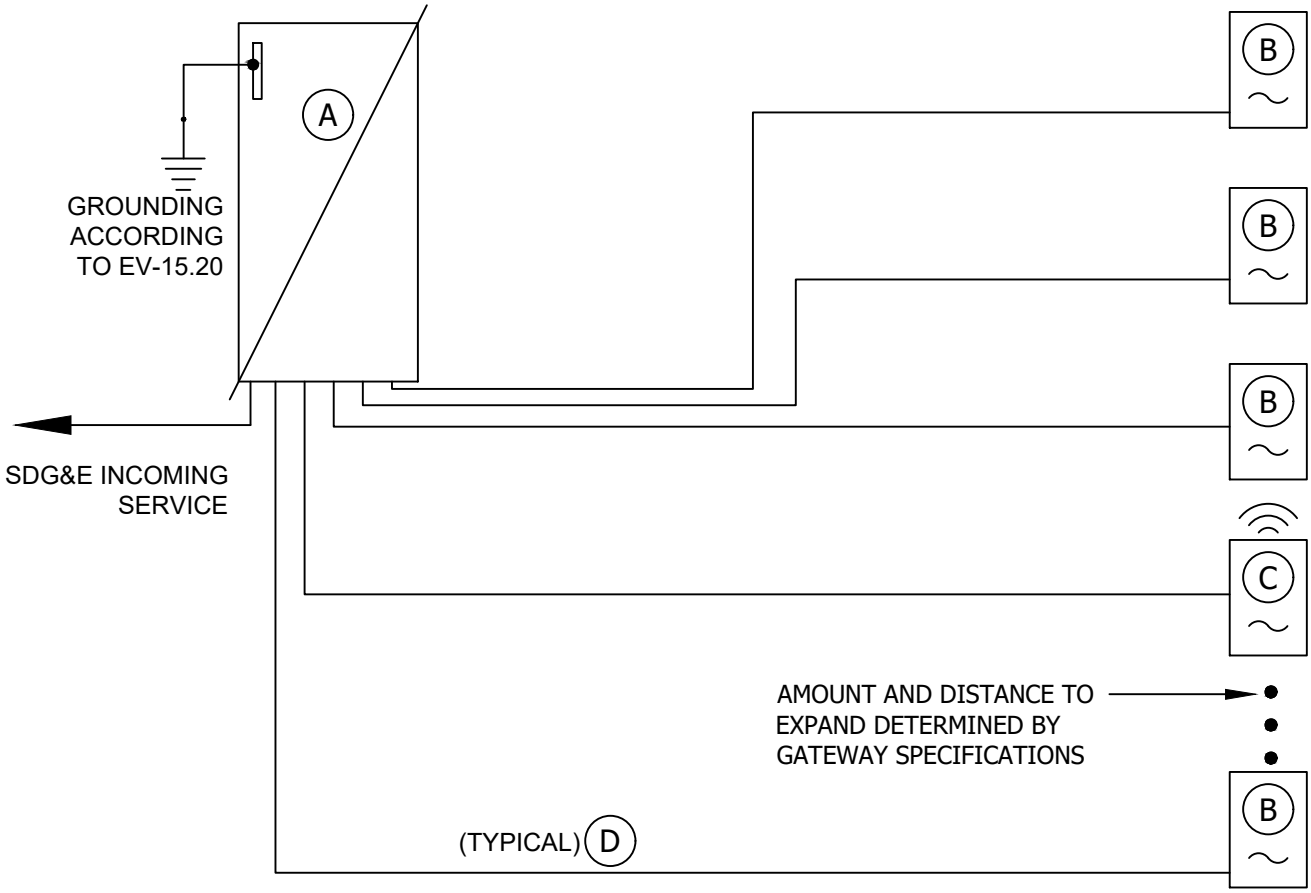

DESIGN:

A COMMERCIAL POWER CENTER, SERVICE SIZED AS NECESSARY PER EV-3.00.

B ELECTRIC VEHICLE SERVICE EQUIPMENT (EVSE). QUANTITY, AND SIZE PER CUSTOMER'S REQUIREMENTS AND TO BE COORDINATED DURING DESIGN PHASE.

C ELECTRIC VEHICLE SERVICE EQUIPMENT (EVSE) WITH INTERNAL GATEWAY/MODEM. QUANTITY, AND SIZE PER CUSTOMER'S REQUIREMENTS AND TO BE COORDINATED DURING DESIGN PHASE. LOCATIONS TO ACCOMMODATE MANUFACTURERS REQUIREMENTS FOR COMMUNICATION WITH OTHER CHARGERS.

D ELECTRIC POWER CONDUIT AND WIRING FROM POWER CENTER TO ELECTRIC VEHICLE SERVICE EQUIPMENT. QUANTITIES OF CONDUITS AND ASSOCIATED WIRING PER NUMBER OF CHARGING STATIONS TO BE INSTALLED PER EV-15.00

REFERENCES:

a. SEE SDG&E STANDARD EV-3.00 EVSE LOAD SUMMARY.

b. SEE SDG&E STANDARD EV-4.10 COMMUNICATIONS.

c. SEE SDG&E STANDARD EV-15.00 ADDITIONAL RESOURCES.

REV	CHANGE	DR	BY	DSN	APV	DATE	REV	CHANGE	DR	BY	DSN	APV	DATE
C	2022 REVISION	ARC	JES	IPJ	KRG	07/21/2022	F						
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SDG&E ELECTRIC VEHICLE CHARGING STATION STANDARDS

INTERNAL GATEWAY - MODEM

EV4.20

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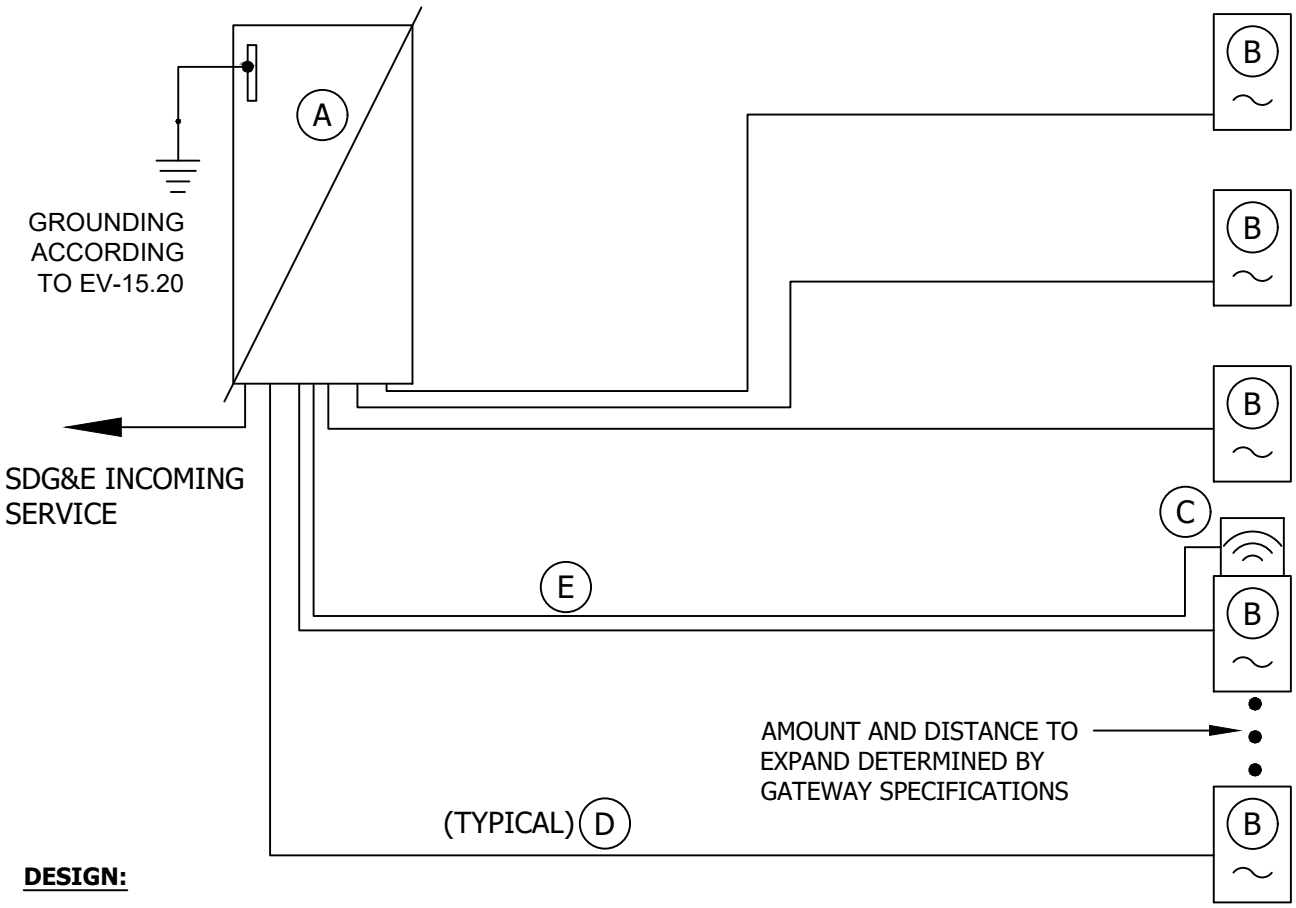

DESIGN:

A — COMMERCIAL POWER CENTER, SERVICE SIZED AS NECESSARY PER EV-3.00.

B — ELECTRIC VEHICLE SERVICE EQUIPMENT (EVSE). QUANTITY, AND SIZE PER CUSTOMER'S REQUIREMENTS AND TO BE COORDINATED DURING DESIGN PHASE.

C — EXTERNAL GATEWAY/MODEM. QUANTITY, TO CONNECT TO ELECTRIC VEHICLE SERVICE EQUIPMENT PER CUSTOMER'S REQUIREMENTS AND PER MANUFACTURER'S SPECIFICATIONS. LOCATIONS TO ACCOMMODATE MANUFACTURERS REQUIREMENTS FOR COMMUNICATION WITH OTHER CHARGERS.

D — ELECTRIC POWER CONDUIT AND WIRING FROM POWER CENTER TO ELECTRIC VEHICLE SERVICE EQUIPMENT. QUANTITIES OF CONDUITS AND ASSOCIATED WIRING PER NUMBER OF CHARGING STATIONS TO BE INSTALLED PER EV-15.00

E — GATEWAY POWER CONDUIT AND WIRING TO BE INSTALLED PER EV-15.00 AND MANUFACTURER REQUIREMENTS.

REFERENCES:

a. SEE SDG&E STANDARD EV-3.00 EVSE LOAD SUMMARY.

b. SEE SDG&E STANDARD EV-4.10 COMMUNICATIONS.

c. SEE SDG&E STANDARD EV-15.00 ADDITIONAL RESOURCES.

REV	CHANGE	DR	BY	DSN	APV	DATE	REV	CHANGE	DR	BY	DSN	APV	DATE
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SDG&E ELECTRIC VEHICLE CHARGING STATION STANDARDS

EXTERNAL GATEWAY - MODEM

EV4.30

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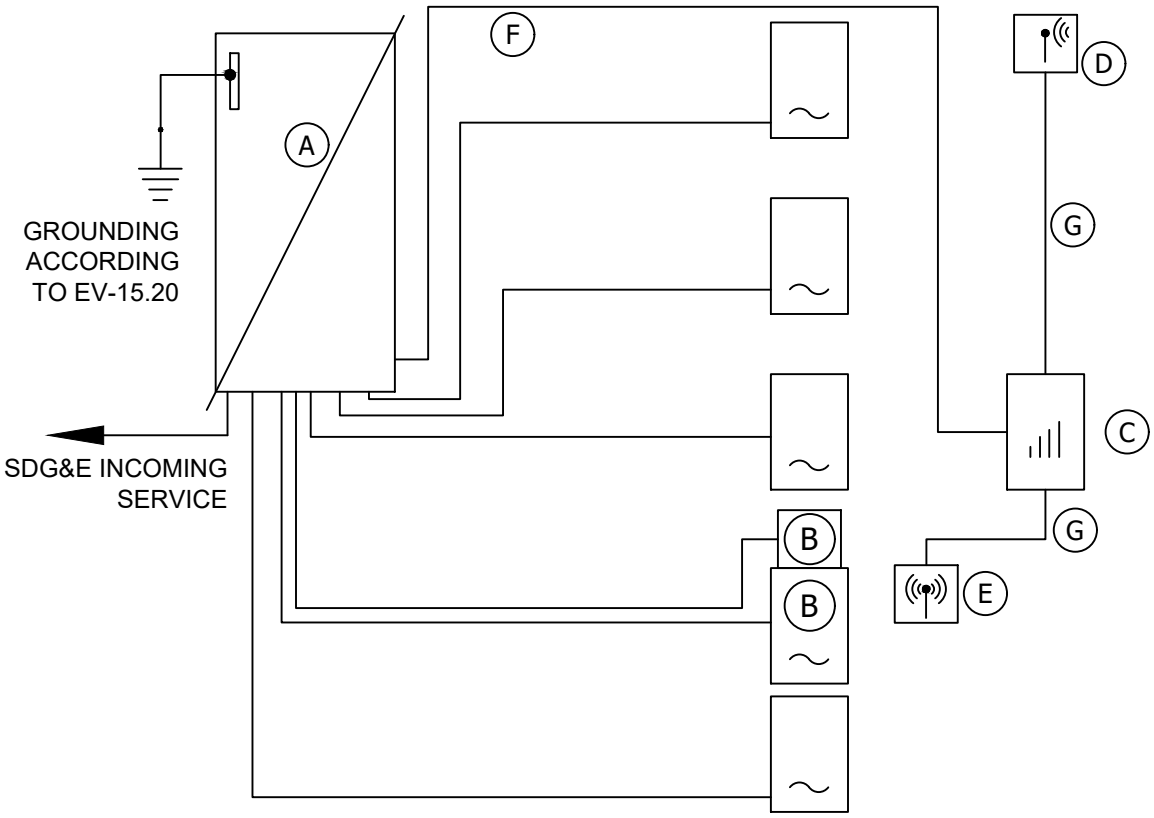

DESIGN:

(A) COMMERCIAL POWER CENTER, SERVICE SIZED AS NECESSARY PER EV-3.00,

(B) EVSE WITH INTERNAL / EXTERNAL GATEWAY/MODEM AS APPLICABLE, SEE EV-4.20 AND EV-4.30.

(C) CELLULAR REPEATER IN SEPARATE WALL MOUNTED ENCLOSURE.

(D) CELLULAR REPEATER RECEIVER ANTENNA, MOUNT OUTDOORS IN SUITABLE LOCATION TO RECEIVE ADEQUATE CELLULAR COVERAGE. MOUNT PER MANUFACTURER'S SPECIFICATIONS.

(E) CELLULAR TRANSMITTER ANTENNA, MOUNT INDOORS IN SUITABLE LOCATION TO TRANSMIT ADEQUATE CELLULAR COVERAGE TO GATEWAYS ON SITE. MOUNT PER MANUFACTURER'S SPECIFICATIONS.

(F) CELLULAR REPEATER POWER CONDUIT AND WIRING TO BE INSTALLED PER EV-15.00.

(G) CELLULAR REPEATER TRANSMISSION CABLES PER MANUFACTURER'S SPECIFICATIONS.

REFERENCES:

a. SEE SDG&E STANDARD EV-3.00 EVSE LOAD SUMMARY.

b. SEE SGDG&E STANDARDS EV-4.20 INTERNAL GATEWAY - MODEM, AND EV-4.30 EXTERNAL GATEWAY - MODEM.

c. SEE SDG&E STANDARD EV-7.40 PARKING LAYOUT - PARKING GARAGE.

d. SEE SDG&E STANDARD EV-15.00 ADDITIONAL RESOURCES.

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SDG&E ELECTRIC VEHICLE CHARGING STATION STANDARDS

CELLULAR REPEATERS

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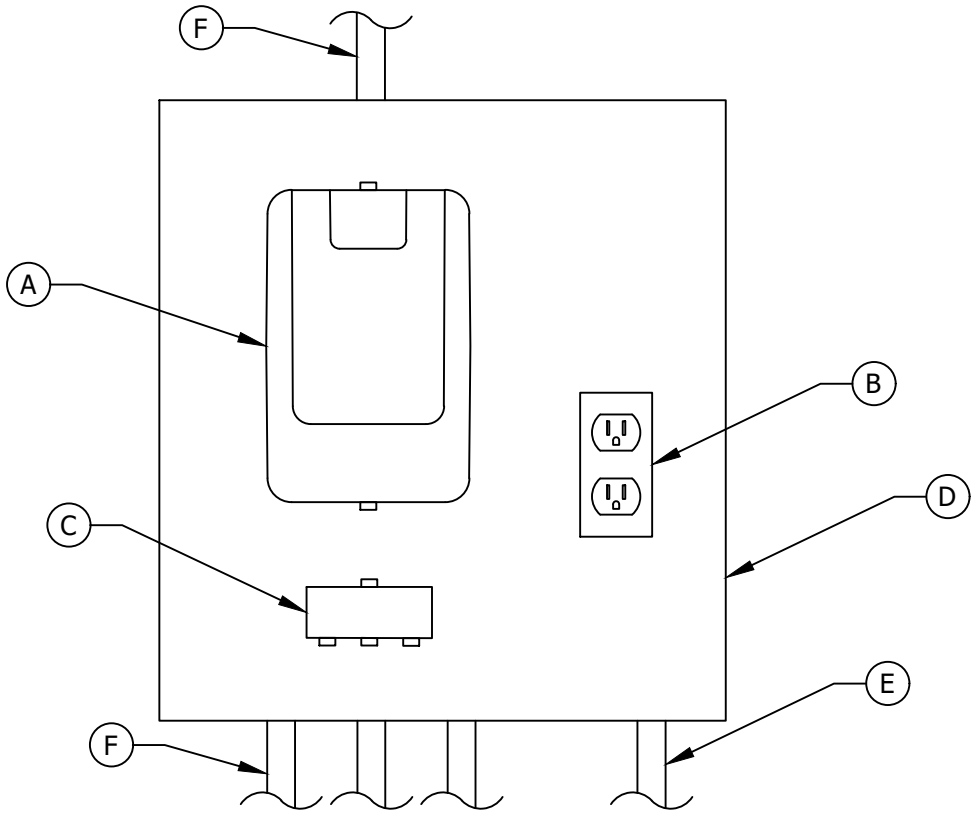

DESIGN:

A CELLULAR REPEATER, BRAND MAKE AND MODEL TO BE CHOSEN BASED ON SPECIFIC ELECTRIC VEHICLE CHARGERS CELLULAR REQUIREMENTS. ENSURE REPEATER SUPPORTS CELLULAR CARRIER THAT CHARGERS ACCEPT.

B 120V DUPLEX RECEPTACLE MOUNTED INSIDE ENCLOSURE. USED TO POWER PLUG IN CELL REPEATER, AND FOR CONVENIENCE. PROVIDE DEDICATED CIRCUIT, PER EV-15.00.

C COAXIAL SPLITTER AS REQUIRED, TO HAVE AS MANY OUTPUT CONNECTIONS AS REQUIRED FOR INDOOR ANTENNAS.

D ENCLOSURE TO BE SIZED MINIMUM FOR THE ENCLOSED EQUIPMENT, AND FOR WIRING BENDS INSIDE THE EQUIPMENT AS REQUIRED. ADEQUATELY RATE FOR ENVIRONMENTAL CONDITIONS.

E POWER CONDUIT AND WIRING FOR DEDICATED BRANCH CIRCUIT FOR ENCLOSURE.

F COAXIAL WIRING AND CONDUITS FOR INDOOR OR OUTDOOR ANTENNAS AS REQUIRED.

REFERENCES:

a. SEE SDG&E STANDARD EV-6.00 OVERALL EQUIPMENT LAYOUT.

b. SEE SDG&E STANDARD EV-15.00 ADDITIONAL RESOURCES.

REV	CHANGE	DR	BY	DSN	APV	DATE	REV	CHANGE	DR	BY	DSN	APV	DATE
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SDG&E ELECTRIC VEHICLE CHARGING STATION STANDARDS

CELLULAR REPEATERS

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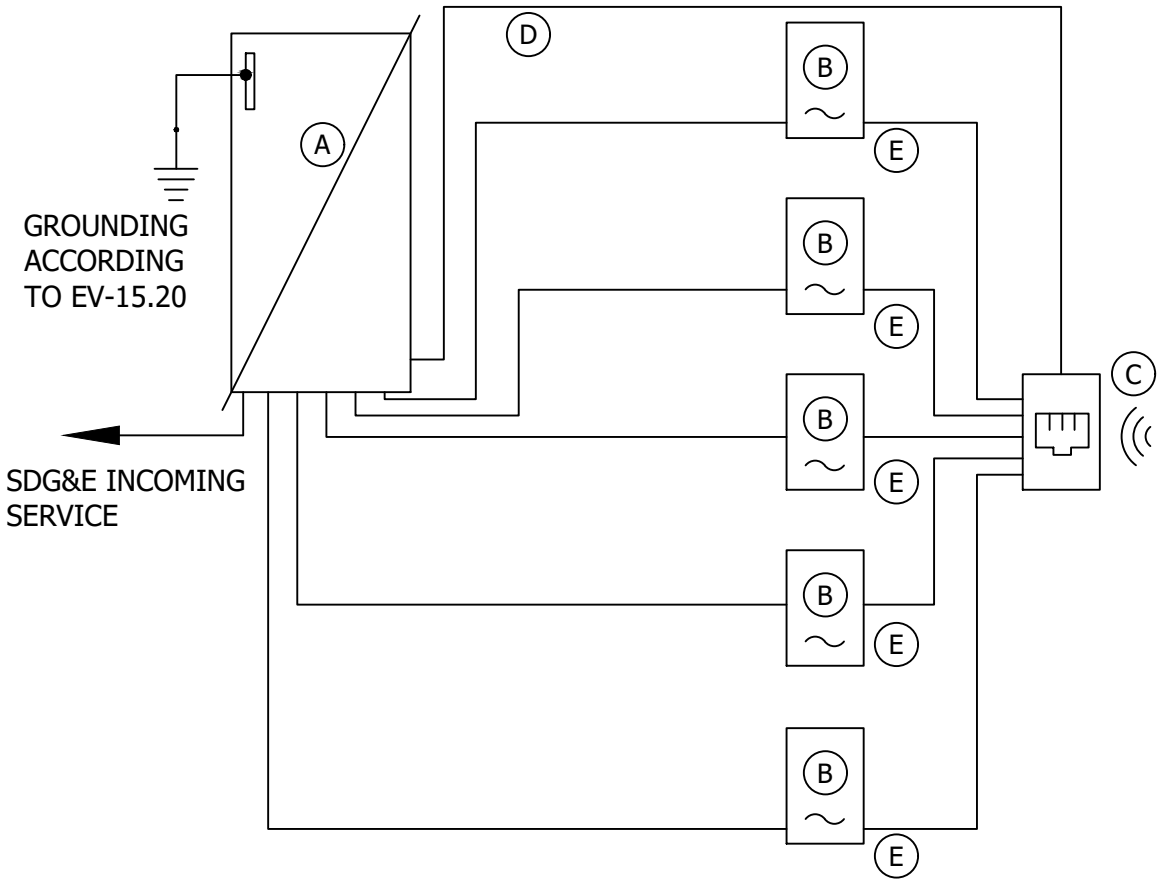

DESIGN:

(A) COMMERCIAL POWER CENTER, SERVICE SIZED AS NECESSARY PER EV-3.00.

(B) EVSE WHICH REQUIRE HARD WIRED CONNECTIONS.

(C) ENCLOSURE CONTAINING CELLULAR MODEM, AND ETHERNET SWITCH WITH ADEQUATE PORTS FOR NUMBER OF DESIRED EVSE. MOUNT OUTDOORS IN SAFE LOCATION WITH ADEQUATE CELLULAR RECEPTION.

(D) CELLULAR REPEATER POWER CONDUIT AND WIRING TO BE INSTALLED PER EV-15.00.

(E) HARD WIRED COMMUNICATION CONNECTION, PER EVSE MANUFACTURER'S SPECIFICATIONS.

REFERENCES:

a. SEE SDG&E STANDARD EV-3.00 EVSE LOAD SUMMARY.

b. SEE SDG&E STANDARD EV-4.10 COMMUNICATIONS.

c. SEE SDG&E STANDARD EV-7.40 PARKING LAYOUT - PARKING GARAGE.

d. SEE SDG&E STANDARD EV-15.00 ADDITIONAL RESOURCES.

REV	CHANGE	DR	BY	DSN	APV	DATE	REV	CHANGE	DR	BY	DSN	APV	DATE
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SDG&E ELECTRIC VEHICLE CHARGING STATION STANDARDS

HARD WIRED COMMUNICATIONS

EV4.50

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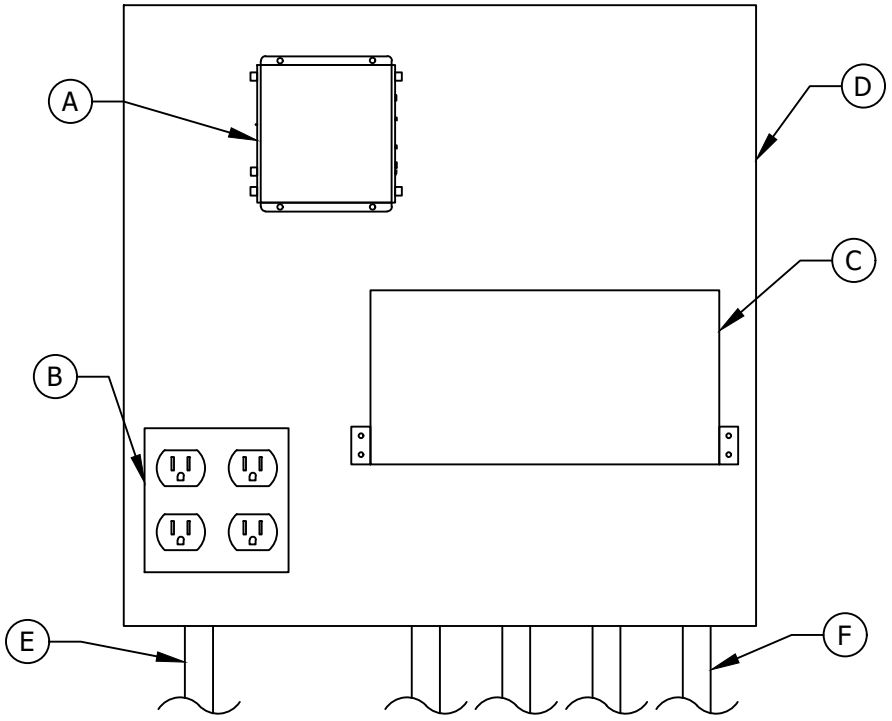

DESIGN:

(A) CELLULAR MODEM, BRAND MAKE AND MODEL TO BE CHOSEN BASED ON AVAILABLE CELLULAR SIGNALS AND STRENGTHS AT SITE LOCATION. ENSURE MODEM SUPPORTS CELLULAR CARRIER THAT IS AVAILABLE.

(B) 120V QUADPLEX RECEPTACLE MOUNTED INSIDE ENCLOSURE. USED TO POWER PLUG IN CELLULAR MODEM, ETHERNET SWITCH, AND FOR CONVENIENCE. PROVIDE DEDICATED CIRCUIT, PER EV-15.00.

(C) ETHERNET SWITCH, TO HAVE AS MANY OUTPUT CONNECTIONS AS REQUIRED FOR NUMBER OF ELECTRIC VEHICLE CHARGERS THAT REQUIRE HARD WIRED CONNECTION.

(D) ENCLOSURE TO BE SIZED MINIMUM FOR THE ENCLOSED EQUIPMENT, AND FOR WIRING BENDS INSIDE THE EQUIPMENT AS REQUIRED. ADEQUATELY RATE FOR ENVIRONMENTAL CONDITIONS. METALLIC ENCLOSURES SIGNIFICANTLY REDUCE THE SIGNAL QUALITY OF CELLULAR MODEMS, AND FIBERGLASS CONSTRUCTION IS PREFERRED FOR SIGNAL QUALITY. IF FIBERGLASS IS NOT AN OPTION DUE TO SECURITY REASONS SUCH AS BEING PLACED NEAR ACCESS TO THE PUBLIC METALLIC ENCLOSURES MAY BE USED, HOWEVER THE ANTENNA OF THE MODEMS MAY NEED TO BE PLACED OUTSIDE OF THE ENCLOSURE. IF THIS IS DONE THE ENVIRONMENTAL RATING OF THE ENCLOSURE MUST ALSO BE MAINTAINED.

(E) POWER CONDUIT AND WIRING FOR DEDICATED BRANCH CIRCUIT FOR ENCLOSURE.

(F) LAN CONDUIT AND WIRING TO ELECTRIC VEHICLE CHARGERS. CAT-5E OR BETTER, REFER TO MANUFACTURER'S SPECIFICATIONS.

REFERENCES:

a. SEE SDG&E STANDARD EV-6.00 OVERALL EQUIPMENT LAYOUT.

b. SEE SDG&E STANDARD EV-15.00 ADDITIONAL RESOURCES.

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EV5.30	400A-600A SERVICE UP TO 480V
EV5.40	800A-4000A SERVICE
EV5.50	PRIMARY METERING SERVICE
EV5.60	ARC FLASH LABELS

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SDG&E ELECTRIC VEHICLE CHARGING STATION STANDARDS

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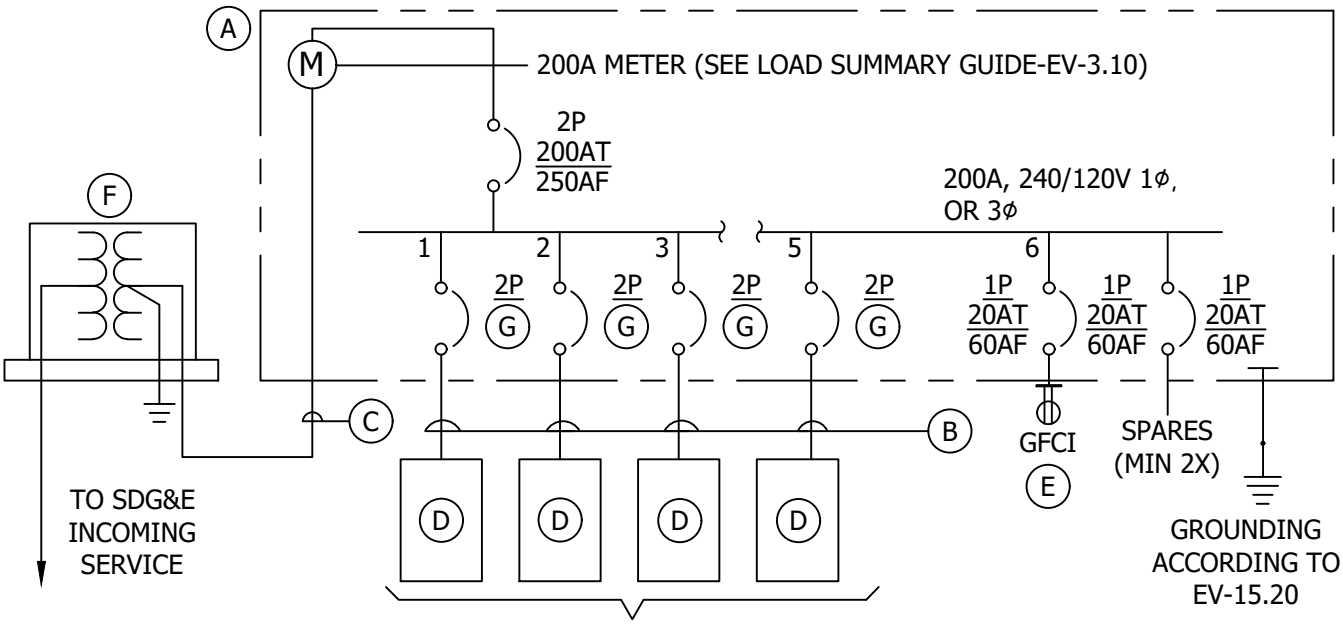
SINGLE LINE DIAGRAMS

EV5.00



DESIGN:

(A) COMMERCIAL SERVICE METER PEDESTAL. SIZE OF SERVICE PER EV-3.00 & SG 500.

(B) SIZE CONDUIT AND CONDUCTORS IN ACCORDANCE WITH EV-15.00.

(C) UNDERGROUND CONDUIT, INSTALL PER SDG&E STANDARD SG 300.

(D) ELECTRIC VEHICLE SERVICE EQUIPMENT, SEE EV-2.00 FOR SPECIFICATIONS.

(E) GROUND-FAULT CIRCUIT INTERRUPTER RECEPTACLE (NEMA 5-20R) IN WEATHERPROOF ENCLOSURE AS APPLICABLE. GFCI RECEPTACLE MAY BE INSTALLED INTERNALLY IN LIEU OF EXTERNAL INSTALLATION IN A NEMA ENCLOSURE.

(F) NEW OR EXISTING SDG&E TRANSFORMER. SEE EV-6.00.

(G) ELECTRIC VEHICLE SERVICE EQUIPMENT OVERCURRENT PROTECTION DEVICE. SIZE PER EV-15.00.

REFERENCES:

a. SEE SDG&E STANDARD SG 300 UNDERGROUND ELECTRIC SERVICE.

b. SEE SDG&E STANDARD EV-2.00 EVSE SPECIFICATIONS.

c. SEE SDG&E STANDARD EV-3.00 EVSE LOAD SUMMARY.

d. SEE SDG&E STANDARD EV-6.00 OVERALL EQUIPMENT LAYOUT.

e. SEE SDG&E STANDARD EV-15.00 ADDITIONAL RESOURCES.

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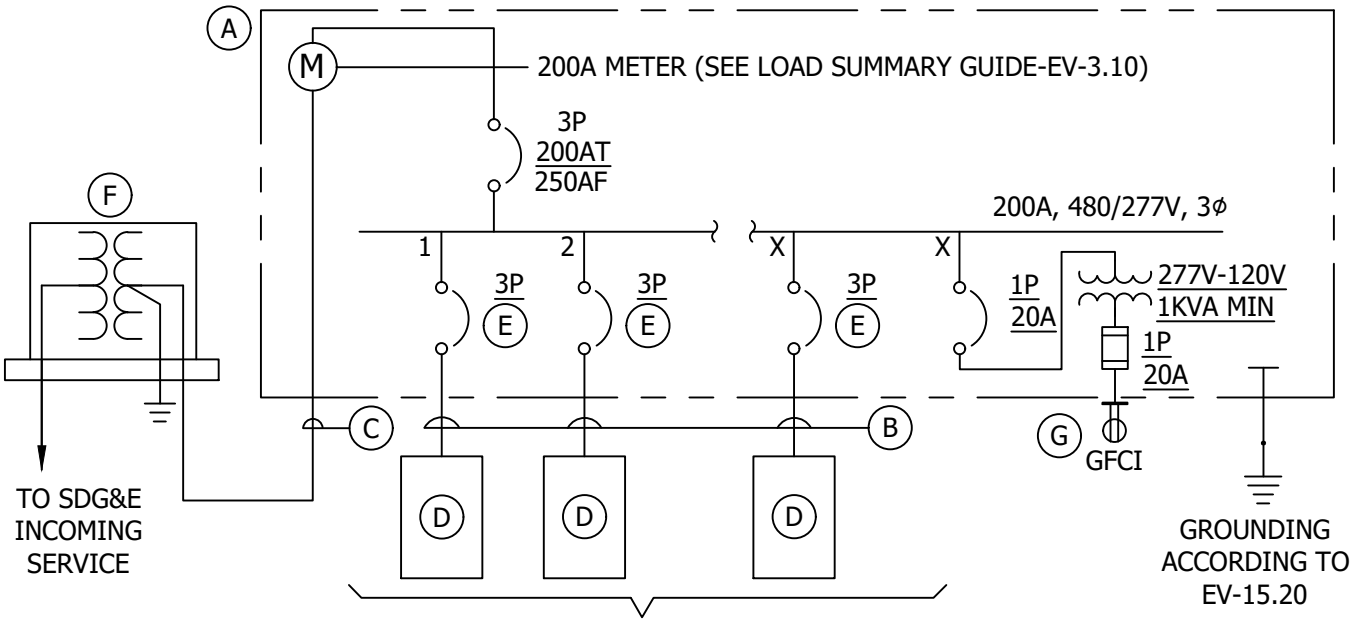

DESIGN:

(A) COMMERCIAL SERVICE METER PEDESTAL. SIZE OF SERVICE PER EV-3.00.

(B) SIZE CONDUIT AND CONDUCTORS IN ACCORDANCE WITH EV-15.00.

(C) UNDERGROUND CONDUIT, INSTALL PER SGD&E STANDARD SG 300.

(D) ELECTRIC VEHICLE SERVICE EQUIPMENT, SEE EV-2.00 FOR SPECIFICATIONS.

(E) ELECTRIC VEHICLE SERVICE EQUIPMENT OVERCURRENT PROTECTION DEVICE. SIZE PER EV-15.00.

(F) NEW OR EXISTING SDG&E TRANSFORMER. SEE EV-6.00.

(G) GROUND-FAULT CIRCUIT INTERRUPTER RECEPTACLE (NEMA 5-20R) 120V IN WEATHERPROOF ENCLOSURE AS APPLICABLE, AND ASSOCIATED STEP DOWN CONTROL POWER TANSFORMER, PRIMARY BREAKER, AND SECONDARY FUSING. GFCI RECEPTACLE MAY BE INSTALLED INTERNALLY IN LIEU OF EXTERNAL INSTALLATION IN A NEMA ENCLOSURE.

REFERENCES:

a. SEE SDG&E STANDARD SG 300 UNDERGROUND ELECTRIC SERVICE.

b. SEE SDG&E STANDARD EV-2.00 EVSE SPECIFICATIONS.

c. SEE SDG&E STANDARD EV-3.00 EVSE LOAD SUMMARY.

d. SEE SDG&E STANDARD EV-6.00 OVERALL EQUIPMENT LAYOUT.

e. SEE SDG&E STANDARD EV-15.00 ADDITIONAL RESOURCES.

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SDG&E ELECTRIC VEHICLE CHARGING STATION STANDARDS

0-200A SERVICE AT 480V

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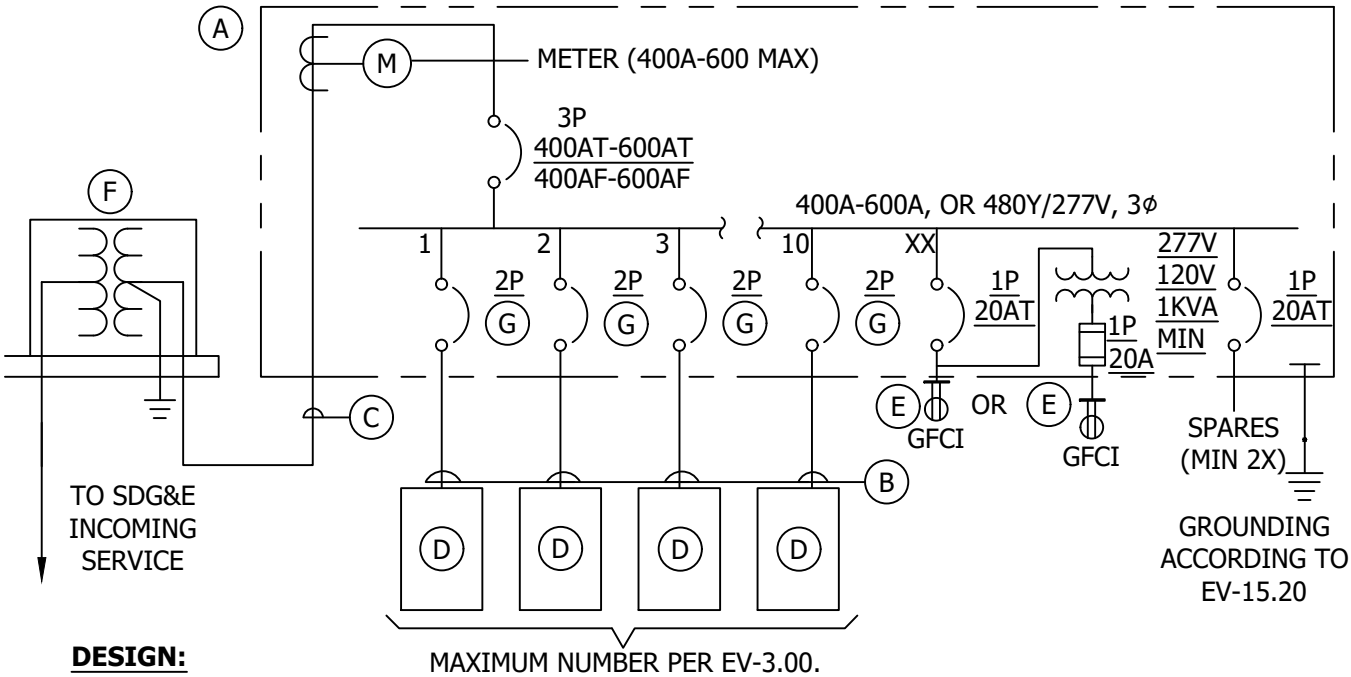

DESIGN:

(A) COMMERCIAL SERVICE METER PEDESTAL. SIZE OF SERVICE PER EV-3.00 & SG 500.

(B) SIZE CONDUIT AND CONDUCTORS IN ACCORDANCE WITH EV-15.00.

(C) UNDERGROUND CONDUIT, INSTALL PER SDG&E STANDARD SG 300.

(D) ELECTRIC VEHICLE SERVICE EQUIPMENT, SEE EV-2.00 FOR SPECIFICATIONS.

(E) GROUND-FAULT CIRCUIT INTERRUPTER RECEPTACLE (NEMA 5-20R) 120V IN WEATHERPROOF ENCLOSURE AS APPLICABLE. GFCI RECEPTACLE MAY BE INSTALLED INTERNALLY IN LIEU OF EXTERNAL INSTALLATION IN A NEMA ENCLOSURE. TRANSFORMER AS REQUIRED FOR 480V SERVICES.

(F) NEW OR EXISTING SDG&E TRANSFORMER. SEE EV-6.00.

(G) ELECTRIC VEHICLE SERVICE EQUIPMENT OVERCURRENT PROTECTION DEVICE. SIZE PER EV-15.00.

REFERENCES:

a. SEE SDG&E STANDARD SG 300 UNDERGROUND ELECTRIC SERVICE.

b. SEE SDG&E STANDARD EV-2.00 EVSE SPECIFICATIONS.

c. SEE SDG&E STANDARD EV-3.00 EVSE LOAD SUMMARY.

d. SEE SDG&E STANDARD EV-6.00 OVERALL EQUIPMENT LAYOUT.

e. SEE SDG&E STANDARD EV-15.00 ADDITIONAL RESOURCES.

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A	ORIGINAL EDITION	-	JK	JS	MDJ	12/7/2017	D						

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SDG&E ELECTRIC VEHICLE CHARGING STATION STANDARDS

400A-600A SERVICE UP TO 480V

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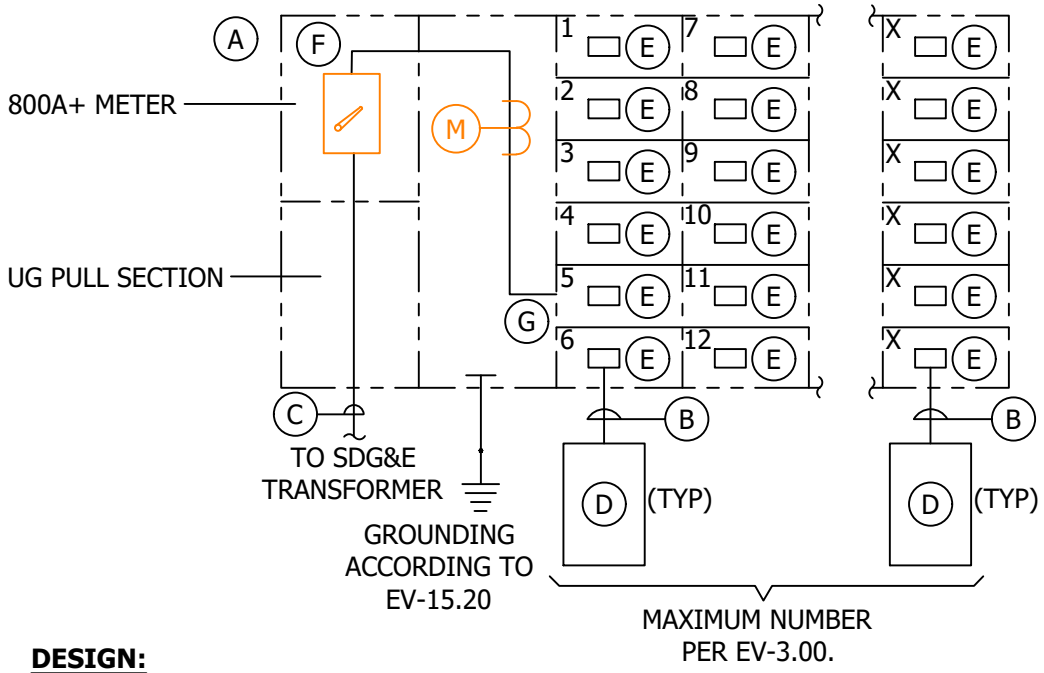

DESIGN:

(A) COMMERCIAL METERED SWITCHGEAR. SIZE OF SERVICE PER EV-3.00.

(B) SIZE CONDUIT AND CONDUCTORS IN ACCORDANCE WITH EV-15.00.

(C) UNDERGROUND CONDUIT, INSTALL PER SDG&E STANDARD SG 300.

(D) ELECTRIC VEHICLE SERVICE EQUIPMENT, SEE EV-2.00 FOR SPECIFICATIONS.

(E) ELECTRIC VEHICLE SERVICE EQUIPMENT OVERCURRENT PROTECTION DEVICE. SIZE PER EV-15.00.

(F) MAIN OVERCURRENT PROTECTION BREAKER. SIZE PER EV-3.00. MAIN BREAKERS FOR SYSTEMS GREATER THAN 150V LINE TO GROUND AND RATED 1000 AMPERES OR MORE SHALL REQUIRE GROUND FAULT PROTECTION.

(G) SEE LOAD SUMMARY GUIDE EV-3.00 FOR MINIMUM BUS RATING.

REFERENCES:

a. SEE SDG&E STANDARD SG 300 UNDERGROUND ELECTRIC SERVICE.

b. SEE SDG&E STANDARD EV-2.00 EVSE SPECIFICATIONS.

c. SEE SDG&E STANDARD EV-3.00 EVSE LOAD SUMMARY.

d. SEE SDG&E STANDARD EV-15.00 ADDITIONAL RESOURCES.

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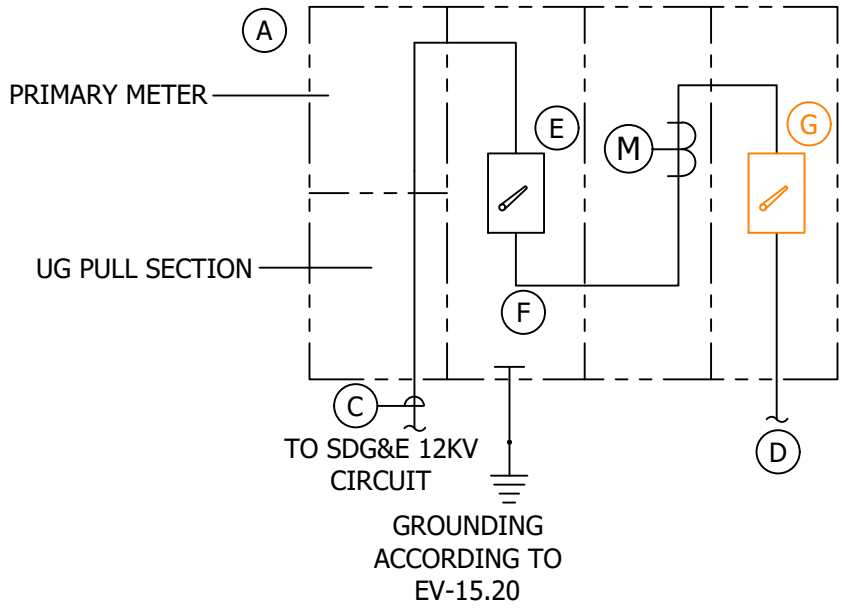

DESIGN:

(A) COMMERCIAL METERED 12KV SWITCHGEAR. SIZE OF SERVICE PER EV-3.00 AND SG 600.

(B) SIZE CONDUIT AND CONDUCTORS IN ACCORDANCE WITH SG 300.

(C) UNDERGROUND CONDUIT, INSTALL PER SDG&E STANDARD SG 4000.

(D) TO CUSTOMER OWNED DISTRIBUTION.

(E) MAIN 12KV FUSED OVERCURRENT PROTECTION. REFER TO SDG&E SG 600.

(F) SEE LOAD SUMMARY GUIDE EV-3.00 FOR MINIMUM BUS RATING.

(G) BRANCH 12KV OVERCURRENT PROTECTION SIZED BY CUSTOMER ENGINEER.

REFERENCES:

a. SEE SDG&E STANDARD UG 4000 CABLES.

b. SEE SDG&E STANDARD SG 600 MEDIUM VOLTAGE ELECTRIC SERVICE & METERING EQUIPMENT. (CONTACT SERVICE STANDARDS AT PROJECT CONCEPTION)

c. SEE SDG&E STANDARD EV-3.00 EVSE LOAD SUMMARY.

d. SEE SDG&E STANDARD EV-15.00 ADDITIONAL RESOURCES.

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SDG&E ELECTRIC VEHICLE CHARGING STATION STANDARDS

PRIMARY METERING SERVICE

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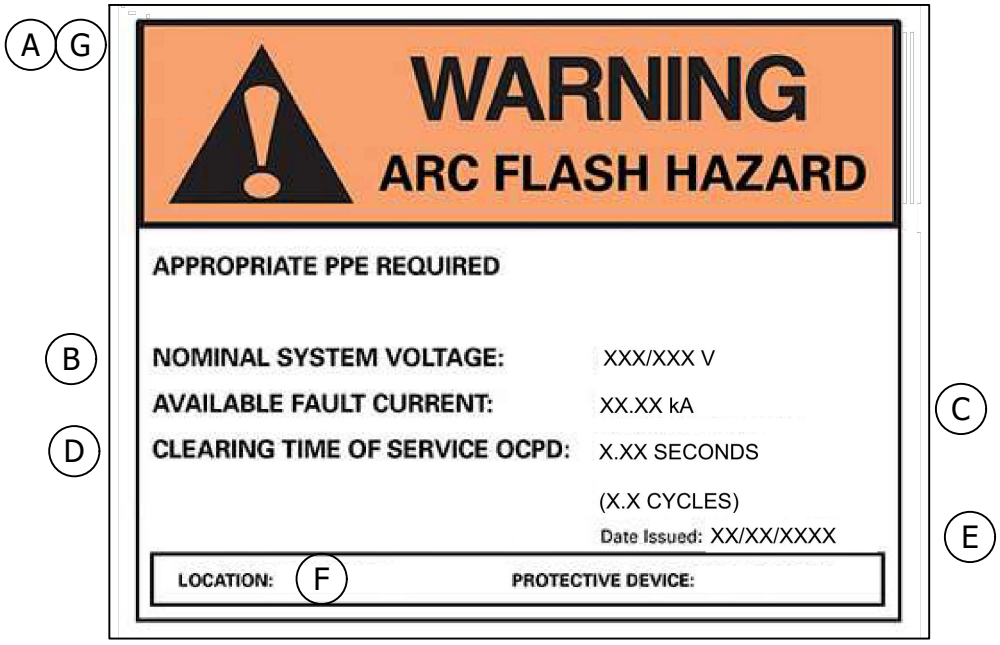

DESIGN:

A ARC FLASH LABELS ARE REQUIRED FOR ELECTRICAL EQUIPMENT THAT IS LIKELY TO BE EXAMINED, ADJUSTED, SERVICE, OR MAINTAINED WHILE ENERGIZED TO WARN QUALIFIED PERSONS OF POTENTIAL ELECTRICAL OR ARC FLASH HAZARDS. SHALL BE INCLUDED ON ALL SERVICE EQUIPMENT.

B LABEL SHALL INCLUDE SYSTEM NOMINAL VOLTAGE.

C LABEL SHALL INCLUDE AVAILABLE FAULT CURRENT AT THE SERVICE OVER CURRENT PROTECTIVE DEVICE. NORMALLY LESS THAN THAT DEFINED IN DM 6142, UNLESS SPECIFICALLY CALCULATED OVER.

D LABEL SHALL INCLUDE THE CLEARING TIME OF SERVICE OVER CURRENT PROTECTIVE DEVICE BASED ON THE AVAILABLE FAULT CURRENTS.

E LABEL SHALL INCLUDE DATE THE CALCULATION WAS PERFORMED.

F LABEL SHALL INCLUDE THE UNIQUE EQUIPMENT IDENTIFICATION, CONSISTENT WITH THE CONSTRUCTION DRAWINGS, AND FIELD OR FACTOR LABELING.

G OTHER ACCEPTABLE INDUSTRY PRACTICES FOR ARC FLASH LABELING AS DESCRIBED IN NFPA 70E SHALL BE ALLOWED. THESE LABELS TYPICALLY INCLUDE THE FOLLOWING INFORMATION. NOMINAL SYSTEM VOLTAGE, ARC FLASH BOUNDARY, INCIDENT ENERGY OR CORRESPONDING WORKING DISTANCE BASED ON THE PPE CATEGORY (NOT BOTH). MINIMAL ARC RATING OF CLOTHING, AND SITE SPECIFIC LEVEL OF PPE.

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SDG&E ELECTRIC VEHICLE CHARGING STATION STANDARDS

ARC FLASH LABELS

EV5.60

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EV6.10	UNDERGROUND POC - EXISTING SERVICE
EV6.11	UNDERGROUND POC - NEW SERVICE
EV6.20	OVERHEAD POC
EV6.30	PRIMARY METERING

DRAWINGS:

ALL DRAWINGS CONTAINED WITHIN THIS DOCUMENT ARE FOR ILLUSTRATION ONLY. THE CONSTRUCTION DRAWINGS ARE USED TO SPECIFY REQUIREMENTS BASED ON ACTUAL SITE CONDITIONS AND MATERIAL/EQUIPMENT TO BE USED OR SELECTED BY CUSTOMER.

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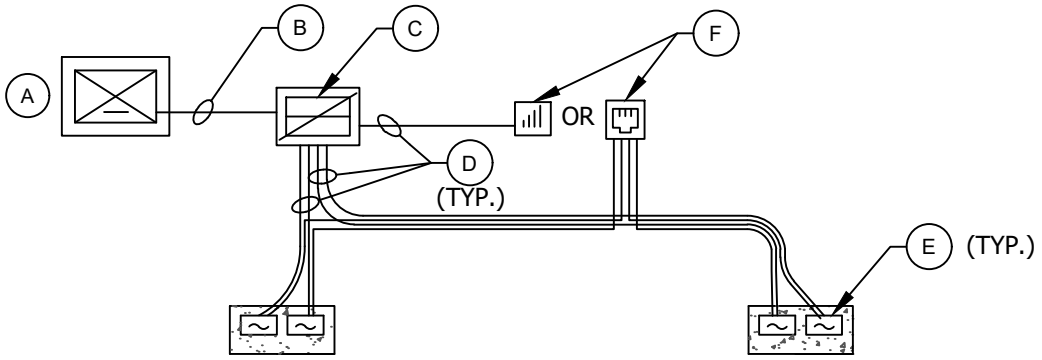
SDG&E ELECTRIC VEHICLE CHARGING STATION STANDARDS

OVERALL EQUIPMENT LAYOUT

EV6.00



DESIGN:

(A) EXISTING SDG&E TRANSFORMER, VOLTAGE, AND ALLOWABLE LOADS PER SDG&E UG 3700. IF TRANSFORMER MUST BE UPSIZED SEE SDG&E DM 5600, AND 3400 FOR PADS.

(B) UNDERGROUND SERVICE CONDUIT PER SDG&E SG 300.

(C) COMMERCIAL POWER CENTER, SERVICE SIZED AS NECESSARY PER EV-3.00. PHYSICAL DIMENSIONS PER MANUFACTURER'S SPECIFICATIONS, ENSURE SITE CONDITIONS MAY ACCOMMODATE POWER CENTER REQUIRED CLEAR AND LEVEL WORKING SPACES PER SDG&E SG 500.

(D) POWER CONDUIT AND WIRING PER SDG&E EV-15.00.

(E) ELECTRIC VEHICLE SERVICE EQUIPMENT PER SDG&E EV-2.00. COORDINATE SELECTIONS AND COUNT TO FULFIL CUSTOMER'S NEEDS. PARKING STALL LAYOUT PER EV-7.00.

(F) COMMUNICATIONS EQUIPMENT AS REQUIRED PER EV-4.00. COMMUNICATION WIRING AND CONDUITS AS REQUIRED IF A SITE CONTROLLER IS INSTALLED.

REFERENCES:

a. SEE SDG&E STANDARD SG 300 UNDERGROUND ELECTRIC SERVICE.

b. SEE SDG&E STANDARD SG 500 ELECTRIC SERVICE & METERING EQUIPMENT.

c. SEE SDG&E STANDARD UG 3400 PADS, RETAINING WALLS, CLEARANCES.

d. SEE SDG&E STANDARD UG 3700 TRANSFORMERS.

e. SEE SDG&E STANDARD DM 5600 TRANSFORMERS.

f. SEE SDG&E STANDARD EV-2.00 EVSE SPECIFICATIONS.

g. SEE SDG&E STANDARD EV-3.00 EVSE LOAD SUMMARY.

h. SEE SDG&E STANDARD EV-4.00 COMMUNICATION BLOCK DIAGRAMS.

i. SEE SDG&E STANDARD EV-7.00 TYPICAL PARKING LAYOUT.

j. SEE SDG&E STANDARD EV-15.00 ADDITIONAL RESOURCES.

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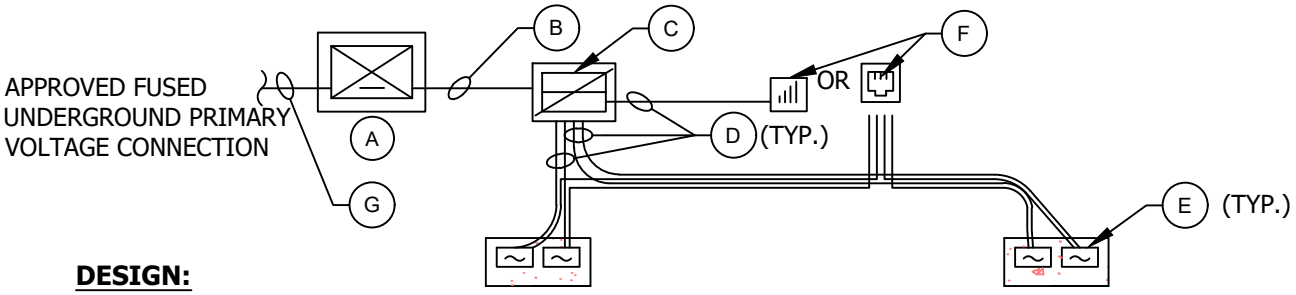

DESIGN:

(A) NEW SDG&E TRANSFORMER, VOLTAGE, PER SDG&E UG 3700. NEW TRANSFORMER PAD AND CLEARANCES PER SDG&E UG 3400. SIZE PER SDG&E DM 5600, AND 3400 FOR PADS.

(B) UNDERGROUND SERVICE CONDUIT PER SDG&E SG 300.

(C) COMMERCIAL POWER CENTER, SERVICE SIZED AS NECESSARY PER EV-3.00. PHYSICAL DIMENSIONS PER MANUFACTURER'S SPECIFICATIONS, ENSURE SITE CONDITIONS MAY ACCOMMODATE POWER CENTER REQUIRED CLEAR AND LEVEL WORKING SPACES PER SDG&E SG 500.

(D) POWER CONDUIT AND WIRING PER SDG&E EV-15.00.

(E) ELECTRIC VEHICLE SERVICE EQUIPMENT PER SDG&E EV-2.00. COORDINATE SELECTIONS AND COUNT TO FULFIL CUSTOMER'S NEEDS. PARKING STALL LAYOUT PER EV-7.00.

(F) COMMUNICATIONS EQUIPMENT AS REQUIRED PER EV-4.00. COMMUNICATION WIRING AND CONDUITS AS REQUIRED IF A SITE CONTROLLER IS INSTALLED.

(G) PRIMARY CONDUCTORS PER SDG&E UG 4000.

REFERENCES:

a. SEE SDG&E STANDARD SG 300 UNDERGROUND ELECTRIC SERVICE.

b. SEE SDG&E STANDARD SG 500 ELECTRIC SERVICE & METERING EQUIPMENT.

c. SEE SDG&E STANDARD UG 3400 PADS, RETAINING WALLS, CLEARANCES.

d. SEE SDG&E STANDARD UG 3700 TRANSFORMERS.

e. SEE SDG&E STANDARD UG 4000 CABLES.

f. SEE SDG&E STANDARD DM 5600 TRANSFORMERS.

g. SEE SDG&E STANDARD EV-2.00 EVSE SPECIFICATIONS.

h. SEE SDG&E STANDARD EV-3.00 EVSE LOAD SUMMARY.

i. SEE SDG&E STANDARD EV-4.00 COMMUNICATION BLOCK DIAGRAMS.

j. SEE SDG&E STANDARD EV-7.00 TYPICAL PARKING LAYOUT.

k. SEE SDG&E STANDARD EV-15.00 ADDITIONAL RESOURCES.

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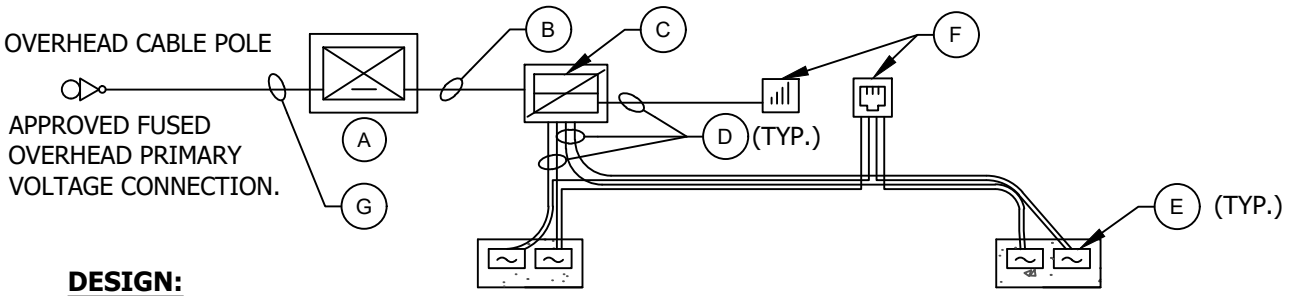

DESIGN:

(A) NEW SDG&E TRANSFORMER, VOLTAGE, PER SDG&E UG 3700. NEW TRANSFORMER PAD AND CLEARANCES PER SDG&E UG 3400. SIZE PER SDG&E DM 5600, AND 3400 FOR PADS.

(B) UNDERGROUND SERVICE CONDUIT PER SDG&E SG 300.

(C) COMMERCIAL POWER CENTER, SERVICE SIZED AS NECESSARY PER EV-3.00. PHYSICAL DIMENSIONS PER MANUFACTURER'S SPECIFICATIONS, ENSURE SITE CONDITIONS MAY ACCOMMODATE POWER CENTER REQUIRED CLEAR AND LEVEL WORKING SPACES PER SDG&E SG 500.

(D) POWER CONDUIT AND WIRING PER SDG&E EV-15.00.

(E) ELECTRIC VEHICLE SERVICE EQUIPMENT PER SDG&E EV-2.00. COORDINATE SELECTIONS AND COUNT TO FULFIL CUSTOMER'S NEEDS. PARKING STALL LAYOUT PER EV-7.00.

(F) COMMUNICATIONS EQUIPMENT AS REQUIRED PER EV-4.00. COMMUNICATION WIRING AND CONDUITS AS REQUIRED IF A SITE CONTROLLER IS INSTALLED.

(G) PRIMARY CONDUCTORS PER SDG&E UG 4000. CABLE RISER PER SDG&E OH 1400/ UG 4200.

REFERENCES:

a. SEE SDG&E STANDARD SG 300 UNDERGROUND ELECTRIC SERVICE.

b. SEE SDG&E STANDARD SG 500 ELECTRIC SERVICE AND METERING EQUIPMENT.

c. SEE SDG&E STANDARD UG 3400 PADS, RETAINING WALLS, CLEARANCES.

d. SEE SDG&E STANDARD UG 3700 TRANSFORMERS.

e. SEE SDG&E STANDARD UG 4000 CABLES.

f. SEE SDG&E STANDARD OH 1400 / UG 4200 CABLE POLES.

g. SEE SDG&E STANDARD DM 5600 TRANSFORMERS.

h. SEE SDG&E STANDARD EV-2.00 EVSE SPECIFICATIONS.

i. SEE SDG&E STANDARD EV-3.00 EVSE LOAD SUMMARY.

j. SEE SDG&E STANDARD EV-4.00 COMMUNICATIONS BLOCK DIAGRAMS.

k. SEE SDG&E STANDARD EV-7.00 TYPICAL PARKING LAYOUT.

l. SEE SDG&E STANDARD EV-15.00 ADDITIONAL RESOURCES.

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SDG&E ELECTRIC VEHICLE CHARGING STATION STANDARDS

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OVERHEAD POC

EV6.20

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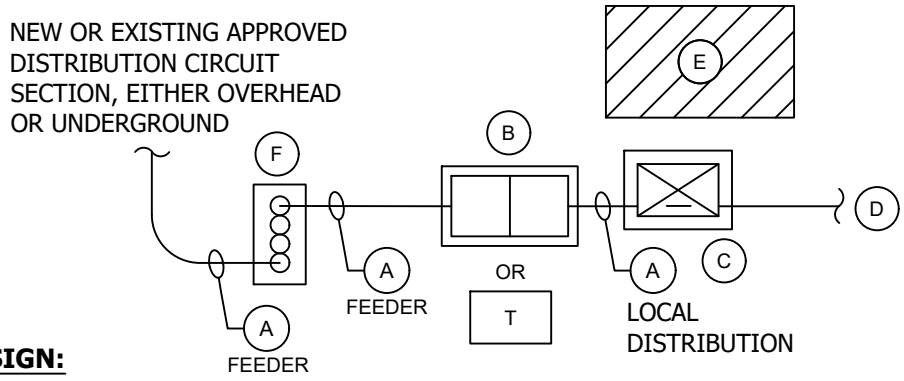

DESIGN:

(A) PRIMARY CONDUCTORS PER SDG&E UG 4000. CABLE RISER AS APPLICABLE PER SDG&E OH 1400/ UG 4200. FEEDER SIZED CONDUCTORS UP TO HANDHOLE/ TERMINATING CABINET, LOCAL DISTRIBUTION AFTERWARDS.

(B) DISTRIBUTION HANDHOLE/ ABOVE GROUND TERMINATING CABINET, AS SITE CONDITIONS REQUIRE. SEE UG 3300 FOR HANDHOLE, OR UG 3524 FOR 600/200A TERMINATING CABINET.

(C) NEW SDG&E TRANSFORMER, VOLTAGE, PER SDG&E UG 3700. NEW TRANSFORMER PAD AND CLEARANCES PER SDG&E UG 3400. SIZE PER SDG&E DM 5600.

(D) SEE EV-6.10, AND EV-6.20 FOR EQUIPMENT CONFIGURATIONS AFTER TRANSFORMER.

(E) FUTURE SPACE ON SITE FOR PRIMARY METERING EQUIPMENT, ADEQUATELY SIZED FOR EQUIPMENT AND READILY ACCESSIBLE TO SDG&E SERVICE TRUCKS.

(F) NEW OR EXISTING TRAYER SWITCH PER UG 3550. IF TRAYER SWITCH IS INSTALLED AT A TIME BEFORE PRIMARY METERING EQUIPMENT, POSITION TO SUPPLY EQUIPMENT MUST BE FUSED.

REFERENCES:

a. SEE SDG&E STANDARD SG 300 UNDERGROUND ELECTRIC SERVICE.

b. SEE SDG&E STANDARD SG 500 ELECTRIC SERVICE & METERING EQUIPMENT.

c. SEE SDG&E STANDARD UG 3400 PADS, RETAINING WALLS, CLEARANCES.

d. SEE SDG&E STANDARD UG 3700 TRANSFORMERS.

e. SEE SDG&E STANDARD UG 4000 CABLES.

f. SEE SDG&E STANDARD OH 1400 / UG 4200 CABLE POLES.

g. SEE SDG&E STANDARD DM 5600 TRANSFORMERS.

h. SEE SDG&E STANDARD EV-3.00 EVSE LOAD SUMMARY.

i. SEE SDG&E STANDARD EV-4.00 COMMUNICATION BLOCK DIAGRAM.

j. SEE SDG&E STANDARD EV-7.00 TYPICAL PARKING LAYOUT.

k. SEE SDG&E STANDARD EV-15.00 ADDITIONAL RESOURCES.

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EV7.20-24	ADA PARKING LAYOUT AND DESIGN NOTES
EV7.30	COMMON PARKING LAYOUT FLEET & ASSIGNED EMPLOYEE CHARGING
EV7.40	COMMON PARKING LAYOUT - PARKING GARAGE

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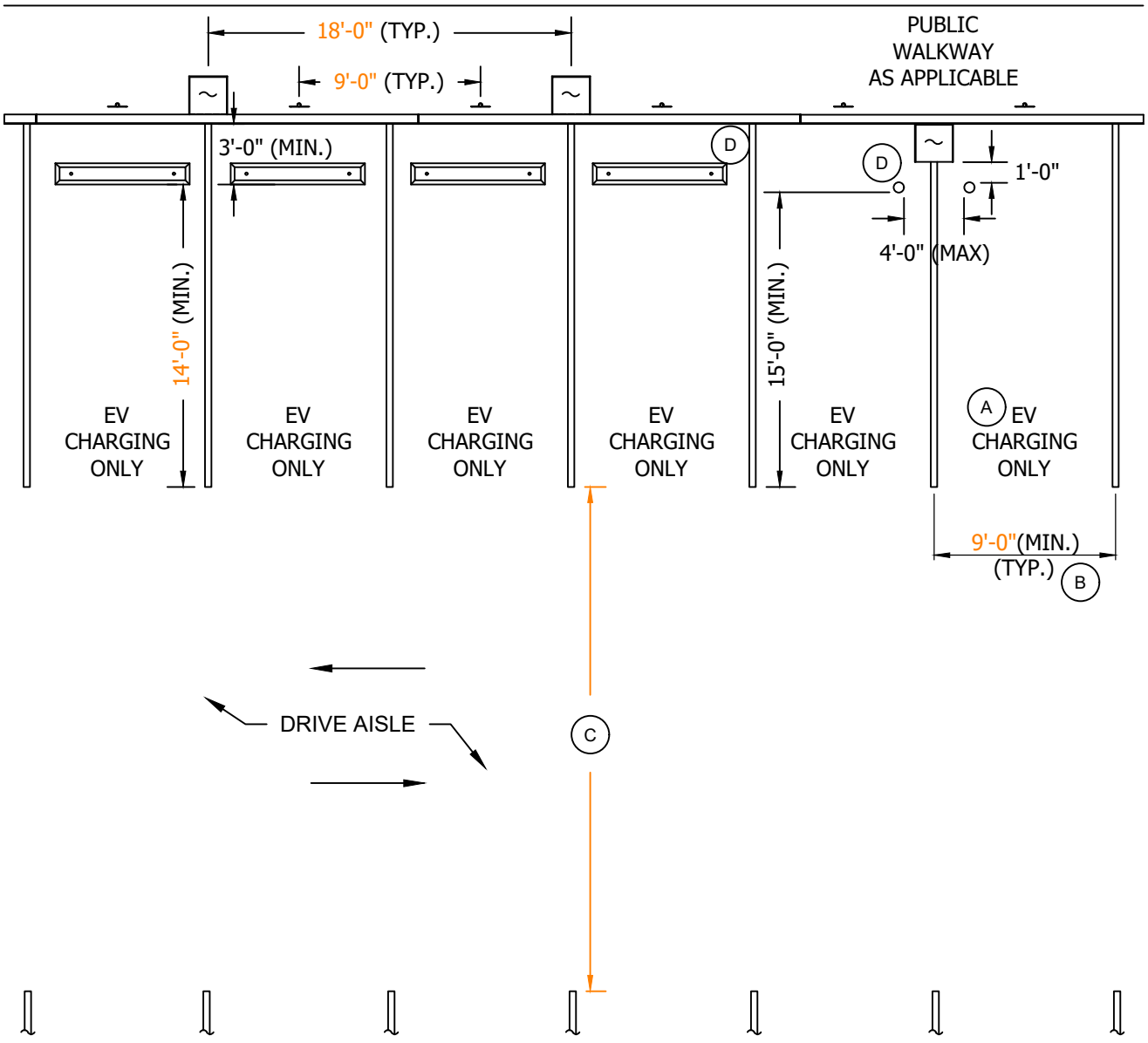
SDG&E ELECTRIC VEHICLE CHARGING STATION STANDARDS

TYPICAL PARKING LAYOUT

EV7.00



REFERENCE:

a. SEE EV7.13 FOR DESIGN NOTES.

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SDG&E ELECTRIC VEHICLE CHARGING STATION STANDARDS

COMMON PARKING LAYOUTS PUBLIC CHARGING

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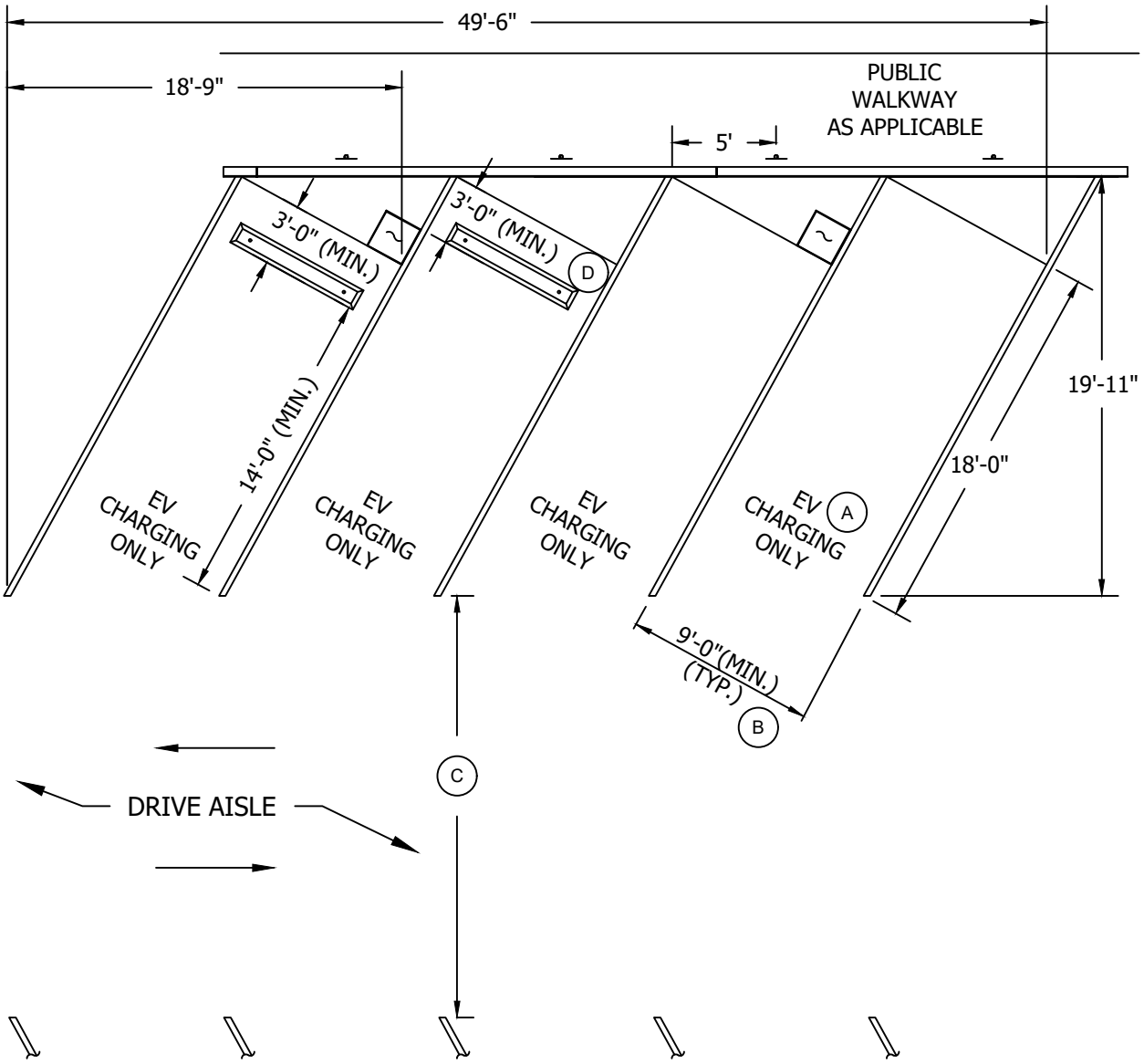

REFERENCE:

a. SEE EV7.13 FOR DESIGN NOTES.

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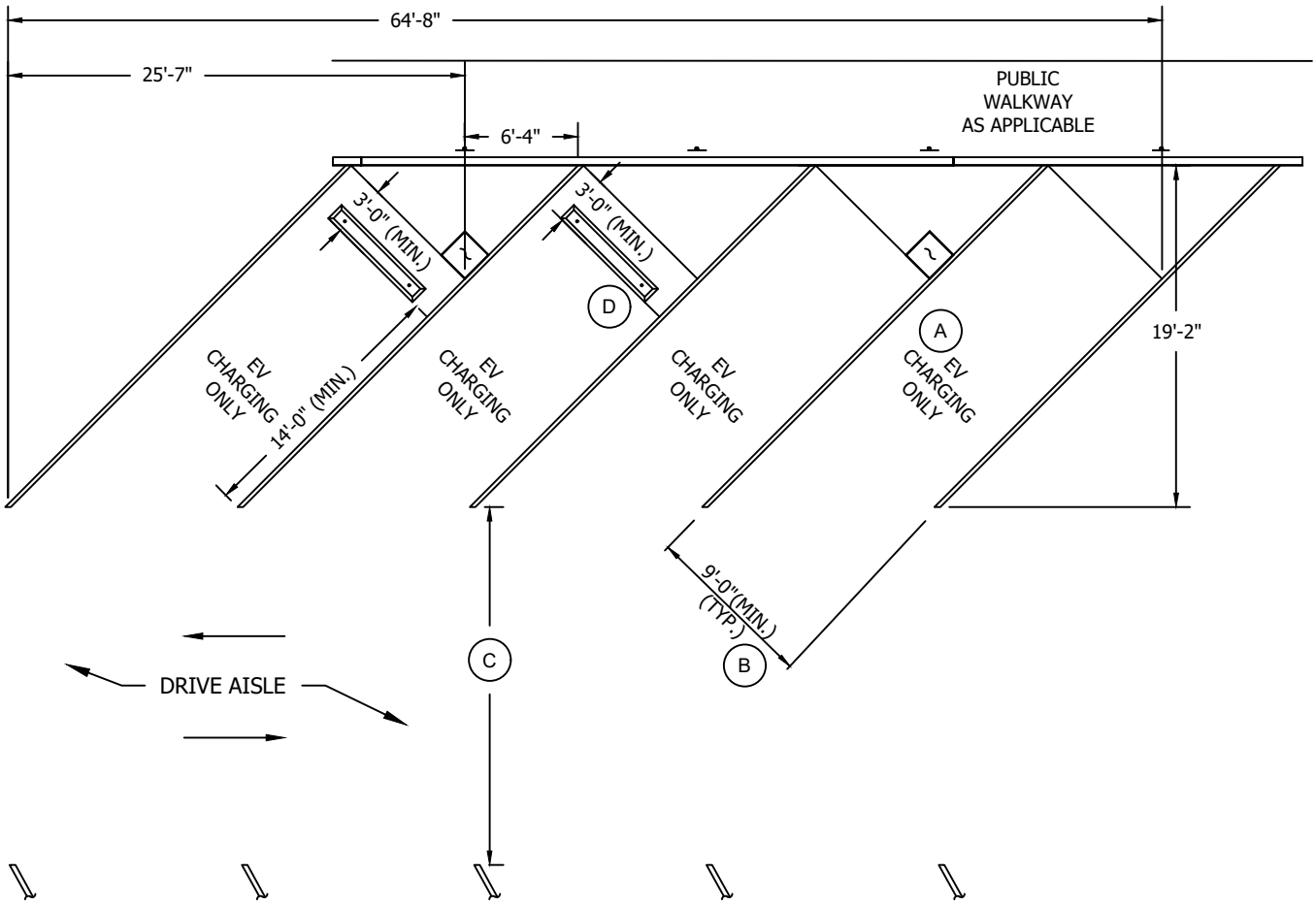

REFERENCE:

a. SEE EV7.13 FOR DESIGN NOTES.

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SDG&E ELECTRIC VEHICLE CHARGING STATION STANDARDS

COMMON PARKING LAYOUTS PUBLIC CHARGING
45 DEGREE ANGLE

EV7.12

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DESIGN:

A STALLS MUST BE MARKED IN ACCORDANCE BY LATEST CALIFORNIA BUILDING CODE 11B.

B DIMENSIONS SHOWN ABOVE ARE TYPICAL MINIMUM DESIGN DIMENSIONS FOR STANDARD NON-ADA EV STALLS. SEE EV-7.20 FOR ADA STALL DIMENSIONS.

C MODIFICATIONS TO PARKING STALL ORIENTATION, COUNT, AND STRIPING, OR TO DRIVE AISLE IN ACCORDANCE WITH LATEST CALIFORNIA BUILDING CODE. TO BE DESIGNED AND REVIEWED BY CIVIL TEAM, WITH APPROVAL OF THE AHJ. DESIGNATED FIRE ACCESS AISLES MUST COMPLY WITH THE COUNTY'S CONSOLIDATED FIRE CODE AND/OR THE FIRE AUTHORITY HAVING JURISDICTION. MINIMUM UNOBSTRUCTED FIRE ACCESS WIDTH IS 24'. INSIDE TURNING RADIUS MINIMUM IS 28'. VERTICAL CLEARANCE MINIMUM IS 13'-6". THE FIRE AUTHORITY HAVING JURISDICTION MAY REQUIRE GREATER DIMENSIONS. FOR MORE INFORMATION REGARDING FIRE CODE STANDARDS, CONTACT THE SAN DIEGO COUNTY FIRE AUTHORITY, OR ORANGE COUNTY FIRE AUTHORITY AS APPLICABLE.

D EVSE MUST BE PROTECTED BY EITHER A WHEELSTOP OR BOLLARD (WHEELSTOPS ARE AN OPTION FOR CHARGERS ONLY). CHARGERS MAY BE PROTECTED BY WHEEL STOPS IN STALLS INTENDED FOR PASSENGER VEHICLES BUT MUST BE PROTECTED BY BOLLARDS IN STALLS INTENDED FOR COMMERCIAL VEHICLES. MINIMUM 1' CLEAR BACK OF BOLLARD, OR 3' CLEAR FRONT OF WHEELSTOP. SEE UG 3481.

REFERENCE:

a. SEE SDG&E STANDARD UG 3481 EQUIPMENT BARRIER PROTECTION AND CLEARANCE.

b. SEE SDG&E STANDARD EV7.20 ADA PARKING LAYOUT.

c. SEE SDG&E STANDARD EV9.00 PRE-CAST CONCRETE WHEEL STOP DETAIL.

d. SEE CALIFORNIA BUILDING CODE MOST RECENT EDITION.

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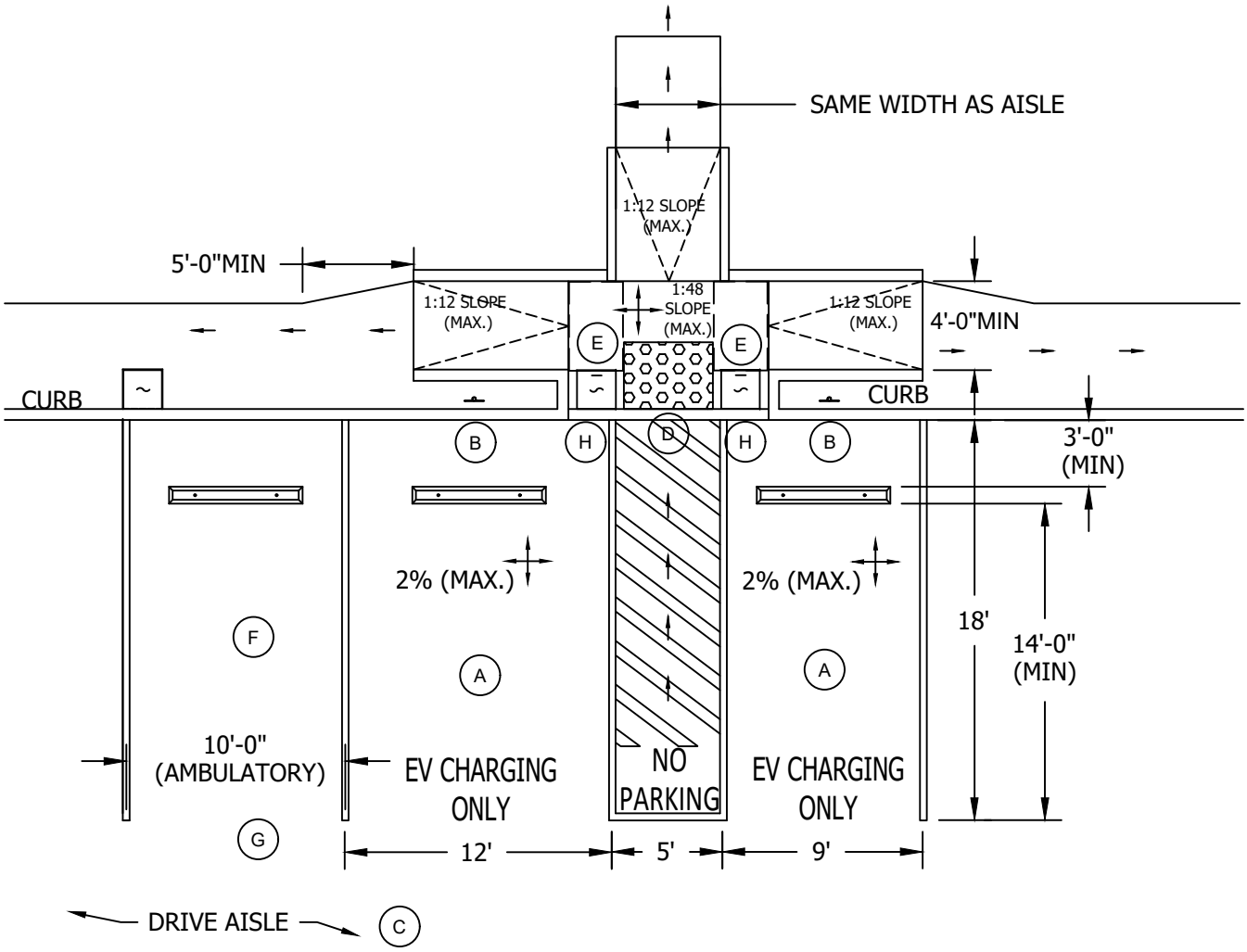
TYPE 1 - CONNECTION TO PATH OF TRAVEL AT HEAD OF STALL
EXISTING SIDEWALK PERPENDICULAR TO ACCESS AISLE AND PARALLEL SIDEWALK CONNECTION, AS APPLICABLE, SEE TYPE 3 FOR PARALLEL CONNECTION ONLY.

NUMBER OF RAMPS TO BE CONSTRUCTED SHALL BE DICTATED BY THE EXISTING PATH OF TRAVEL REQUIREMENTS FOR THE SITE.



LEGEND

PATH OF TRAVEL (ACCESSIBLE ROUTE)

NO PATH OF TRAVEL IN DRIVE AISLE UNLESS SHOW ON PLAN.

NOTE REFERENCES ARE ON SHEET EV7.24

REV	CHANGE	DR	BY	DSN	APV	DATE	REV	CHANGE	DR	BY	DSN	APV	DATE
C	2022 REVISION	ARC	JES	IPJ	KRG	08/12/2022	F						
B	COMPLETELY REVISED	-	JES	JES	CZH	10/09/2020	E						
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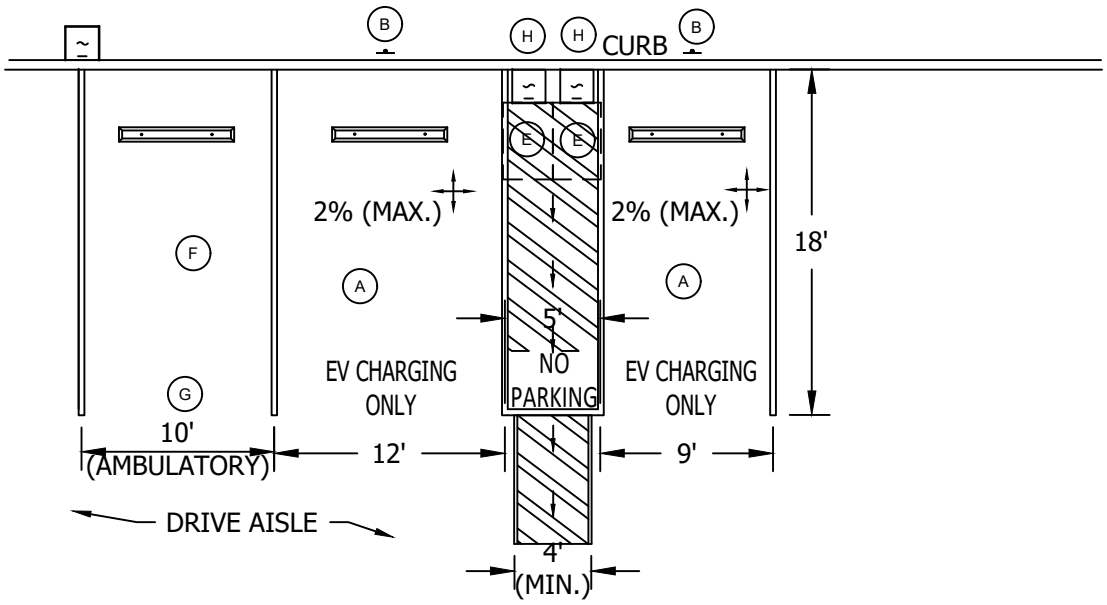
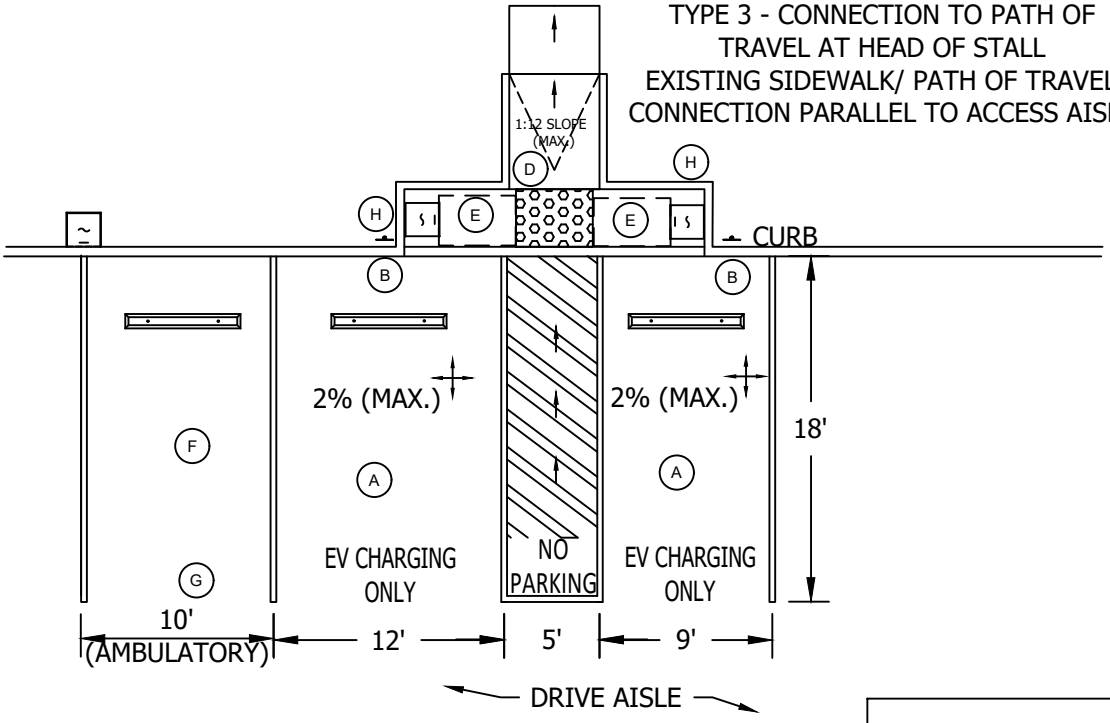
TYPE 2 - CONNECTION TO PATH OF TRAVEL AT FOOT OF STALL

NO EXISTING CONNECTION TO PATH OF TRAVEL AT HEAD OF STALL



TYPE 3 - CONNECTION TO PATH OF TRAVEL AT HEAD OF STALL EXISTING SIDEWALK/ PATH OF TRAVEL CONNECTION PARALLEL TO ACCESS AISLE



LEGEND

→ → PATH OF TRAVEL (ACCESSIBLE ROUTE)

NO PATH OF TRAVEL IN DRIVE AISLE UNLESS SHOW ON PLAN.

NOTE REFERENCES ARE ON SHEET EV7.24

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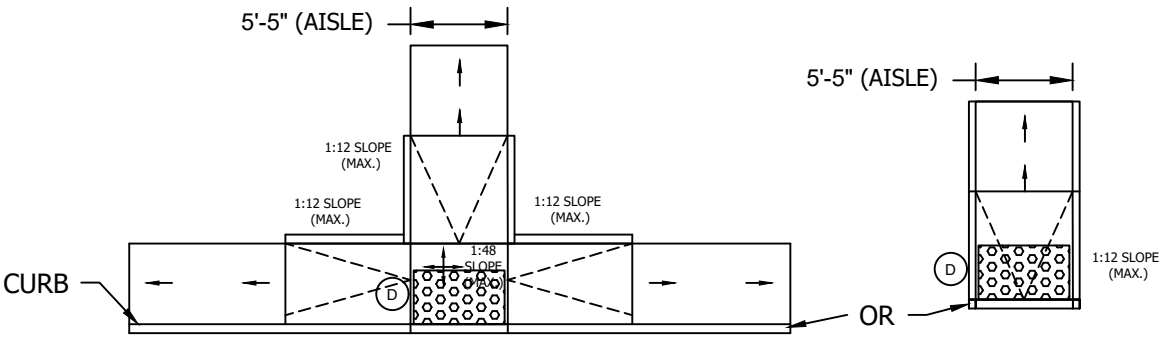


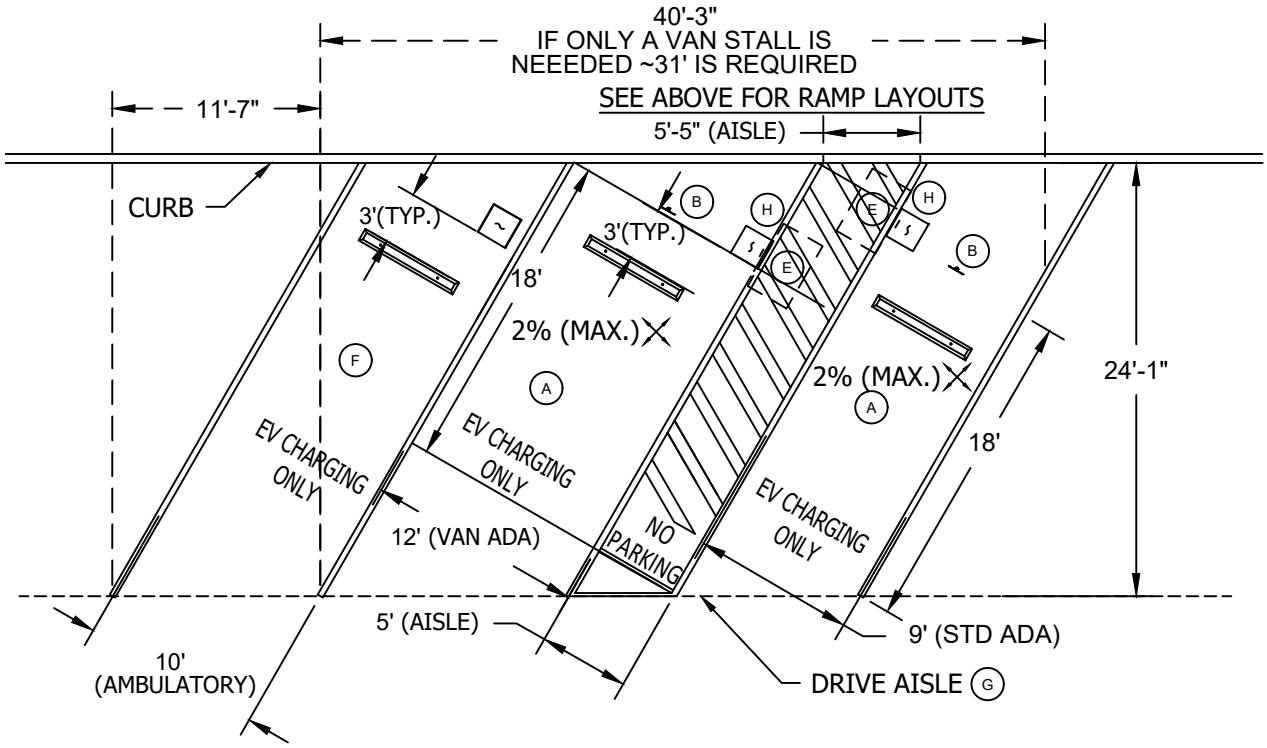
TYPE 1 - CONNECTION TO PATH OF TRAVEL AT HEAD OF STALL

EXISTING SIDEWALK PARALLEL TO ADJACENT CURB AND PERPENDICULAR SIDEWALK CONNECTION, AS APPLICABLE.

NUMBER OF RAMPS TO BE CONSTRUCTED SHALL BE DICTATED BY THE EXISTING PATH OF TRAVEL REQUIREMENTS FOR THE SITE.

TYPE 2 - CONNECTION TO PATH OF TRAVEL AT HEAD OF STALL

EXISTING SIDEWALK/ PATH OF TRAVEL CONNECTION PERPENDICULAR TO ADJACENT CURB.



RAMP STYLE 2

LEGEND: PATH OF TRAVEL → →

NO PATH OF PATH OF TRAVEL IN DRIVE AISLE UNLESS SHOW ON PLAN.

NOTE REFERENCES ARE ON SHEET EV7.24

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SDG&E ELECTRIC VEHICLE CHARGING STATION STANDARDS

ADA PARKING LAYOUT 60 DEGREE ANGLE

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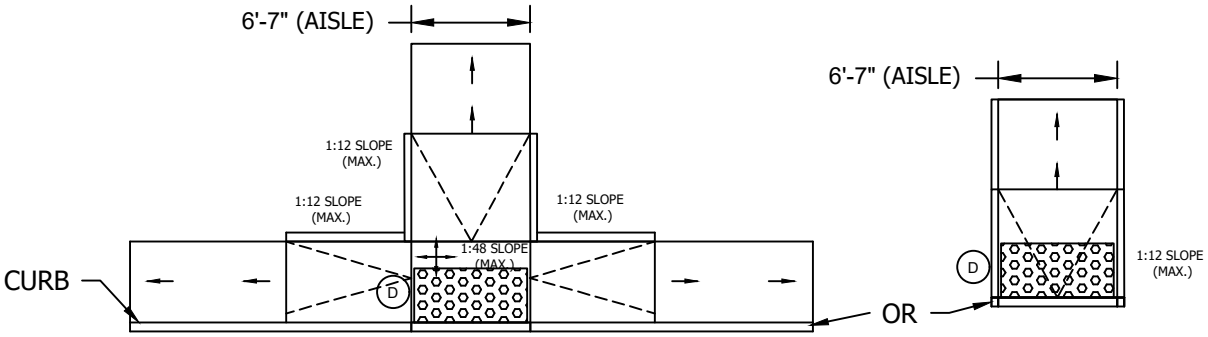


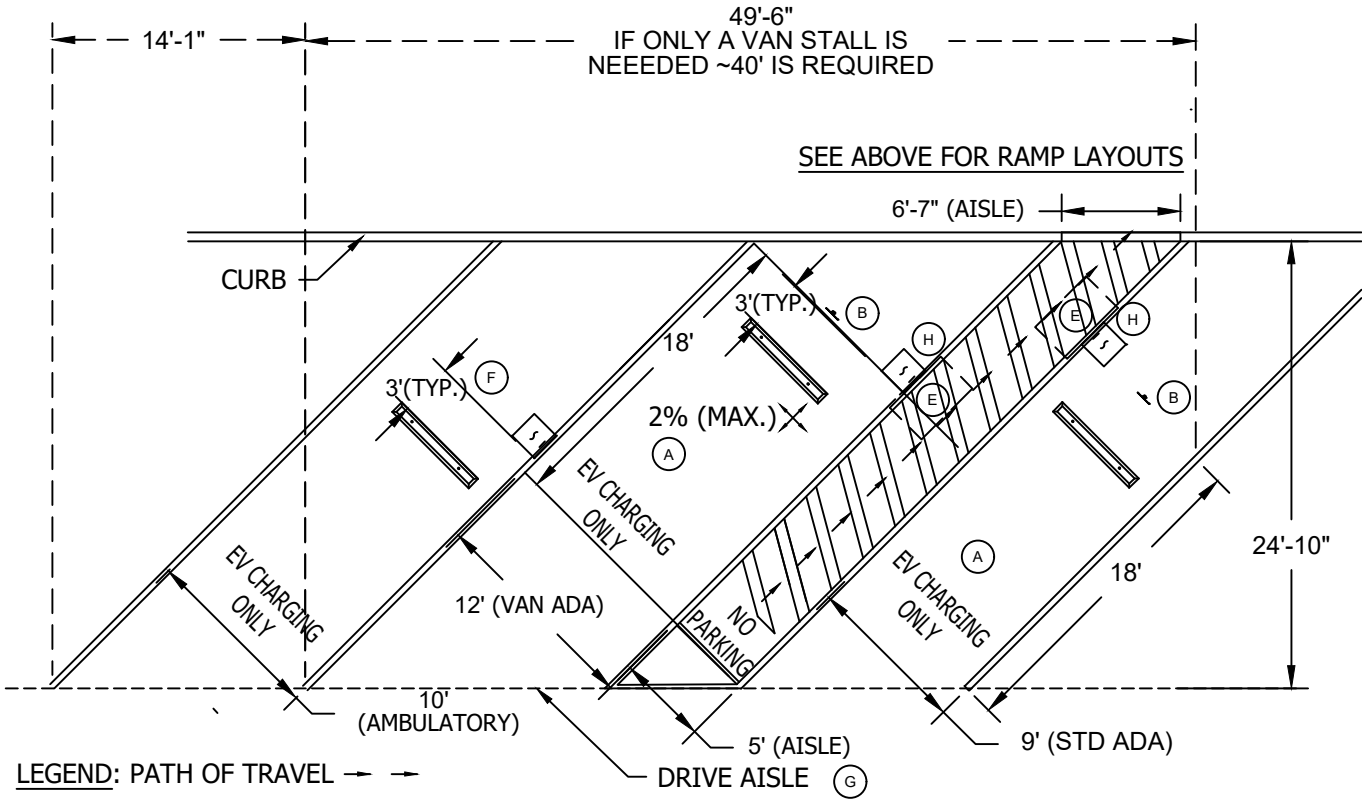
TYPE 1 - CONNECTION TO PATH OF TRAVEL AT HEAD OF STALL

EXISTING SIDEWALK PARALLEL TO ADJACENT CURB AND PERPENDICULAR SIDEWALK CONNECTION, AS APPLICABLE.

NUMBER OF RAMPS TO BE CONSTRUCTED SHALL BE DICTATED BY THE EXISTING PATH OF TRAVEL REQUIREMENTS FOR THE SITE.

TYPE 2 - CONNECTION TO PATH OF TRAVEL AT HEAD OF STALL

EXISTING SIDEWALK/ PATH OF TRAVEL CONNECTION PERPENDICULAR TO ADJACENT CURB.



LEGEND: PATH OF TRAVEL → →

NO PATH OF PATH OF TRAVEL IN DRIVE AISLE UNLESS SHOW ON PLAN.

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SDG&E ELECTRIC VEHICLE CHARGING STATION STANDARDS

ADA PARKING LAYOUT 45 DEGREE ANGLE

EV7.23

TABLE EV-7.23

ELECTRIC VEHICLE CHARGING STATIONS FOR PUBLIC USE AND COMMON USE			
TOTAL NUMBER OF EVCS AT A FACILITY	MINIMUM NUMBER (BY TYPE) OF EVCS REQUIRED TO COMPLY WITH SECTION 11B-812		
	VAN ACCESSIBLE	STANDARD ACCESSIBLE	AMBULATORY
1 TO 4	1	0	0
5 TO 25	1	1	0
26 TO 50	1	1	1
51 TO 75	1	2	2
76 TO 100	1	3	3
101 AND OVER	1, PLUS 1 FOR EACH 300, OR FRACTION THEREOF, OVER 100	3, PLUS 1 FOR EACH 60, OR FRACTION THEREOF, OVER 100	3, PLUS 1 FOR EACH 50, OR FRACTION THEREOF, OVER 100
NOTE: CONFIRM WITH LOCAL JURISDICTIONS FOR MORE STRINGENT MINIMUM ACCESSIBLE STALL COUNTS			

REFERENCES:

a. SEE SDG&E STANDARD EV-3.00 EVSE LOAD SUMMARY.
b. SEE SDG&E STANDARD EV-9.10 PRE-CAST CONCRETE WHEEL STOP DETAIL.
c. SEE CALIFORNIA BUILDING CODE MOST RECENT EDITION.
d. SEE CALIFORNIA BUILDING CODE TABLE 11B-228.3.2.1 MOST RECENT EDITION.

DESIGN:

(A) ADA ACCESSIBLE STALLS ARE REQUIRED FOR PROJECTS IN WHICH EV STALLS ARE AVAILABLE TO PUBLIC USAGE. MINIMUM COUNT PER TABLE ON EV-7.23. ADA STALLS, AISLES, AND ROUTES REQUIRE 98" OVERHEAD CLARENCE.

(B) ADA STALLS MUST BE MARKED AND HAVE IDENTIFICATION SIGNS IN ACCORDANCE BY LATEST CALIFORNIA BUILDING CODE 11B-812.
1 TO 4 EVCS - ISA MARKING FOR VAN NOT REQUIRED
5 TO 25 EVCS - ONE VAN ACCESSIBLE SHALL BE MARKED WITH ISA. STANDARD SHALL NOT BE REQUIRED
26 OR MORE EVCS - ALL VAN, AND STANDARD STALLS SHALL HAVE ISA MARKINGS

(C) DIMENSIONS SHOWN ABOVE ARE TYPICAL MINIMUM DESIGN DIMENSIONS FOR STANDARD ADA, VAN ACCESSIBLE, AND AMBULATORY EV STALLS.

(D) DETECTABLE WARNINGS SHALL BE PLACED 6-8" FROM DEMARCATION LINE AT THE FACE OF CURB AT ENTRANCE OF VEHICULAR WAY, AND SHALL EXTEND 36" INTO PATH OF TRAVEL AND BE 2" LESS THAN WIDTH OF RAMP.

(E) ACCESSIBLE ROUTE REQUIRES 30"x48" MINIMUM CLEARANCE FLOOR SPACE ADJACENT TO CHARGER FACE.

(F) AMBULATORY STALLS DO NOT REQUIRE ADA SIGNAGE OR MARKING.

(G) MODIFICATIONS TO PARKING STALL ORIENTATION, COUNT, AND STRIPING, OR TO DRIVE AISLE IN ACCORDANCE WITH LATEST CALIFORNIA BUILDING CODE. TO BE DESIGNED AND REVIEWED BY CIVIL TEAM, WITH APPROVAL OF THE AHJ.

(H) HEIGHT OF OPERABLE PARTS ON CHARGER SHALL NOT EXCEED 48", OR 54" ON EXISTING CURB, FROM CLEAR SPACE DESIGNATED BY LETTER E. HORIZONTAL REACH DEPTH TO OPERABLE PARTS SHALL NOT EXCEED 10". REFERENCE SECTION 11b-308.3.2 FOR CLARIFICATION.

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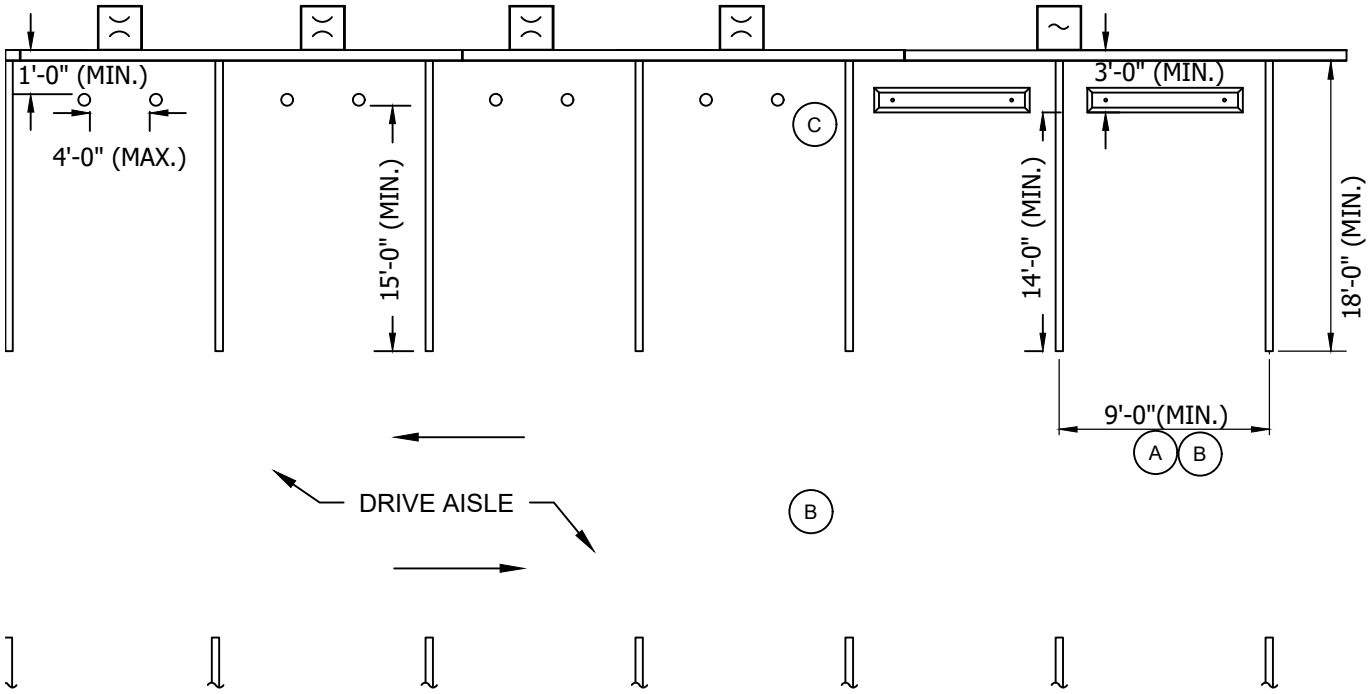

DESIGN:

(A) DIMENSIONS SHOWN ABOVE ARE MINIMUM REQUIREMENT FOR PUBLIC OR PRIVATE FLEET, AND ASSIGNED EMPLOYEE PARKING STALLS FOR ELECTRIC VEHICLE CHARGING. STALLS ARE FOR MEDIUM / HEAVY DUTY ELECTRIC VEHICLES. SIZE EACH STALL TO APPROPRIATELY ACCOMMODATE CUSTOMER ELECTRIC VEHICLE SELECTION. TYPICAL MAXIMUM STALL DIMENSIONS ARE 12'-0" W X 40'-0" L.

(B) MODIFICATIONS TO PARKING STALL ORIENTATION, COUNT, AND STRIPING, OR TO DRIVE AISLE IN ACCORDANCE WITH LATEST CALIFORNIA BUILDING CODE. TO BE DESIGNED AND REVIEWED BY CIVIL TEAM, WITH APPROVAL OF THE AHJ.

(C) EVSE MUST BE PROTECTED BY EITHER A WHEELSTOP OR BOLLARD (WHEELSTOPS ARE AN OPTION FOR CHARGERS ONLY). CHARGERS MAY BE PROTECTED BY WHEEL STOPS IN STALLS INTENDED FOR PASSENGER VEHICLES BUT MUST BE PROTECTED BY BOLLARDS IN STALLS INTENDED FOR COMMERCIAL VEHICLES. MINIMUM 1' CLEAR BACK OF BOLLARD, OR 3' CLEAR FRONT OF WHEELSTOP. SEE UG 3481.

REFERENCES:

a. SEE SDG&E STANDARD UG 3481 EQUIPMENT BARRIER PROTECTION AND CLEARANCE.

b. SEE SDG&E STANDARD EV-9.00 PRE-CAST CONCRETE WHEEL STOP DETAIL.

c. SEE CALIFORNIA BUILDING CODE MOST RECENT EDITION.

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SDG&E ELECTRIC VEHICLE CHARGING STATION STANDARDS

COMMON PARKING LAYOUT FLEET & ASSIGNED EMPLOYEE CHARGING

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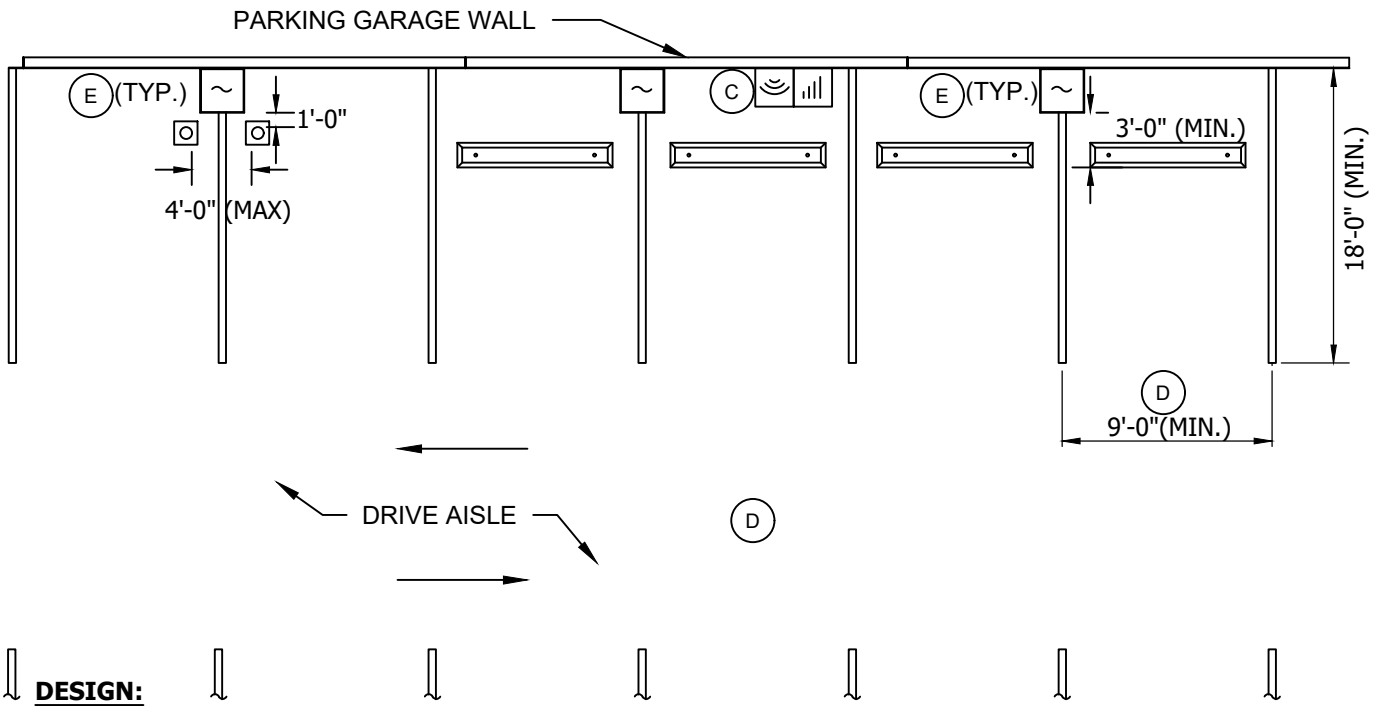

DESIGN:

(A) PARKING GARAGES WHICH REQUIRE NEW ELECTRICAL SERVICES SHALL LOCATE SERVICE EQUIPMENT OUTDOORS, OR WITHIN ELECTRICAL ROOM (NOT SHOWN). IF CANNOT BE MET THEN A DEVIATION IS REQUIRED.

(B) IF MULTIPLE SERVICES FOR ONE PARKING GARAGE ARE REQUIRED THEY SHALL BE INSTALLED PER SG-013 (NOT SHOWN).

(C) EVSE INSTALLED INSIDE PARKING GARAGES MUST BE TESTED FOR RECEPTION QUALITY AND STRENGTH BEFORE LOCATIONS ARE FINALIZED. ADDITIONAL COMMUNICATIONS EQUIPMENT MAY BE REQUIRED PER EV-4.00.

(D) MODIFICATIONS TO PARKING STALL ORIENTATION, COUNT, AND STRIPING, OR TO DRIVE AISLE IN ACCORDANCE WITH LATEST CALIFORNIA BUILDING CODE. TO BE DESIGNED AND REVIEWED BY CIVIL TEAM, WITH APPROVAL OF THE AHJ.

(E) STALLS ON POST TENSION SLAB SHALL INCLUDE WHEEL STOPS FOR STALLS INTENDED FOR PASSENGER VEHICLES AND SHALL USE PLATE MOUNTED BOLLARDS FOR STALLS INTENDED FOR COMMERCIAL VEHICLES AS DESIGNED IN STRUCTURAL/CIVIL PLANS PLANS. MINIMUM 1' CLEAR BACK OF BOLLARD, OR 3' CLEAR FRONT OF WHEELSTOP.

REFERENCES:

a. SEE SDG&E STANDARD SG 013 ELECTRIC SERVICE POLICIES - EXISTING CUSTOMER.

b. SEE SDG&E STANDARD EV-3.00 EVSE LOAD SUMMARY.

c. SEE SDG&E STANDARD EV-4.00 COMMUNICATION BLOCK DIAGRAMS.

d. SEE SDG&E STANDARD EV-9.10 PRE-CAST CONCRETE WHEEL STOP DETAIL.

e. SEE CALIFORNIA BUILDING CODE MOST RECENT EDITION.

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SDG&E ELECTRIC VEHICLE CHARGING STATION STANDARDS

SHEET 1 OF 1

COMMON PARKING LAYOUT - PARKING GARAGE

EV7.40

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EV8.10	EVSE CONCRETE PAD DETAILS
EV8.20	EVSE WALL MOUNTING DETAILS
EV8.30	EQUIPMENT MOUNTING DETAILS

DRAWINGS:

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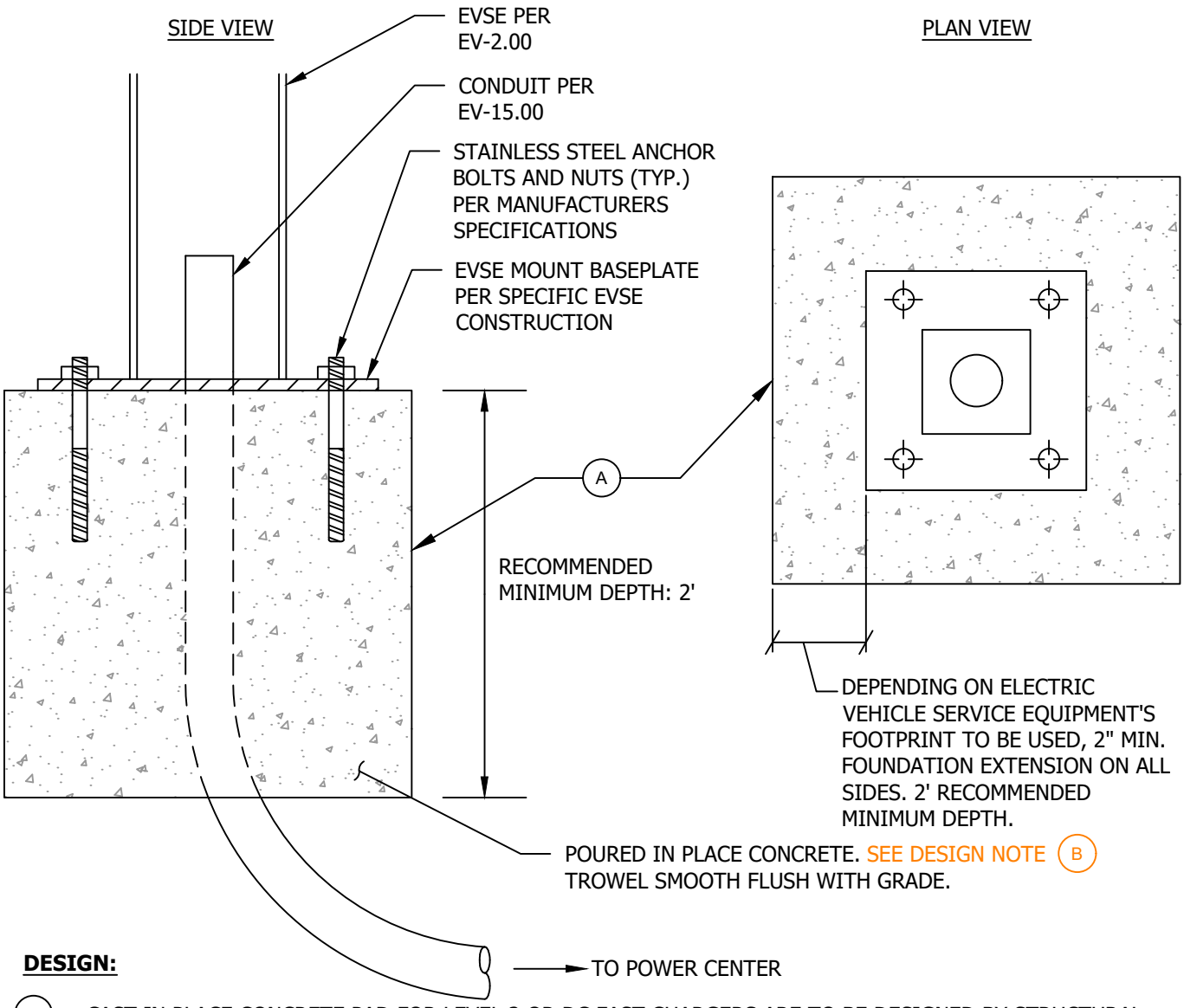
SDG&E ELECTRIC VEHICLE CHARGING STATION STANDARDS

EVSE MOUNTING DETAILS

EV8.00



DESIGN:

(A) CAST IN PLACE CONCRETE PAD FOR LEVEL 2 OR DC FAST CHARGERS ARE TO BE DESIGNED BY STRUCTURAL ENGINEER WITH APPROVAL OF THE AHJ. STRENGTH OF CONCRETE USED IN DESIGN CALCULATIONS SHALL NOT EXCEED 2500 PSI. SEE SPECIFIC CONSTRUCTION DRAWINGS.

(B) ACCEPTABLE MIX DESIGNS MAY INCLUDE SUPERIOR READY MIX (LAKESIDE, EL CENTRO, OCEANSIDE, ESCONDIDO, SAN DIEGO PLANT):

- -MIX NUMBER 27P, 4000 PSI CONCRETE
- -MIX NUMBER 2725P, 4000 PSI CONCRETE
- -MIX NUMBER 37P-45, 4500 PSI CONCRETE
- -MIX NUMBER 437P, 4500 PSI CONCRETE

IF A DIFFERENT MIX DESIGN IS PROPOSED FOR USE, SUBMIT FOR SDG&E REVIEW.

REFERENCES:

a. SEE EVSE MANUFACTURERS INSTALLATION GUIDE.
b. SEE SDG&E STANDARD EV-2.00 EVSE SPECIFICATIONS.
c. SEE SDG&E STANDARD EV-15.00 ADDITIONAL RESOURCES.

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SDG&E ELECTRIC VEHICLE CHARGING STATION STANDARDS

EVSE CONCRETE PAD DETAILS

EV8.10

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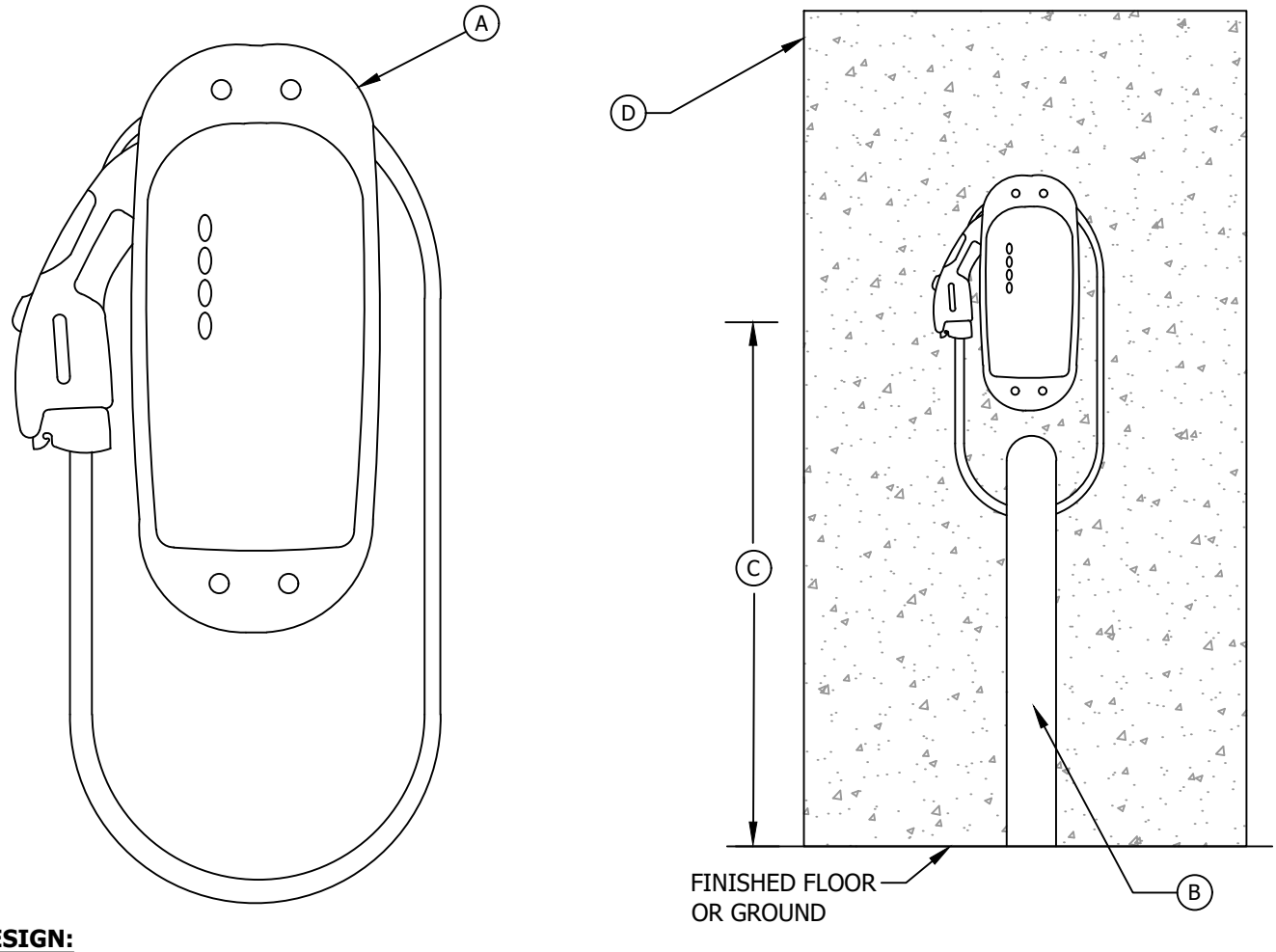

DESIGN:

(A) EVSE THAT REQUIRE WALL MOUNTING. ANCHOR TYPE & LOCATION PER EVSE SPECIFIC CONSTRUCTION.

(B) PROTECTIVE BARRIER, BOLLARD, OR WHEELSTOP. SEE SDG&E STANDARD UG 3821 OR EV-9.00 AS APPLICABLE PER EV-7.00.

(C) EVSE MOUNTING HEIGHT PER MANUFACTURER'S SPECIFICATIONS.

(D) CMU, CONCRETE, OR BRICK WALL WITH ADEQUATE SPACE TO MOUNT EVSE. IF NONE OF THESE ARE PRESENT THEN A UNISTRUT SYSTEM MAY BE DESIGNED BY A STRUCTURAL ENGINEER, WITH APPROVAL OF THE AHJ.

REFERENCES:

a. SEE SDG&E STANDARD UG 3481 EQUIPMENT BARRIER PROTECTION AND CLEARANCE.

b. SEE SDG&E STANDARD EV-7.00 TYPICAL PARKING LAYOUT.

c. SEE SDG&E STANDARD EV-9.00 PRE-CAST CONCRETE WHEEL STOP DETAIL.

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SDG&E ELECTRIC VEHICLE CHARGING STATION STANDARDS

SHEET 1 OF 1

EVSE WALL MOUNTING DETAILS

EV8.20

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DESIGN:

(A) ANY EQUIPMENT WHICH REQUIRES WALL MOUNTING, WHETHER THAT BE A DISCONNECT, ENCLOSURE, EVSE SHALL BE MOUNTED PERMANENTLY TO A STRUCTURAL WALL BY MEANS DESIGNED BY A STRUCTURAL ENGINEER. IN THE ABSENCE OF A STRUCTURAL WALL A UNISTRUT SUPPORT SYSTEM MAY BE DESIGN BY A STRUCTURAL ENGINEER WITH THE APPROVAL OF THE AHJ.

(B) ANY CONDUIT THAT IS MOUNTED ON A STRUCTURE, OR ON A SUPPORT SYSTEM AND ANY CORING OF WALL FOR CORRESPONDING CONDUIT MUST ALSO BE DETAILED ON CONSTRUCTION DRAWINGS BY A STRUCTURAL ENGINEER.

REFERENCES:

a. SEE SDG&E STANDARD UG 3481 EQUIPMENT BARRIER PROTECTION AND CLEARANCE.

b. SEE SDG&E STANDARD EV-7.00 TYPICAL PARKING LAYOUT.

c. SEE SDG&E STANDARD EV-9.00 PRE-CAST CONCRETE WHEEL STOP DETAIL.

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EV9.10	PRE-CAST CONCRETE WHEEL STOP DETAIL

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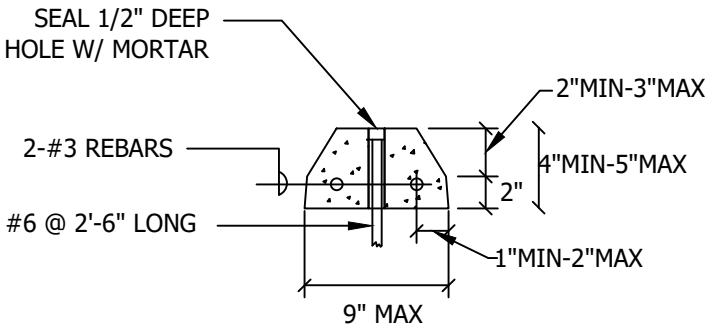
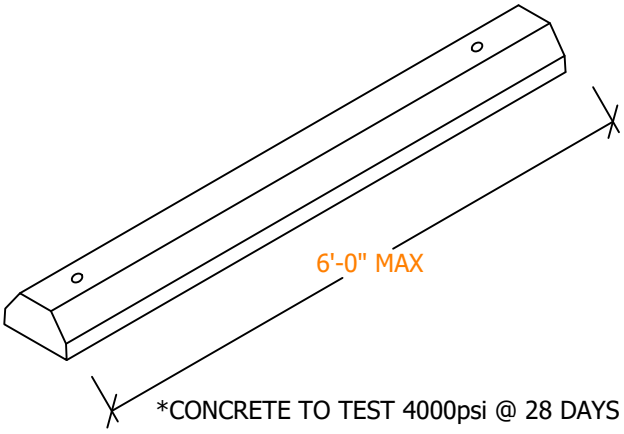
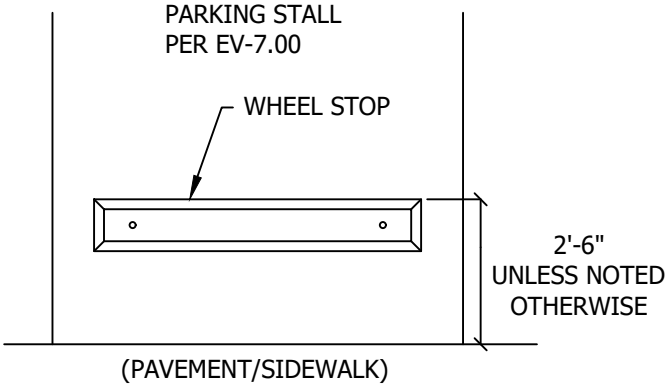
	PRE-CAST CONCRETE WHEEL STOP DETAIL			



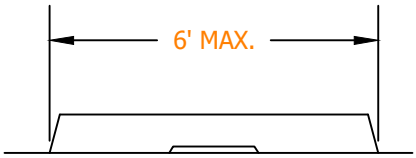
SECTION VIEW



ISOMETRIC VIEW



PLAN VIEW



ELEVATION VIEW

DESIGN:

(A) PHYSICAL BARRIER REQUIRED FOR ELECTRIC VEHICLE SERVICE EQUIPMENT'S PROTECTION. WHEEL STOPS AND/OR CONCRETE BOLLARDS ARE RECOMMENDED TO PREVENT A VEHICLE FROM CONTACTING OR DAMAGING ELECTRIC VEHICLE SERVICE EQUIPMENT. REFER TO SDG&E UG 3481 FOR BOLLARD INSTALLATION DETAILS. REFER TO EV-7.00 FOR TYPICAL STALL LAYOUTS.

(B) A WHEEL STOP CONSTRUCTION MAY BE SPECIALLY DESIGNED FOR EVSE STALLS. THESE WHEEL STOPS SHALL MEET OR EXCEED THE SPECIFICATIONS OF THIS DETAIL AND SHALL BE APPROVED BY THE AHJ.

REFERENCES:

a. SEE SDG&E STANDARD UG 3481 EQUIPMENT BARRIER PROTECTION AND CLEARANCE.

b. SEE SDG&E STANDARD EV-7.00 TYPICAL PARKING LAYOUT.

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SDG&E ELECTRIC VEHICLE CHARGING STATION STANDARDS

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PRE-CAST CONCRETE WHEEL STOP DETAIL

EV9.10

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EV10.20	EVSE STALL STGNAGE EXAMPLE

DRAWINGS:

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SDG&E ELECTRIC VEHICLE CHARGING STATION STANDARDS

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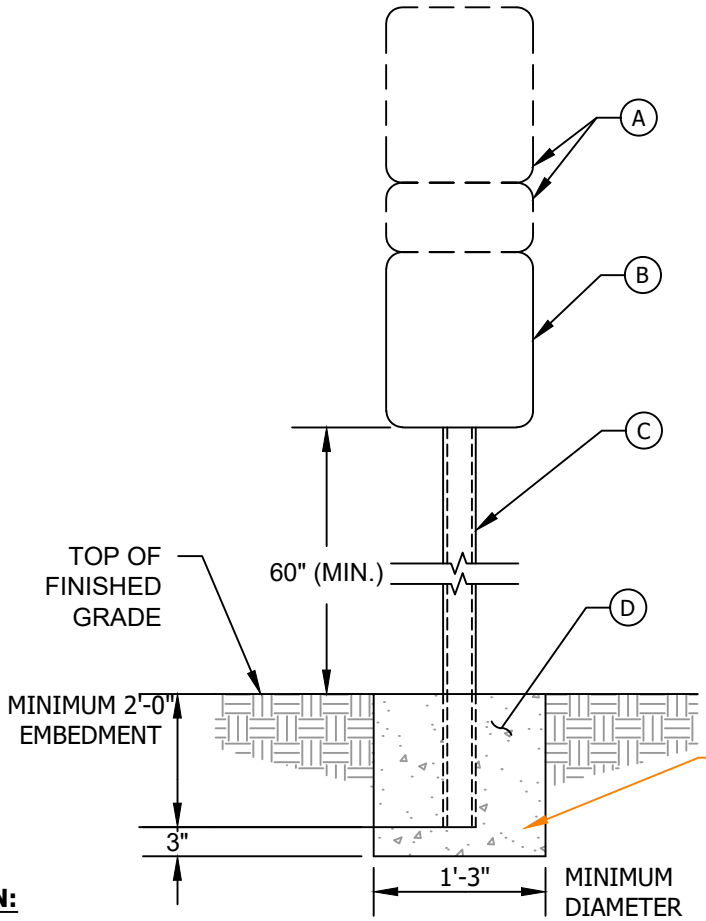
SIGN POLE DETAILS

EV10.00



DESIGN:

(A) ADA SIGNAGE (AS REQUIRED) PER CBC 2019 SIGNAGE BACKGROUND NOT SMALLER THAN 70 SQ. INCHES & CENTERED IN FRONT OF ACCESSIBLE STALL OR RELATIVE LOCATION.

(B) EV CHARGING SIGN. SEE DRAWINGS EV-10.20 FOR ADDITIONAL SIGN DETAILS. REFER TO CONSTRUCTION DRAWINGS FOR SIGN PLACEMENT. SITES WITH PUBLIC ACCESS CHARGING SIGNS ARE REQUIRED. PRIVATE ACCESS CHARGING, NON ADA STALL SIGNS ARE OPTIONAL.

(C) 2" DIAMETER GALVANIZED STEEL POST, MIN 9' TALL INCLUDING 2' MIN EMBEDMENT.

(D) ACCEPTABLE MIX DESIGNS MAY INCLUDE SUPERIOR READY MIX (LAKESIDE, EL CENTRO, OCEANSIDE, ESCONDIDO, SAN DIEGO PLANT):

- -MIX NUMBER 27P, 4000 PSI CONCRETE
- -MIX NUMBER 2725P, 4000 PSI CONCRETE
- -MIX NUMBER 37P-45, 4500 PSI CONCRETE
- -MIX NUMBER 437P, 4500 PSI CONCRETE

IF A DIFFERENT MIX DESIGN IS PROPOSED FOR USE, SUBMIT FOR SDG&E REVIEW.

REFERENCES:

a. SEE SDG&E STANDARD EV-7.00 TYPICAL PARKING LAYOUT.
b. SEE SDG&E STANDARD EV-10.20 EVSE STALL SIGNAGE EXAMPLE.

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SDG&E ELECTRIC VEHICLE CHARGING STATION STANDARDS

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SIGN POLE DETAILS

EV10.10

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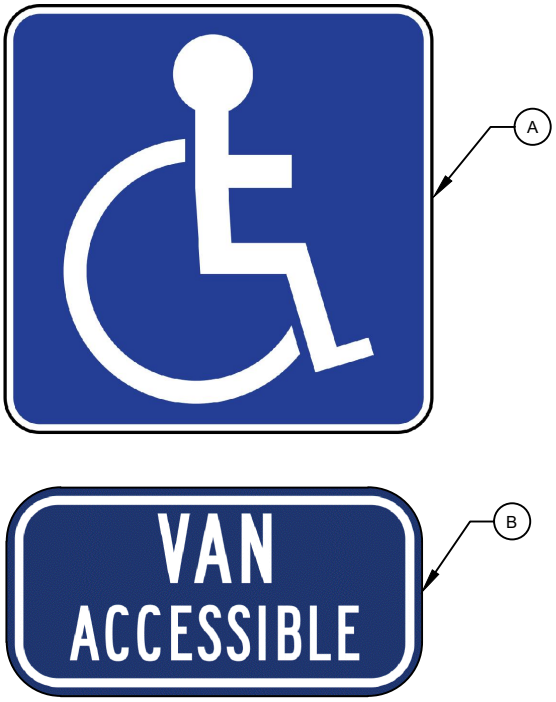
STANDARD SIGNAGE:

ADA SIGNAGE:



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DESIGN:

(A) CALIFORNIA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES SIGN D9-6.

(B) CALIFORNIA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES SIGN R7-8B.

(C) CALIFORNIA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES SIGN R113A (CA).

REFERENCES:

a. SEE SDG&E STANDARD EV-7.00 TYPICAL PARKING LAYOUT.

b. CALIFORNIA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

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SDG&E ELECTRIC VEHICLE CHARGING STATION STANDARDS

EVSE STALL SIGNAGE EXAMPLE

EV10.20

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EV-11.10	TYPICAL TRANSFORMERS
EV-11.20	DRY TYPE TRANSFORMER ENCLOSURES
EV-11.30	DISCONNECT SWITCHES

DRAWINGS:

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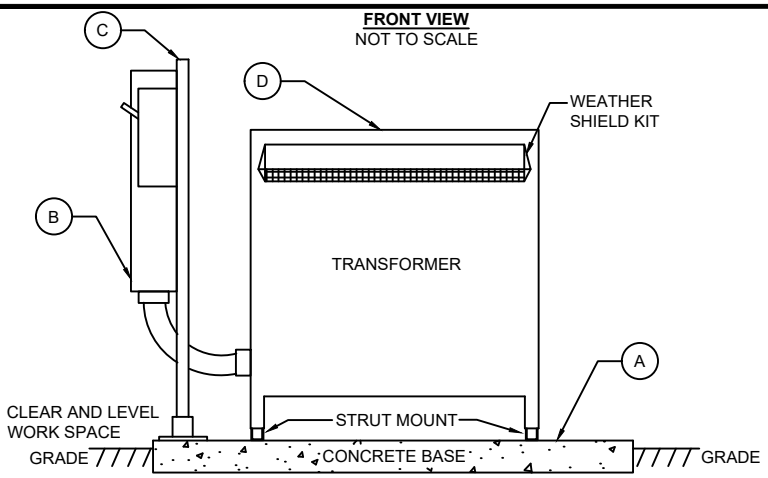
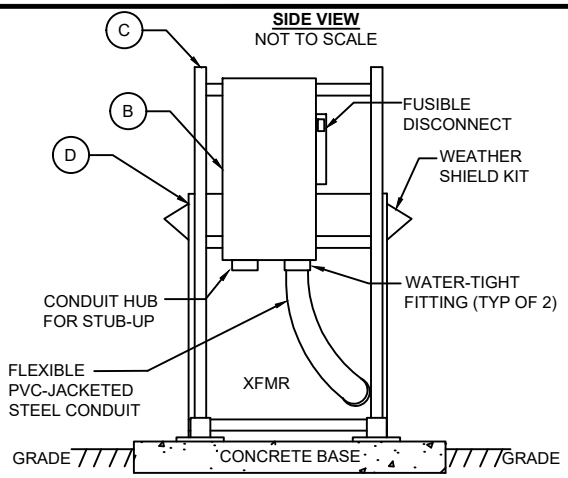
SDG&E ELECTRIC VEHICLE CHARGING STATION STANDARDS

DRY TYPE TRANSFORMERS

EV11.00





DESIGN:

(A) DRY TYPE TRANSFORMERS MUST BE MOUNTED TO A STRUCTURAL BASE (PRECAST PAD, CAST IN PLACE PAD, NON POST TENSION SLAB, AND POST TENSION SLAB CHECKED WITH GROUND PENETRATING RADAR FOR POST TENSION CABLE).

(B) FUSED DISCONNECTING MEANS SHALL BE REQUIRED ON ANY SIDE OF THE TRANSFORMER THAT IS CONNECTED TO AN ELECTRICAL SUPPLY IF THERE IS NOT ANOTHER READILY ACCESSIBLE DISCONNECTING MEANS.

(C) UNISTRUT RACK PER STRUCTURAL CONSTRUCTION DRAWINGS AS APPLICABLE. STRUCTURAL WALL MAY BE USED IN LIEU OF UNISTRUT FOR MOUNTING DISCONNECT.

(D) TRANSFORMERS SHALL BE VENTILATED, NEMA 3R, 80°C RISE WITH 220°C INSULATION SYSTEM. TRANSFORMER SHALL BE TP-1 ENERGY-EFFICIENT WITH 2016 ENCLOSURE CONSTRUCTION. TRANSFORMER SHALL HAVE (2) 2-1/2% ABOVE RATED VOLTAGE TAPS AND (2) 2-1/% BELOW RATED VOLTAGE TAPS.

TABLE EV-11.10

TYPICAL TRANSFORMERS 3ϕ			MAXIMUM LOAD 3ϕ	MAXIMUM OCPD'S 3ϕ	
KVA RATING	DIMENSIONS	WEIGHT	CONNECTED KVA	480V	208V
75 KVA	29.00"W X 22.00"L	643LBS	75 KVA	125A	250A
112.5 KVA	28.22"W X 23.42"L	876LBS	112.5 KVA	175A	400A
150 KVA	28.22"W X 23.42"L	1064LBS	150 KVA	225A	500A
225 KVA	31.44"W X 24.67"L	1569LBS	225 KVA	350A	800A
300 KVA	36.69"W X 32.65"L	2050LBS	300 KVA	450A	1000A
500 KVA	44.20"W X 36.23"L	3681LBS	500 KVA	800A	1600A
TYPICAL TRANSFORMERS 1ϕ			MAXIMUM LOAD 1ϕ	MAXIMUM OCPD'S 1ϕ	
KVA RATING	DIMENSIONS	WEIGHT	CONNECTED KVA	480V	240V
75 KVA	24.22"W X 23.84"L	657LBS	75 KVA	200A	400A
100 KVA	29.97"W X 33.97"L	803LBS	100 KVA	250A	500A
NOTE: THESE ARE TYPICAL DIMENSIONS, ACTUAL DIMENSIONS ARE TO BE CONFIRMED BEFORE CONSTRUCTION.					

REFERENCES:

a. SEE SDG&E STANDARD EV-3.00.

b. SEE CEC ARTICLE 240 MOST RECENT EDITION.

c. SEE CEC ARTICLE 450 MOST RECENT EDITION.

d. SEE SDG&E STANDARD EV-15.60.

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SDG&E ELECTRIC VEHICLE CHARGING STATION STANDARDS

TYPICAL TRANSFORMERS

EV11.10

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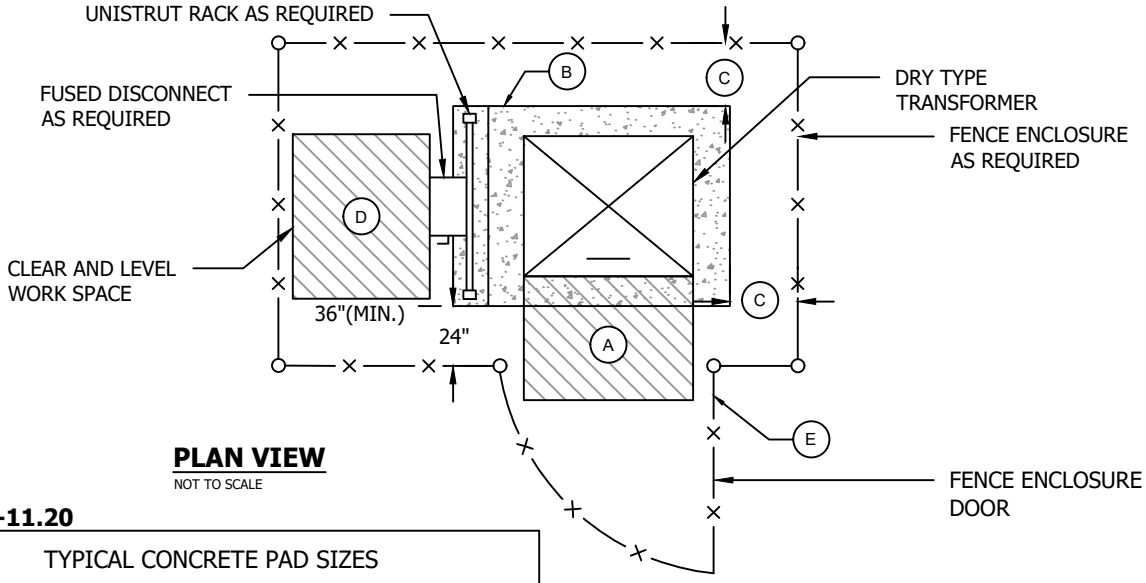

PLAN VIEW
NOT TO SCALE

TABLE EV-11.20

TYPICAL CONCRETE PAD SIZES	
KVA RATING	DIMENSIONS
75 KVA	41.00"W X 34.00"L
112.5/100 KVA	40.22"W X 35.42"L
150 KVA	40.22"W X 35.42"L
225 KVA	43.44"W X 36.67"L
300 KVA	48.69"W X 44.65"L
500 KVA	56.20"W X 48.23"L
NOTE: ACTUAL CONCRETE PAD DIMENSIONS SHALL REFLECT ACTUAL DRY TYPE TRANSFORMERS DIMENSIONS	

DESIGN:

(A) CLEAR AND LEVEL SPACE MINIMUM OF 36" DEEP X TRANSFORMER WIDTH FROM FRONT OF TRANSFORMER.

(B) STRUCTURAL BASE A MINIMUM OF 6" AROUND DIMENSIONS OF TRANSFORMER. TYPICAL SIZES PER TABLE ON THIS SHEET.

(C) A MINIMUM OF 12" FROM EDGE OF PAD, AND 18" TO EDGE OF TRANSFORMER.

(D) CLEAR AND LEVEL WORK SPACE FOR ELECTRICAL EQUIPMENT PER CEC 110.26.

(E) FENCED ENCLOSURE IS REQUIRED FOR DRY TYPE TRANSFORMERS LOCATED IN PUBLIC ACCESS, SHALL BE A MINIMUM OF 8' HIGH WITH MINIMUM 36" WIDE SWING OUT DOOR. OVERALL DIMENSIONS TO ACCOMMODATE REQUIRED CLEARANCES.

REFERENCES:

a. SEE SDG&E STANDARD 110.26 SPACES ABOUT ELECTRICAL EQUIPMENT

b. SEE SDG&E STANDARD EV-7.00 TYPICAL PARKING LAYOUT.

c. SEE SDG&E STANDARD EV-10.20 EVSE STALL SIGNAGE EXAMPLE.

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SDG&E ELECTRIC VEHICLE CHARGING STATION STANDARDS

DRY TYPE TRANSFORMERS ENCLOSURES

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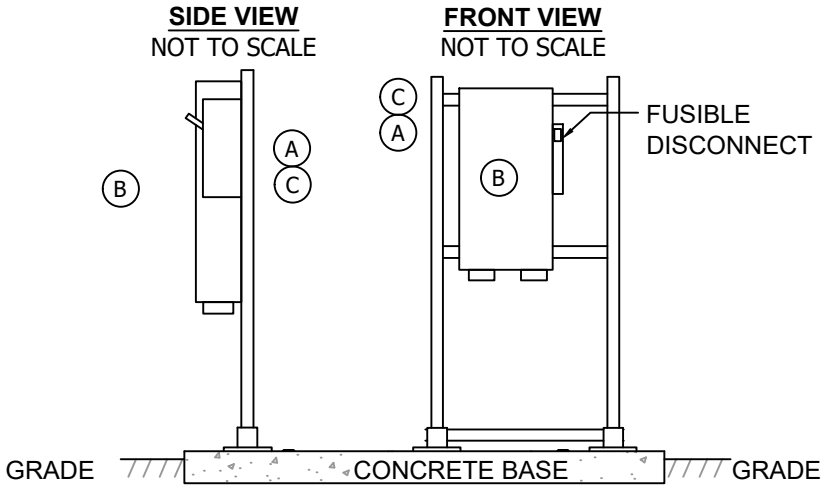

DESIGN:

(A) READILY ACCESSIBLE DISCONNECTING MEANS FOR EVSE. REQUIRED FOR 60A AND ABOVE FOR ANY VOLTAGE CHARGERS, OR FOR ANY CHARGER ON A SYSTEM OVER 150V LINE TO GROUND. FOR THE PURPOSES OF THESE STANDARDS READILY ACCESSIBLE SHALL MEAN WITHIN 50FT DISTANCE, AND CLEARLY WITHIN LINE OF SIGHT. DISCONNECT SHALL BE REQUIRED TO BE LOCKABLE OPEN.

(B) CLEAR AND LEVEL WORK SPACE FOR ELECTRICAL EQUIPMENT PER CEC 110.26.

(C) DISCONNECTS SHALL BE SIZED TO MATCH POLE COUNT, AND MINIMUM AMPERAGE FOR THE OCPD FEEDING THE CIRCUIT OF THE CHARGER THE DISCONNECT PROTECTS.

(D) CEC DOES NOT REQUIRE FUSES FOR DISCONNECT SWITCHES AHEAD OF EVSE, BUT IT MAY BE REQUESTED SPECFICALLY FOR REDUNDANT PROTECTION BY SDG&E REPRESENTATIVE. CONSULT WITH SDG&E IF DISCONNECTING MEANS REQUIRE FUSES OR NOT.

(E) MOUNTING OF DISCONNECTS SHALL BY DESIGNED PER A STRUCTURAL ENGINEERS PLANS AND CALCULATIONS TO EITHER A NEW FREESTANDING SUPPORT, OR AN APPROVABLE EXISTING SURFACE.

REFERENCES:

a. SEE SDG&E STANDARD EV-3.00 EVSE LOAD SUMMARY.

b. SEE SDG&E STANDARD EV-15.50 EVSE LOAD SUMMARY.

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SDG&E ELECTRIC VEHICLE CHARGING STATION STANDARDS

DISCONNECT SWITCHES

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EV-12.20	SECONDARY TRENCHING THROUGH HARDSCAPE

DRAWINGS:

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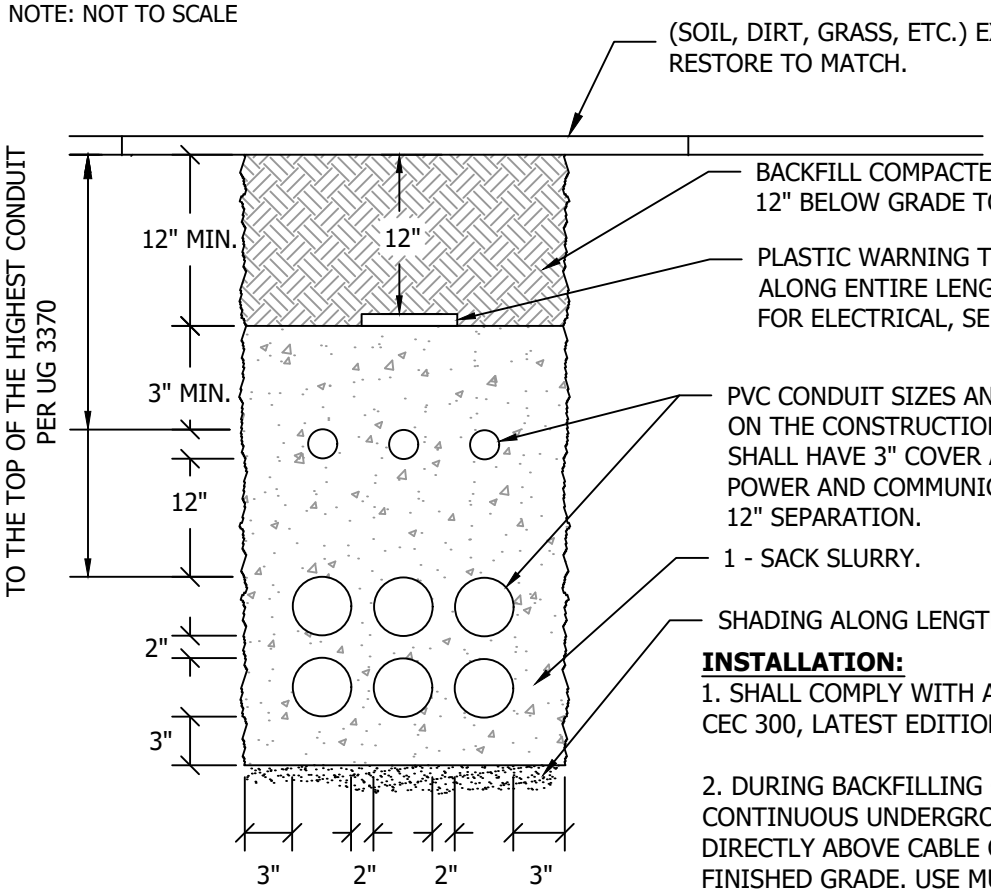
SDG&E ELECTRIC VEHICLE CHARGING STATION STANDARDS

EVSE TRENCHING DETAILS

EV12.00

TRENCHING DETAIL (THROUGH LANDSCAPE)

NOTE: NOT TO SCALE



INSTALLATION:

1. SHALL COMPLY WITH ALL REQUIREMENTS OF CEC 300, LATEST EDITION.

2. DURING BACKFILLING OF TRENCHES, INSTALL CONTINUOUS UNDERGROUND-LINE WARNING TAPE DIRECTLY ABOVE CABLE OR RACEWAY BELOW FINISHED GRADE. USE MULTIPLE TAPES WHERE WIDTH OF MULTIPLE LINES INSTALLED IN A COMMON TRENCH EXCEEDS 16 INCHES OVERALL.

CONSTRUCTION:

A. RECOMMENDED BY MANUFACTURER FOR THE METHOD OF INSTALLATION AND SUITABLE TO IDENTIFY AND LOCATE UNDERGROUND ELECTRICAL LINES.

B. PRINTING ON TAPE SHALL BE PERMANENT AND SHALL NOT BE DAMAGED BY BURIAL OPERATIONS.

C. TAPE MATERIAL AND INK SHALL BE CHEMICALLY INERT AND NOT SUBJECT TO DEGRADATION WHEN EXPOSED TO ACIDS, ALKALIS, AND OTHER DESTRUCTIVE SUBSTANCES COMMONLY FOUND IN SOILS.

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SDG&E ELECTRIC VEHICLE CHARGING STATION STANDARDS

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SECONDARY TRENCHING THROUGH LANDSCAPE

EV12.10

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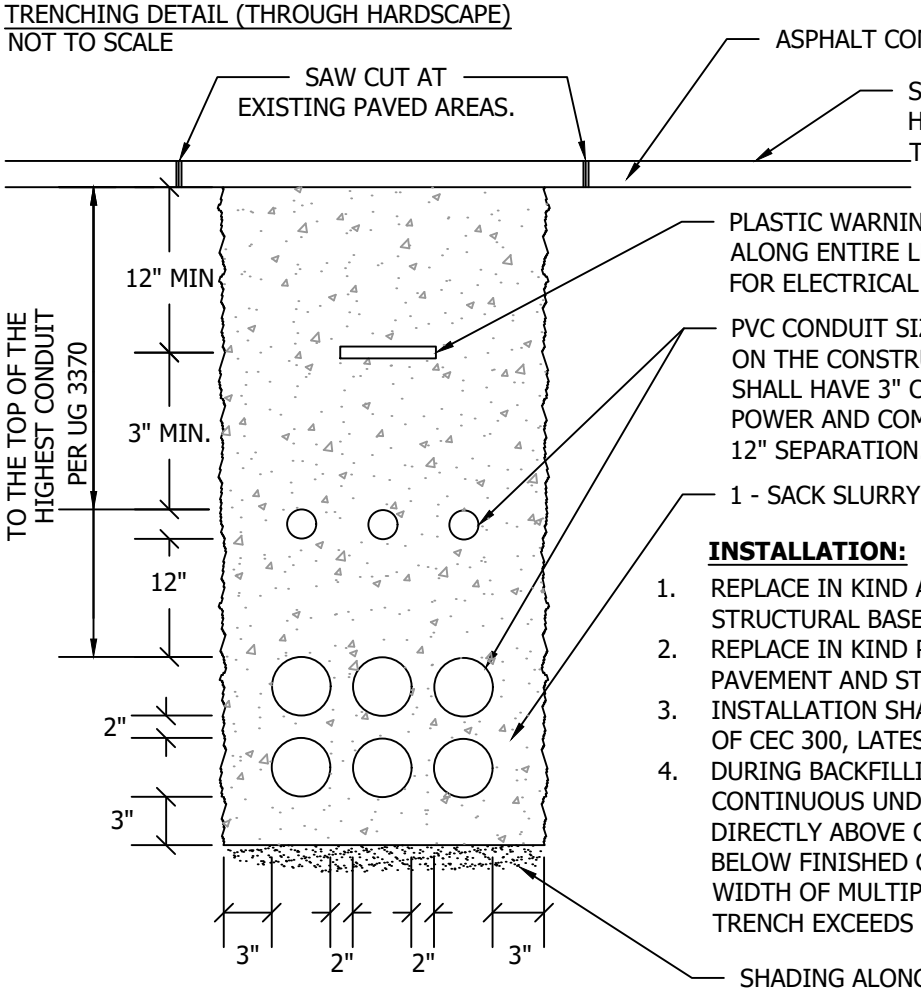
TRENCHING DETAIL (THROUGH HARDSCAPE)
NOT TO SCALE



INSTALLATION:

1. REPLACE IN KIND ASPHALT CONCRETE PAVEMENT AND STRUCTURAL BASE.
2. REPLACE IN KIND PORTLAND CEMENT CONCRETE (PCC) PAVEMENT AND STRUCTURAL BASE.
3. INSTALLATION SHALL COMPLY WITH ALL REQUIREMENTS OF CEC 300, LATEST EDITION.
4. DURING BACKFILLING OF TRENCHES, INSTALL CONTINUOUS UNDERGROUND-LINE WARNING TAPE DIRECTLY ABOVE CABLE OR RACEWAY AT 12 INCHES BELOW FINISHED GRADE. USE MULTIPLE TAPES WHERE WIDTH OF MULTIPLE LINES INSTALLED IN A COMMON TRENCH EXCEEDS 16 INCHES OVERALL.

CONSTRUCTION:

A. RECOMMENDED BY MANUFACTURER FOR THE METHOD OF INSTALLATION AND SUITABLE TO IDENTIFY AND LOCATE UNDERGROUND ELECTRICAL LINES.

B. PRINTING ON TAPE SHALL BE PERMANENT AND SHALL NOT BE DAMAGED BY BURIAL OPERATIONS.

C. TAPE MATERIAL AND INK SHALL BE CHEMICALLY INERT AND NOT SUBJECT TO DEGRADATION WHEN EXPOSED TO ACIDS, ALKALIS, AND OTHER DESTRUCTIVE SUBSTANCES COMMONLY FOUND IN SOILS.

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SDG&E ELECTRIC VEHICLE CHARGING STATION STANDARDS

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SECONDARY TRENCHING THROUGH HARDSCAPE

EV12.20

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EV13.20	EQUIPMENT IDENTIFICATION
EV13.30	PANEL SCHEDULE

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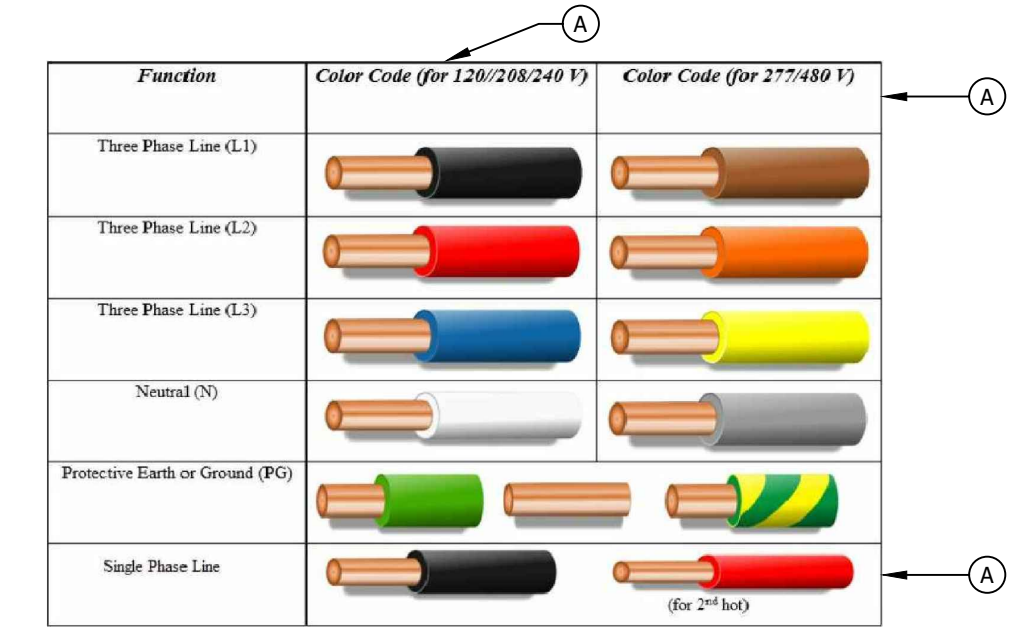

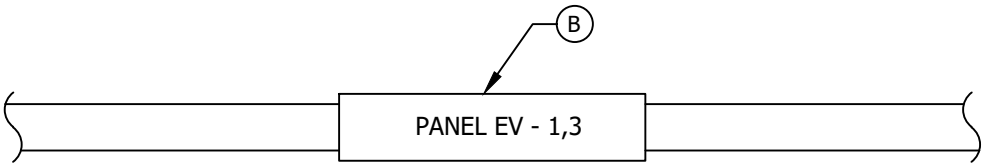

(EXAMPLE LABEL: PANEL NAME - CORRESPONDING CIRCUIT NUMBERS)

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DESIGN:

(A) CONDUCTOR COLOR CODING PER PHASE IDENTIFICATION, 600V OR LESS. USE CORRESPONDING TABLE FOR SINGLE OR THREE PHASE CIRCUITS FOR THE APPLICABLE VOLTAGE SYSTEMS.

(B) ALL CONDUCTORS TO BE IDENTIFIED WITH THEIR RESPECTIVE CIRCUIT BY SELF-ADHESIVE LABELS OR MARKER TAPE. ON EACH ITEM, INSTALL UNIQUE DESIGNATION LABEL THAT IS CONSISTENT WITH SINGLE LINE DIAGRAMS, SCHEDULES, AND OPERATION AND MAINTENANCE MANUALS. UNLESS OTHERWISE INDICATED, PROVIDE A SINGLE LINE OF TEXT WITH 1/2 INCH HIGH LETTERS ON 1-1/2 INCH HIGH LABEL; WHERE TWO LINES OF TEXT ARE REQUIRED, USE LABELS 2 INCHES HIGH.

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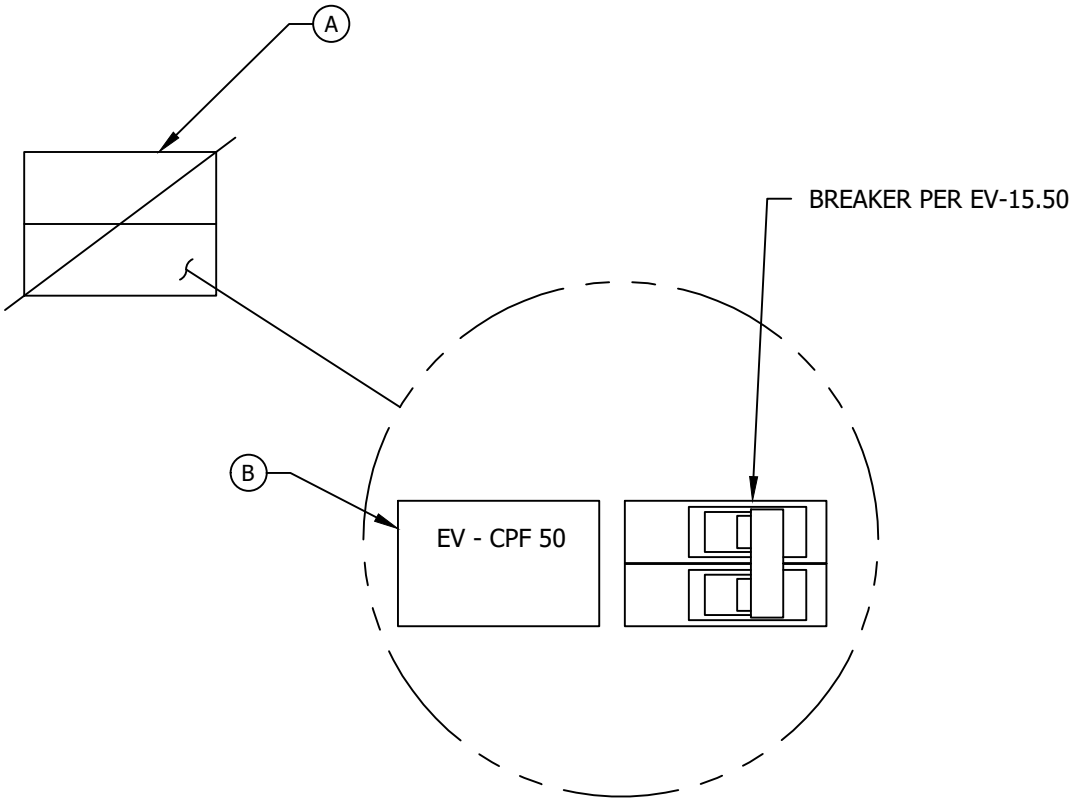

(EXAMPLE LABEL: ELECTRIC VEHICLE CHARGER MODEL)

DESIGN:

(A) POWER CENTERS MUST BE LABELED PER SDG&E STANDARD SG 017.

(B) CIRCUIT BREAKER TO BE IDENTIFIED WITH PERMANENT MEANS.

REFERENCES:

a. SEE SDG&E STANDARD SG 017 PLAQUE SPECIFICATIONS & EXAMPLES.

b. SEE SDG&E STANDARD EV-3.00 EVSE LOAD SUMMARY.

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(A)	XXX		LOCATION: XXX								Bus Rating:XXXA			XXX/XXXV, Xø, XW	
			MAIN: XXXA, XP											MOUNTING:XXX	
			PANEL DEVICE MIN A.I.C. RATING = XXXXX											Nema XX	
	LOCATION	VOLTAMPS			CIR	BRK	A	B	C	BRK	CIR	VOLTAMPS			LOCATION
		øA	øB	øC								øA	øB	øC	
(D)	EV CHARGER -X	XXXX			1	XX	*				2				SPACE
			XXXX		3	2P		*			4				SPACE
(D)	SPARE			-	5	XX			*		6				SPACE
	-	-			7	2P	*				8				SPACE
(D)	SPACE				9			*			10				SPACE
	SPACE				11				*		12				SPACE
	SPACE				7		*				14				SPACE
	SPACE				9			*			16				SPACE
	SPACE				11				*		18				SPACE
	SPACE				19		*				20				SPACE
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	SPACE				25		*				26				SPACE
	SPACE				27			*			28				SPACE
	SPACE				29				*		30				SPACE
	SPACE				31		*				32				SPACE
	SPACE				33			*			34				SPACE
	SPACE				35				*		36				SPACE
	SPACE				37		*				38				SPACE
	SPACE				39			*			40				SPACE
	SPACE				41				*		42				SPACE

	øA = 0	(E)	øB = 0	(E)	øC = 0 (E)

TOTAL CONNECTED VA =	0.00	KVA
+ 25% LCL =	0.00	KVA
TOTAL =	0.00	KVA
CONNECTED LOAD =	0.00	A

DESIGN: (E)

(A) ALL POWER CENTERS SHALL HAVE A CORRESPONDING PANEL SCHEDULE FILLED OUT WITH THE MINIMUM INFORMATION INCLUDED IN THIS SECTION. THE PANEL SCHEDULE SHALL ALSO INCLUDE THE UNIQUE NAME IDENTIFICATION OF THE EQUIPMENT CONSISTENT TO THE CONSTRUCTION DOCUMENTS.

(B) INCLUDE THE MAIN BREAKER AMPERAGE RATING, NUMBER OF POLES, AND MINIMUM AIC RATING FOR ALL OCPD LOCATED INSIDE OF THE PANEL.

(C) INCLUDE THE BUS AMPERAGE RATING, NOMINAL SYSTEM VOLTAGE, AND NEMA RATING OF THE ENCLOSURE.

(D) FILL OUT THE NAMING FOR EACH UNIQUE OCPD, A NAMING CONVENTION SHALL BE ABLE TO CLEARLY IDENTIFY WHICH CHARGER THE BREAKER CORRESPONDS TO. SPARE BREAKERS, OR SPACES FOR FUTURE BREAKERS SHALL BE LABELED AS SUCH.

(E) EACH OCPD SHALL LIST OUT THE VA INTENDED TO BE SERVED BY THAT OCPD PER PHASE. EACH PHASE SHALL LIST OUT TOTAL CONNECTED VA, IDEALLY SPREAD OUT LOAD PER PHASE AS EVENLY AS POSSIBLE. COMBINE TOTAL CONNECTED VA, AND TRANSLATE TO CONNECTED AMPERES TO ENSURE MAIN OCPD IS NOT OVERLOADED.

REFERENCES:

a. SEE SDG&E STANDARD EV3.00 EVSE LOAD SUMMARY.

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B	COMPLETELY REVISED	-	JES	JES	CZH	10/09/2020	E						
A	ORIGINAL EDITION	-	JK	JS	MDJ	12/7/2017	D						

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EV14.10 - 14.12	TYPICAL MATERIALS

DRAWINGS:

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SDG&E ELECTRIC VEHICLE CHARGING STATION STANDARDS

TYPICAL MATERIALS

EV14.00

TYPICAL MATERIALS
(SEE CONSTRUCTION DRAWINGS FOR SITE SPECIFIC MATERIAL LIST)

TABLE EV-14.10

ITEM #	TYPE	ITEM DESCRIPTION	MANUFACTURER/ SUPPLIER	MODEL	STOCK NUMBER	CU
1	CONDUIT FIT	EV, CONDUIT FITTINGS, 1" FTMC, STRAIGHT	T&B	5334	S339236	EVCF1FS
2	CONDUIT FIT	EV, CONDUIT FITTINGS, 1-1/2" FTMC, STRAIGHT	T&B	5336	S339238	EV1.5FSS
3	CONDUIT FIT	EV, CONDUIT FITTINGS, 2" FTMC, STRAIGHT	T&B	5337	S339240	EVCF2FSS
4	CONDUIT FIT	EV, CONDUIT FITTINGS, 1" RMC CONDUIT 22.5° BEND	WHEATLAND	6249	S339086	EVCF1R22
5	2" CONDUIT BEND	EV, CONDUIT FIT, 2" RMC 22.5° BEND	WHEATLAND	6256	S339090	EVCF2R22
6	3" CONDUIT BEND	EV, CONDUIT FIT, 3" RMC 22.5° BEND	WHEATLAND	6258	S339092	EVCF3R22
7	4" CONDUIT BEND	EV, CONDUIT FIT, 4" RMC 22.5° BEND	WHEATLAND	6260	S339094	EVCF4R22
8	1" CONDUIT BEND	EV, CONDUIT FIT, 1" RMC 45° BEND	WHEATLAND	6296	S339076	EVCF1R45
9	1-1/2" CONDUIT BEND	EV, CONDUIT FIT, 1-1/2" RMC 45° BEND	WHEATLAND	6298	S339078	EV1.5R45
10	2" CONDUIT BEND	EV, CONDUIT FIT, 2" RMC 45° BEND	WHEATLAND	6299	S339080	EVCF2R45
11	3" CONDUIT BEND	EV, CONDUIT FIT, 3" RMC 45° BEND	WHEATLAND	6301	S339082	EVCF3R45
12	4" CONDUIT BEND	EV, CONDUIT FIT, 4" RMC 45° BEND	WHEATLAND	6303	S339084	EVCF4R45
13	1" CONDUIT bend	EV, CONDUIT, 1" RMC, 90° BEND	WHEATLAND	6358	S339066	EVC1RM90
14	1-1/2" CONDUIT BEND	EV, CONDUIT, 1-1/2" RMC, 90° BEND	WHEATLAND	6360	S339068	EVC1.5R9
15	2" CONDUIT BEND	EV, CONDUIT, 2" RMC, 90° BEND	WHEATLAND	6361	S339070	EVC2RM90
16	3" CONDUIT BEND	EV, CONDUIT FIT, 3" RMC 90° BEND	WHEATLAND	6363	S339072	EVCF3R90
17	4" CONDUIT BEND	EV, CONDUIT FIT, 4" RMC 90° BEND	WHEATLAND	6365	S339074	EVCF4R90
18	CONDUIT	EV, CONDUIT, 1" EMT, 22.5° BEND	WHEATLAND	8250	S339046	EVC1EM22
19	CONDUIT	EV, CONDUIT, 1-1/2" EMT, 22.5° BEND	WHEATLAND	8251	S339048	EVC1.5E2
20	CONDUIT	EV, CONDUIT, 2" EMT, 22.5° BEND	WHEATLAND	8253	S339050	EVC2EM22
21	CONDUIT	EV, CONDUIT, 3" EMT, 22.5° BEND	WHEATLAND	8270	S339052	EVC3EM22
22	CONDUIT	EV, CONDUIT, 4" EMT, 22.5° BEND	WHEATLAND	8271	S339054	EVC4RM22
23	CONDUIT	EV, CONDUIT, 1" EMT, 45° BEND	WHEATLAND	8285	S339036	EVC1EM45
24	CONDUIT	EV, CONDUIT, 1-1/2" EMT, 45° BEND	WHEATLAND	8287	S339038	EVC1.5E4
25	CONDUIT	EV, CONDUIT, 2" EMT, 45° BEND	WHEATLAND	8289	S339040	EVC2EM45
26	CONDUIT	EV, CONDUIT, 3" EMT, 45° BEND	WHEATLAND	8290	S339042	EVC3EM45
27	CONDUIT	EV, CONDUIT, 4" EMT, 45° BEND	WHEATLAND	8292	S339044	EVC4RM45
28	CONDUIT	EV, CONDUIT, 1" EMT, 90° BEND	WHEATLAND	8343	S339026	EVC1EM90
29	CONDUIT	EV, CONDUIT, 1-1/2" EMT, 90° BEND	WHEATLAND	8345	S339028	EVC1.5E9
30	CONDUIT	EV, CONDUIT, 2" EMT, 90° BEND	WHEATLAND	8346	S339030	EVC2EM90
31	CONDUIT	EV, CONDUIT, 3" EMT, 90° BEND	WHEATLAND	8348	S339032	EVC3EM90
32	CONDUIT	EV, CONDUIT, 4" EMT, 90° BEND	WHEATLAND	8350	S339034	EVC4EM90
33	1-1/2" CONDUIT BEND	EV, CONDUIT FIT, 1-1/2" RMC 22.5° BEND	WHEATLAND	16256	S339088	EV1.5R22
34	CONDUIT	EV, CONDUIT, 1" FTMC, STRAIGHT	ANACONDA	34238	S339096	EVC1FTSS
35	CONDUIT	EV, CONDUIT, 1-1/2" FTMC, STRAIGHT	ANACONDA	34254	S339098	EVC1.5FS
36	CONDUIT	EV, CONDUIT, 2" FTMC, STRAIGHT	ANACONDA	34268	S339100	EVC2FSS
37	CONDUIT	EV, CONDUIT, 1" RMC, STRAIGHT	WESTERN TUBE	67003	S339242	EVTBTEMP
38	CONDUIT	EV, CONDUIT, 1" RMC, STRAIGHT	WESTERN TUBE	544010000	S339056	EVC1RMSS
39	CONDUIT	EV, CONDUIT, 1-1/2" RMC, STRAIGHT	WESTERN TUBE	544210000	S339058	EVC1.5RS
40	CONDUIT	EV, CONDUIT, 3" RMC, STRAIGHT	WESTERN TUBE	544310000	S339060	EVC2RMSS
41	CONDUIT	EV, CONDUIT, 3" RMC, STRAIGHT	WESTERN TUBE	544510000	S339062	EVC3RMSS
42	CONDUIT	EV, CONDUIT, 4" RMC, STRAIGHT	WESTERN TUBE	544710000	S339064	EVC4RMSS
43	CONDUIT	EV, CONDUIT, 1" EMT STRAIGHT	WESTERN TUBE	550210000	S339016	EVC1EMSS
44	CONDUIT	EV, CONDUIT, 1-1/2" EMT, STRAIGHT	WESTERN TUBE	550410000	S339018	EVC1.5ES
45	CONDUIT	EV, CONDUIT, 2" EMT, STRAIGHT	WESTERN TUBE	550510000	S339020	EVC2EMSS
46	CONDUIT	EV, CONDUIT, 3" EMT, STRAIGHT	WESTERN TUBE	550710000	S339022	EVC3EMSS
47	CONDUIT	EV, CONDUIT, 4" EMT, STRAIGHT	WESTERN TUBE	55091000	S339024	EVC4EMSS
48	CONCRETE	EV, BASE CONCRETE, L2	OLD CASTLE	070-X013073-001	S125720	EVBCONL2

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TYPICAL MATERIALS
(SEE CONSTRUCTION DRAWINGS FOR SITE SPECIFIC MATERIAL LIST)

TABLE EV-14.11

ITEM #	TYPE	ITEM DESCRIPTION	MANUFACTURER / SUPPLIER	MODEL	STOCK NUMBER	CU
49	WIRE	EV, WIRE, #4 COPPER, THHN BLACK	CERROWIRE	112-4401P 5000 FT. REELS	S339166	EVN4CTBK
50	WIRE	EV, WIRE, #4 COPPER, THHN WHITE	CERROWIRE	112-4402P 5000 FT. REELS	S339172	EVN4CTWE
51	WIRE	EV, WIRE, #4 COPPER, THHN RED	CERROWIRE	112-4403P 5000 FT. REELS	S339168	EVN4CTRD
52	WIRE	EV, WIRE, #4 COPPER, THHN BLUE	CERROWIRE	112-4404P 5000 FT. REELS	S339170	EVN4CTBE
53	WIRE	EV, WIRE, #4 COPPER, THHN GREEN	CERROWIRE	112-4405P 5000 FT. REELS	S339174	EVN4CTGN
54	WIRE	EV, WIRE #3 COPPER, THHN BLACK	CERROWIRE	112-4501P 5000 FT. REELS	S339218	EVN3CTBK
55	WIRE	EV, WIRE #3 COPPER, THHN WHITE	CERROWIRE	112-4502P 5000 FT. REELS	S339226	EVN3CTWE
56	WIRE	EV, WIRE #3 COPPER, THHN RED	CERROWIRE	112-4503P 5000 FT. REELS	S339222	EVN3CTRD
57	WIRE	EV, WIRE #3 COPPER, THHN BLUE	CERROWIRE	112-4504P 5000 FT. REELS	S339224	EVN3CTBE
58	WIRE	EV, WIRE #3 COPPER, THHN GREEN	CERROWIRE	112-4505P 5000 FT. REELS	S339220	EVN3CTGN
59	WIRE	EV, WIRE #3 COPPER, THHN ORANGE	CERROWIRE	112-4506P 5000 FT. REELS	S339230	EVN3CTOE
60	WIRE	EV, WIRE #3 COPPER, THHN YELLOW	CERROWIRE	112-4507P 5000 FT. REELS	S339232	EVN3CTYW
61	WIRE	EV, WIRE #3 COPPER, THHN BROWN	CERROWIRE	112-4508P 5000 FT. REELS	S339228	EVN3CTBN
62	WIRE	EV, WIRE #3 COPPER, THHN GRAY	CERROWIRE	112-4510P 5000 FT. REELS	S339234	EVN3CTGY
63	WIRE	EV, WIRE, #2 COPPER, THHN BLACK	CERROWIRE	112-4601P 5000 FT. REELS	S339176	EVN2CTBK
64	WIRE	EV, WIRE, #2 COPPER, THHN WHITE	CERROWIRE	112-4602P 5000 FT. REELS	S339182	EVN2CTWE
65	WIRE	EV, WIRE, #2 COPPER, THHN RED	CERROWIRE	112-4603P 5000 FT. REELS	S339178	EVN2CTRD
66	WIRE	EV, WIRE, #2 COPPER, THHN BLUE	CERROWIRE	112-4604P 5000 FT. REELS	S339180	EVN2CTBE
67	WIRE	EV, WIRE, #2 COPPER, THHN GREEN	CERROWIRE	112-4605P 5000 FT. REELS	S339192	EVN2CTGN
68	WIRE	EV, WIRE, #2 COPPER, THHN ORANGE	CERROWIRE	112-4606P 5000 FT. REELS	S339186	EVN2CTOE
69	WIRE	EV, WIRE, #2 COPPER, THHN YELLOW	CERROWIRE	112-4607P 5000 FT. REELS	S339188	EVN2CTYW
70	WIRE	EV, WIRE, #2 COPPER, THHN BROWN	CERROWIRE	112-4608P 5000 FT. REELS	S339184	EVN2CTBN
71	WIRE	EV, WIRE, #2 COPPER, THHN GRAY	CERROWIRE	112-4610P 5000 FT. REELS	S339190	EVN2CTGY
72	WIRE	EV, WIRE, #1/0 COPPER, THHN ORANGE	CERROWIRE	112-5006M 2500 FT. REELS	S339196	EV1/0COE
73	WIRE	EV, WIRE, #1/0 COPPER, THHN YELLOW	CERROWIRE	112-5007M 2500 FT. REELS	S339198	EV1/0CYW
74	WIRE	EV, WIRE, #1/0 COPPER, THHN BROWN	CERROWIRE	112-5008M 2500 FT. REELS	S339194	EV1/0CBN
75	WIRE	EV, WIRE, #1/0 COPPER, THHN GRAY	CERROWIRE	112-5010M 2500 FT. REELS	S339200	EV1/0CGY
76	WIRE	EV, WIRE, #4/0 COPPER, THHN ORANGE	CERROWIRE	112-5606M 2500 FT. REELS	S339204	EV4/0COE
77	WIRE	EV, WIRE, #4/0 COPPER, THHN YELLOW	CERROWIRE	112-5607M 2500 FT. REELS	S339206	EV4/0CYW
78	WIRE	EV, WIRE, #4/0 COPPER, THHN BROWN	CERROWIRE	112-5608M 2500 FT. REELS	S339202	EV4/0CBN
79	WIRE	EV, WIRE, #4/0 COPPER, THHN GRAY	CERROWIRE	112-5610M 2500 FT. REELS	S339208	EV4/0CGY
80	WIRE	EV, WIRE, #350 COPPER, THHN ORANGE	CERROWIRE	112-6806M 2500 FT. REELS	S339212	EV350COE
81	WIRE	EV, WIRE, #350 COPPER, THHN YELLOW	CERROWIRE	112-6807M 2500 FT. REELS	S339214	EV350CYW
82	WIRE	EV, WIRE, #350 COPPER, THHN BROWN	CERROWIRE	112-6808M 2500 FT. REELS	S339210	EV350CBN
83	WIRE	EV, WIRE, #350 COPPER, THHN GRAY	CERROWIRE	112-6810M 2500 FT. REELS	S339216	EV350CGY
84	WIRE	EV, ENCLOSURE BOX, VYNCKIER	HOFFMAN	A30H2412GQRLP	S339244	EVENCBXV
85		EV, UNI-STRUT	B-LINE	B22-120-GLV	S339246	EVUNSTRT

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TYPICAL MATERIALS
(SEE CONSTRUCTION DRAWINGS FOR SITE SPECIFIC MATERIAL LIST)

TABLE EV-14.12

ITEM #	TYPE	ITEM DESCRIPTION	MANUFACTURER/ SUPPLIER	MODEL	STOCK NUMBER	CU
86	EVSE	CPE250, 1xCCCS1	CHARGEPOINT	CPE250C-625-CCS1	S338866	CPE250C
87	EVSE	CPE250, 1xCCS1 200A, 1xCHAdeMO	CHARGEPOINT	CPE250C-625-CCS1-200A-CHD	S338864	CPE2502A
88	EVSE	CPE250, 1xCCS1, 1xCHAdeMO	CHARGEPOINT	CPE250C-625-CCS1-CHD	S338862	CPE250CH
89	EVSE	CPE250 MOUNTING TEMPLATE	CHARGEPOINT	CPE250-CMT-IMPERIAL	S338870	CPE250MT
90	EVSE	CPE250 PAIRING KIT	CHARGEPOINT	CPE250-PAIRINGKIT-F	S338868	CPE250PK
91	EVSE	SINGLE PORT, WALL MNT, 18' CBL, W/ CMK	CHARGEPOINT	CPF50-L18 WALLMNT-CMK6	S338854	EVSPWM18
92	EVSE	SINGLE PORT, PD MNT, 18' CBL, W/ CMK	CHARGEPOINT	CPF50-L18-PEDMNT-CMK6	S338850	EVSPPM18
93	EVSE	DUAL PORT, PD MNT, 18' CBL, W/ CMK	CHARGEPOINT	CPF50-L18-PEDMNT-CMK-Dual	S338852	DPM18FTC
94	EVSE	SINGLE PORT, WALL MNT, 23' CBL, W/ CMK	CHARGEPOINT	CPF50-L23 WALLMNT-CMK8	S338860	EVSPWM23
95	EVSE	SINGLE PORT, PD MNT, 23' CBL, W/ CMK	CHARGEPOINT	CPF50-L23-PEDMNT-CMK8	S338856	EVSPPM23
96	EVSE	DUAL PORT, PD MNT, 23' CBL, W/ CMK	CHARGEPOINT	CPF50-L23-PEDMNT-CMK8-Dual	S338858	DPM23FTC
97		EV,DSCNCT,60A F, N1,600V,2P,2W,1PH	SIEMENS	HF262	S339134	HF262
98		EV,DSCNCT,60A F,N3R,600V,2P,2W,1PH	SIEMENS	HF262R	S339142	HF262R
99		EV,DSCNCT,100A F,N1,600V,2P,2W,1PH	SIEMENS	HF263	S339136	HF263
100		EV,DSCNCT,100A F,N3R,600V,2P,2W,1PH	SIEMENS	HF263R	S339144	HF263R
101		EV,DSCNCT,60A F,N1,600V,3P,3W,3PH	SIEMENS	HF362	S339150	HF362
102		EV,DSCNCT,60A F,N3R,600V,3P,3W,3PH	SIEMENS	HF362R	S339158	HF362R
103		EV,DSCNCT,100A F,N1,600V,3P,3W,3PH	SIEMENS	HF363	S339152	HF363
104		EV,DSCNCT,100A F,N3R,600V,3P,3W,3PH	SIEMENS	HF363R	S339160	HF363R
105		EV,DSCNCT,200A F,N1,600V,3P,3W,3PH	SIEMENS	HF364	S339154	HF364
106		EV,DSCNCT,200A F,N3R,600V,3P,3W,3PH	SIEMENS	HF364R	S339162	HF364R
107		EV,DSCNCT,400A F,N1,600V,3P,3W,3PH	SIEMENS	HF365A	S339156	HF365A
108		EV,DSCNCT,400A F,N3R,600V,3P,3W,3PH	SIEMENS	HF365RA	S339164	HF365RA
109		EV,DSCNCT,60A NF,N1,600V,2P,2W,1PH	SIEMENS	HNF262	S339102	HNF262
110		EV,DSCNCT,60A NF,N3R,600V,3P,3W,1PH	SIEMENS	HNF262R	S339110	HNF262R
111		EV,DSCNCT,100A NF,N1,600V,2P,2W,1PH	SIEMENS	HNF263	S339104	HNF263
112		EV,DSCNCT,100A NF, N3R 600V,2P,2W,1PH	SIEMENS	HNF263R	S339112	HNF263R
113		EV,DSCNCT,60A NF,N1,600V,3P,3W,3PH	SIEMENS	HNF362	S339118	HNF362
114		EV,DSCNCT,60A NF,N3R,600V,3P,3W,3PH	SIEMENS	HNF362R	S339126	HNF362R
115		EV, DSCNCT,100A NF,N1,600V,3P,3W,3PH	SIEMENS	HNF363	S339120	HNF363
116		EV,DSCNCT,100A NF,N3R,600V,3P,3W,3PH	SIEMENS	HNF363R	S339128	HNF363R
117		EV,DSCNCT,200A NF,N1,600V,3P,3W,3PH	SIEMENS	HNF364	S339122	HNF364
118		EV,DSCNCT,200A NF,N3R,600V,3P,3W,3PH	SIEMENS	HNF364R	S339130	HNF364R
119		EV, DSCNCT,400A NF,N1,600V,3P,3W,3PH	SIEMENS	HNF365A	S339124	HNF365A
120		EV,DSCNCT,400A NF,N3R1,600V,3P,3W,3PH	SIEMENS	HNF365RA	S339132	HNF365RA

DESIGN:

A. THE ABOVE LIST IS MEANT TO REPRESENT TYPICAL MATERIAL USED FOR THIS TYPE OF PROJECT. REFER TO CONSTRUCTION DRAWINGS FOR SITE SPECIFIC BILL OF MATERIALS.

B. CONSULT WITH ENGINEER PRIOR TO CONSTRUCTION IF ANY MATERIAL DISCREPANCIES ARISE.

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EV15.20 - 15.22	CEC GROUND WIRE TABLES & GROUNDING DETAILS
EV15.30 - 15.34	CEC VOLTAGE DROP CALCULATIONS
EV15.40 - 15.42	CEC CONDUIT FILL CALCULATIONS, AND TABLE
EV15.50 - 15.51	CIRCUIT BREAKER CALCULATIONS

DRAWINGS:

ALL DRAWINGS CONTAINED WITHIN THIS DOCUMENT ARE FOR ILLUSTRATION ONLY. THE CONSTRUCTION DRAWINGS ARE USED TO SPECIFY REQUIREMENTS BASED ON ACTUAL SITE CONDITIONS AND MATERIAL/EQUIPMENT TO BE USED OR SELECTED BY CUSTOMER.

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TABLE EV-15.10

ALLOWABLE AMPACITIES OF INSULATED COPPER CONDUCTORS RATED UP TO AND INCLUDING 2000 VOLTS, 60°C, 75°C, 90°C			
SIZE AWG OR KCMIL	60°C (140°F)	75°C (167°F)	90°C (194°F)
	TYPE TW	TYPE THWN	TYPE THHN
12	20A	25A	30A
10	30A	35A	40A
8	40A	50A	55A
6	55A	65A	75A
4	70A	85A	95A
2	95A	115A	130A
1/0	125A	150A	170A
2/0	145A	175A	195A
3/0	165A	200A	225A
4/0	195A	230A	260A
250	215A	255A	290A
300	240A	285A	320A
350	260A	310A	350A
400	280A	335A	380A
500	320A	380A	430A

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DESIGN:

THE AMPACITY OF A CIRCUIT IS LIMITED TO THE THERMAL RATING OF THE LOWEST RATED CONNECTION. THE RATINGS OF THE TERMINALS ON EITHER THE LINE OR LOAD SIDES OF ANY CIRCUIT MAY BE LOWER THAN THE RATING OF THE CONDUCTORS. THE AMPACITY OF THAT ENTIRE CIRCUIT IS EQUAL TO THE VALUE FROM THE COLUMN OF THE ENTIRE CIRCUIT'S LOWEST THERMAL RATING.

PER CEC 110.14 WIRING FOR CIRCUITS UP TO 100A, WITH WIRING FROM #14 AWG TO #1 AWG SHALL USE THE AMPACITY OF COLUMN 60°C (140°F).

PER CEC 110.14 WIRING FOR CIRCUITS OVER 100A, WITH WIRING LARGER THAN #1 AWG SHALL USE THE AMPACITY OF COLUMN 75°C (167°F).

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B	COMPLETELY REVISED	-	JES	JES	CZH	10/09/2020	E						
A	ORIGINAL EDITION	-	JK	JS	MDJ	12/7/2017	D						

TABLE EV-15.11

ADJUSTMENT FACTORS FOR MORE THAN THREE CURRENT-CARRYING CONDUCTORS	
NUMBER OF CURRENT CARRYING CONDUCTORS	PERCENT OF VALUES IN TABLE ABOVE AS ADJUSTED FOR AMBIENT TEMPERATURE IF NECESSARY
4-6	80
7-9	70
10-20	50
21-30	45
31-40	40
41 AND ABOVE	35

REFERENCES:

a. SEE CEC 110.14 ELECTRICAL CONNECTIONS, MOST RECENT EDITION.

b. SEE CEC TABLE 310.15 (B) (16), MOST RECENT EDITION.

c. SEE CEC TABLE 310.15 (B) (3) (a), MOST RECENT EDITION.

d. SEE SDG&E STANDARD EV-2.10 DEFINITIONS.

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B	COMPLETELY REVISED	-	JES	JES	CZH	10/09/2020	E						
A	ORIGINAL EDITION	-	JK	JS	MDJ	12/7/2017	D						

GROUNDING:

DESIGNERS SHALL FAMILIARIZE THEMSELVES WITH ALL PORTIONS OF CEC ARTICLE 250. THESE REFERENCES ARE SOME OF THE MOST COMMONLY REFERENCED, BUT NOT THE TOTAL EXTENT OF SECTIONS THAT MAY APPLY TO EVSE DESIGNS.

WHEN INSTALLING SERVICES FOLLOW THE PROVISIONS OF 250.24.

WHEN INSTALLING SEPERATELY DERIVED SYSTEMS, SUCH AS BUT NOT LIMITED TO THOSE AFTER A DRY TYPE TRANSFORMER, FOLLOW THE PROVISIONS OF CEC 250.30.

WHEN ESTABLISHING EITHER A NEW GROUNDING SYSTEM, OR A CONNECTION TO THE EXISTING GROUNDING ELECTRODE SYSTEM, FOLLOW THE PROVISIONS OF CEC 250.50.

WHEN SIZING FOR AN EQUIPMENT GROUNDING CONDUCTOR THE SIZES CALLED OUT IN TABLE 250.122 ARE THE MINIMUM. WHEN ACTUALLY CHOOSING A GROUNDING CONDUCTOR BE SURE TO CHOOSE THE LARGEST OF THE FOLLOWING:

- UPSIZING GROUND WIRES PER CEC 250.122(b) (WHEN LINE WIRING IS UPSIZED FOR VOLTAGE DROP, AMPACITY DERATING PER EV-15.11, OR ANY OTHER REASON)
- BRANCH CIRCUIT GROUND WIRE PER CHARGER MANUFACTURER'S SPECIFICATIONS

REFERENCES:

a. SEE SDG&E STANDARD EV-15.10 CEC CABLE AMPACITIES.

b. SEE CEC ARTICLE 250 GROUNDING AND BONDING, MOST RECENT EDITION

c. SEE CEC SECTION 250.24 GROUNDING SERVICE-SUPPLIED ALTERNATING-CURRENT SYSTEMS, MOST RECENT EDITION

d. SEE CEC SECTION 250.30 GROUNDING SEPERATELY DERIVED SYSTEMS, MOST RECENT EDITION.

e. SEE CEC SECTION 250.50 GROUNDING ELECTRODE SYSTEM, MOST RECENT EDITION.

f. SEE CEC SECTION 250.66 SIZE OF ALTERNATING-CURRENT GROUNDING ELECTRODE CONDUCTOR, MOST RECENT EDITION.

g. SEE CEC SECTION 250.122 SIZE OF EQUIPMENT GROUNDING CONDUCTORS, MOST RECENT EDITION.

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B	COMPLETELY REVISED	-	JES	JES	CZH	10/09/2020	E						
A	ORIGINAL EDITION	-	JK	JS	MDJ	12/7/2017	D						

TABLE EV-15.21A

GROUNDING ELECTRODE CONDUCTOR FOR ALTERNATING-CURRENT SYSTEMS		
SIZE OF LARGEST UNGROUNDED SERVICE-ENTRANCE CONDUCTOR OR EQUIVALENT AREA FOR PARALLEL CONDUCTORS (AWG/KCMIL)		SIZE OF GROUNDING ELECTRODE CONDUCTOR (AWG/KCMIL)
COPPER	ALUMINUM OR COPPER-CLAD ALUMINUM	COPPER
2 OR SMALLER	1/0 OR SMALLER	8
1 OR 1/0	2/0 OR 3/0	6
2/0 OR 3/0	4/0 OR 250	4
OVER 3/0 THROUGH 350	OVER 250 THROUGH 500	2
OVER 350 THROUGH 600	OVER 500 THROUGH 900	1/0
OVER 600 THROUGH 1100	OVER 900 THROUGH 1750	2/0
OVER 1100	OVER 1750	3/0

TABLE EV-15.21B

MINIMUM SIZE EQUIPMENT GROUNDING CONDUCTORS FOR GROUNDING RACEWAY AND EQUIPMENT	
RATING OR SETTING OF AUTOMATIC OVERCURRENT DEVICE IN CIRCUIT AHEAD OF EQUIPMENT, CONDUIT, ETC., NOT EXCEEDING (AMPERES)	SIZE (AWG OR KCMIL) COPPER
20	12
60	10
100	8
200	6
300	4
400	3
500	2
600	1
800	1/0
1000	2/0
1200	3/0
1600	4/0
2000	250

REFERENCES:

a. SEE CEC TABLE 250.66, MOST RECENT EDITION.

b. SEE CEC TABLE 250.122, MOST RECENT EDITION.

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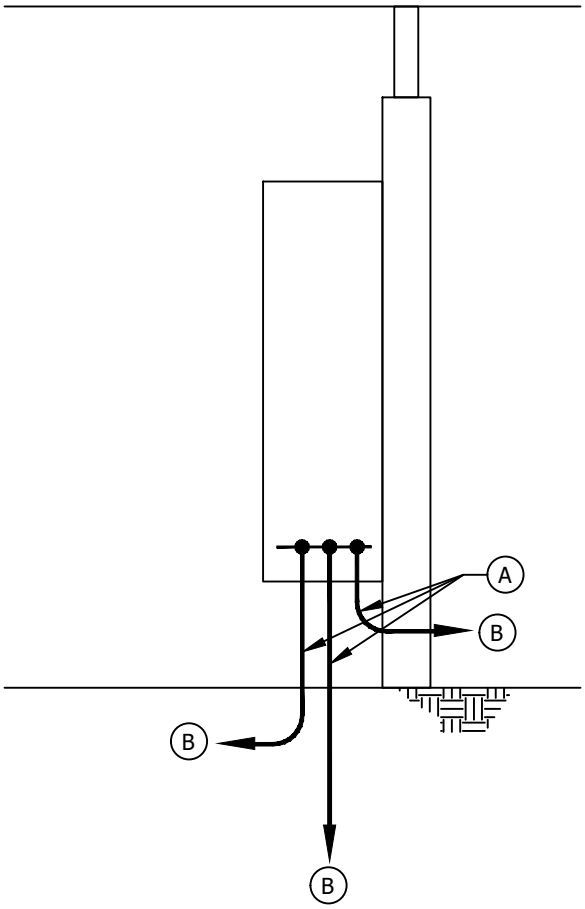

DESIGN:

(A) GROUNDING ELECTRODE CONDUCTOR SIZED PER TABLE EV-15.21A.

(B) CONNECT TO NEAREST OF THE FOLLOWING: COLD WATER, BUILDING STEEL, CONCRETE ENCASED ELECTRODE UNLESS NONE ARE PRESENT. IF MISSING THEN CONNECT TO EXISTING OR INSTALL NEW GROUND RING, ROD AND PIPE ELECTRODES, PLATE ELECTRODES, OR OTHER LISTED ELECTRODES. USE EXOTHERMIC, COMPRESSION, OR OTHER APPROVED GROUNDING CONNECTIONS.

REFERENCES:

a. SEE CEC ARTICLE 250 GROUNDING AND BONDING MOST RECENT EDITION.

b. SEE SDG&E STANDARD UG4510.

REV	CHANGE	DR	BY	DSN	APV	DATE	REV	CHANGE	DR	BY	DSN	APV	DATE
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VOLTAGE DROP:

VOLTAGE DROP AS DEFINED IN SECTION 8.4 OF THE NONRESIDENTIAL COMPLIANCE MANUAL OF TITLE 24 PART 6 BY THE CALIFORNIA ENERGY COMMISSION IS LIMITED TO 5% TOTAL FROM POINT OF SERVICE TO THE FURTHEST LOAD. IT IS ALSO CONSIDERED GOOD PRACTICE TO KEEP THE VOLTAGE DROP OF ANY ONE BRANCH CIRCUIT UNDER 3% WITHIN ANY ELECTRICAL SYSTEM. THE FORMULA TO CALCULATE VOLTAGE DROP IS AS FOLLOWS:

$$\text{3 PHASE: } VD = \sqrt{3} * I * (R * \cos(\Theta) + X * \sin(\Theta)) * L / N$$

$$\text{1 PHASE: } VD = 2 * I * (R * \cos(\Theta) + X * \sin(\Theta)) * L / N$$

$$\text{DC: } VD = 2 * I * R * L / N$$

$$\%VD = (VD / \text{SYSTEM VOLTAGE}) * 100$$

FOR A VAST MAJORITY OF ELECTRIC VEHICLE CHARGING STATIONS THE POWER FACTOR OF THE SYSTEM IS GREATER THAN 0.99. WHEN POWER FACTOR IS SO CLOSE TO 1 THE (SIN(Θ)) PORTION OF THE EQUATION CAN BE ASSUMED TO BE 0 AND THE (COS(Θ)) CAN BE ASSUMED TO BE 1 WITH NEGLIGIBLE LOSS OF ACCURACY TO THE CALCULATIONS. INCLUDE THE FULL CALCULATION FOR ANY CIRCUIT WITH <0.95 POWER FACTOR.

UNITS:

VD = VOLTS DROPPED (VOLTS)

I = CURRENT OF THE CIRCUIT (AMPS)

R = CONDUCTIVE RESISTANCE (OHMS/1000FT)

X = INDUCTIVE REACTANCE (OHMS/1000FT)

Θ = PHASE ANGLE (DEGREES)
(COS(Θ) = POWER FACTOR OF THE SYSTEM)

L = DISTANCE OF CIRCUIT (IN TERMS OF 1000FT)

N = NUMBER OF PARALLEL RUNS OF CONDUCTORS IN SPECIFIC CIRCUIT (INTEGER VALUE)

REFERENCES:

a. SEE SECTION 8.4 OF THE NONRESIDENTIAL COMPLIANCE MANUAL OF TITLE 24 PART 6 BY THE CALIFORNIA ENERGY COMMISSION, MOST RECENT EDITION

b. SEE CEC CHAPTER 9 TABLE 8, MOST RECENT EDITION.

c. SEE CEC CHAPTER 9 TABLE 9, MOST RECENT EDITION.

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B	COMPLETELY REVISED	-	JES	JES	CZH	10/09/2020	E						
A	ORIGINAL EDITION	-	JK	JS	MDJ	12/7/2017	D						

TABLE EV-15.31

CONDUCTOR PROPERTIES	
SIZE (AWG OR KCMIL)	DIRECT-CURRENT RESISTANCE AT 75°C FOR UNCOATED COPPER (OHM/kFT)
12	1.98
10	1.24
8	0.778
6	0.491
4	0.308
2	0.194
1/0	0.122
2/0	0.0967
3/0	0.0766
4/0	0.0608
250	0.0515
300	0.0429
350	0.0367
400	0.0321
500	0.0258

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TABLE EV-15.32

ALTERNATING-CURRENT RESISTANCE AND REACTANCE FOR 600-VOLT CABLES, 3-PHASE, 60 HZ, 75°C - THREE SINGLE CONDUCTORS IN CONDUIT (OHMS TO NEUTRAL PER 1000 FEET)					
	X_L (REACTANCE) FOR ALL WIRES		ALTERNATING-CURRENT RESISTANCE FOR UNCOATED COPPER WIRES		
SIZE (AWG OR KCMIL)	PVC, ALUMINUM CONDUITS	STEEL CONDUIT	PVC CONDUIT	ALUMINUM CONDUIT	STEEL CONDUIT
12	0.054	0.068	2.0	2.0	2.0
10	0.050	0.063	1.2	1.2	1.2
8	0.052	0.065	0.78	0.78	0.78
6	0.051	0.064	0.49	0.49	0.49
4	0.048	0.060	0.31	0.31	0.31
2	0.045	0.057	0.19	0.20	0.20
1/0	0.044	0.055	0.12	0.13	0.12
2/0	0.043	0.054	0.10	0.10	0.10
3/0	0.042	0.052	0.077	0.082	0.079
4/0	0.041	0.051	0.062	0.067	0.063
250	0.041	0.052	0.052	0.057	0.054
300	0.041	0.051	0.044	0.049	0.045
350	0.040	0.050	0.038	0.043	0.039
400	0.040	0.049	0.033	0.038	0.035
500	0.039	0.048	0.027	0.032	0.029

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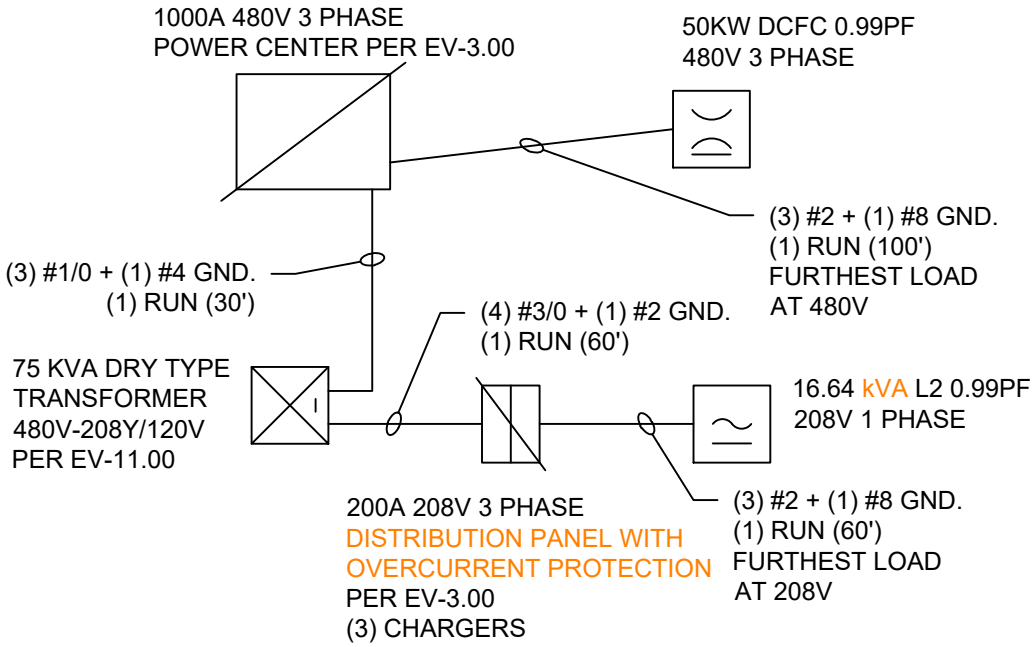
A	ORIGINAL EDITION	-	JK	JS	MDJ	12/7/2017	D						

EXAMPLE CALCULATION:



VOLTAGE DROP - 480V CHARGER:

VD = √3 * 60.17A * (0.190OHM * 1 + 0.045OHM * 0) * 0.100' / 1 = 1.98V

%VD = 1.98V/480V * 100% = 0.41% VD THIS IS ACCEPTABLE.

VOLTAGE DROP - DT XFMR - 200A POWER CENTER - 208V CHARGER:

16.64kVA * 3 = 49.92kVA

VD = √3 * 60.07A * (0.120OHM * 1 + 0.044OHM * 0) * 0.030' / 1 = 0.37V

%VD = 0.37V/480V * 100% = 0.08%

VD = √3 * 138.66A * (0.077OHM * 1 + 0.042OHM * 0) * 0.060' / 1 = 1.11V

%VD = 1.11V/208V * 100% = 0.53%

VD = 2 * 80.00A * (0.19OHM * 1 + 0.045OHM * 0) * 0.060' / 1 = 1.82V

%VD = 1.82V/208V * 100% = 0.88%

TOTAL %VD = 0.08% + 0.53% + 0.88% = 1.49% VD THIS IS ACCEPTABLE

AT BOTH 480V & 208V NO PART OF THE CIRCUIT IS > 3%, AND TOTAL TO FURTHEST LOAD IS < 5%. THIS SYSTEM PASSES.

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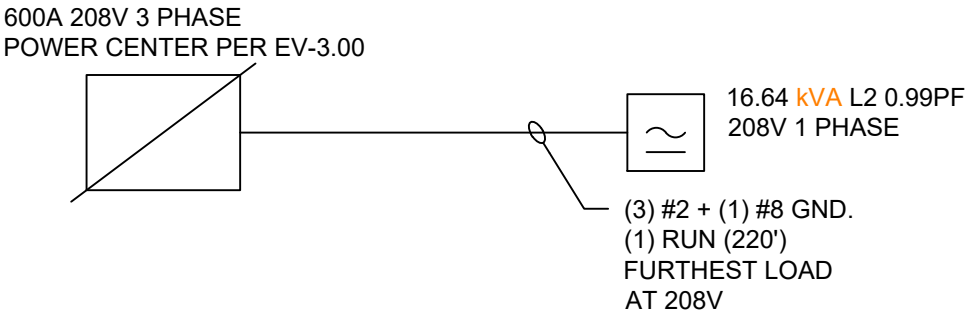
A	ORIGINAL EDITION	-	JK	JS	MDJ	12/7/2017	D						

EXAMPLE CALCULATION:

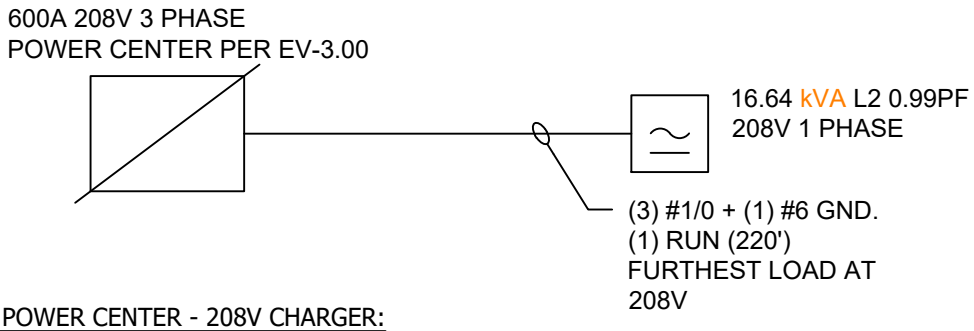


VOLTAGE DROP - 600A POWER CENTER - 208V CHARGER:

VD = 2 * 80.00A * (0.19OHM * 1 + 0.045OHM * 0) * 0.22' / 1 = 6.69V

%VD = 6.69V/208V * 100% = 3.22% VD THIS IS NOT ACCEPTABLE

UPSIZE CABLES FROM (3) #2 TO (3) #1/0 (ALSO UPSIZE GROUND WIRE TO #6)



VOLTAGE DROP - 600A POWER CENTER - 208V CHARGER:

VD = 2 * 80.00A * (0.12OHM * 1 + 0.044OHM * 0) * 0.22' / 1 = 4.22V

%VD = 4.22V/208V * 100% = 2.03% VD THIS IS ACCEPTABLE

UPSIZE CABLES FROM (3) #2 TO (3) #1/0 (ALSO UPSIZE GROUND WIRE TO #6)

AT 208V NO PART OF THE CIRCUIT IS > 3%, AND TOTAL TO FURTHEST LOAD IS < 5%. THIS SYSTEM PASSES.

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TABLE EV-15.40A

PERCENT OF CROSS SECTION OF CONDUIT AND TUBING FOR CONDUCTORS AND CABLES	
NUMBER OF CONDUCTORS AND/OR CABLES	CROSS-SECTIONAL AREA (%)
1	53
2	31
OVER 2	40

TABLE EV-15.40B

DIMENSIONS AND PERCENT AREA OF CONDUIT AND TUBING FOR ELECTRICAL METALLIC TUBING (EMT)		
TRADE SIZE	OVER 2 WIRES 40% ($IN.^2$)	TOTAL AREA 100% ($IN.^2$)
1	0.346	0.864
$1\frac{1}{2}$	0.814	2.036
2	1.342	3.356
3	3.538	8.846
4	5.901	14.753

TABLE EV-15.40C

DIMENSIONS AND PERCENT AREA OF CONDUIT AND TUBING FOR RIGID METAL CONDUIT (RMC)		
TRADE SIZE	OVER 2 WIRES 40% ($IN.^2$)	TOTAL AREA 100% ($IN.^2$)
1	0.355	0.887
$1\frac{1}{2}$	0.829	2.071
2	1.363	3.408
3	3.000	7.499
4	5.153	12.882
5	8.085	20.212
6	11.663	29.158

REFERENCES:

A. SEE CEC CHAPTER 9 TABLE 1, MOST RECENT EDITION.

B. SEE CEC CHAPTER 9 TABLE 4, MOST RECENT EDITION.

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C	2022 REVISION	ARC	JES	IPJ	KRG	07/22/2022	F						
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A	ORIGINAL EDITION	-	JK	JS	MDJ	12/7/2017	D						

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TABLE EV-15.41A

DIMENSIONS AND PERCENT AREA OF CONDUIT AND TUBING FOR RIGID PVC CONDUIT (PVC), SCHEDULE 40, AND HPDE CONDUIT (HPDE)		
TRADE SIZE	OVER 2 WIRES 40% ($IN.^2$)	TOTAL AREA 100% ($IN.^2$)
1	0.333	0.832
$1\frac{1}{2}$	0.794	1.986
2	1.316	3.291
3	2.907	7.268
4	5.022	12.554
5	7.904	19.761

TABLE EV-15.41B

DIMENSIONS OF INSULATED CONDUCTORS AND FIXTURE WIRES	
THHN SIZE (AWG OR KCMIL)	APPROXIMATE AREA (IN^2)
12	0.0133
10	0.0211
8	0.0366
6	0.0507
4	0.0824
2	0.1158
1/0	0.1855
2/0	0.2223
3/0	0.2679
4/0	0.3237
250	0.3970
300	0.4608
350	0.5242
400	0.5863
500	0.7073

REFERENCES:

A. SEE CEC CHAPTER 9 TABLE 4, MOST RECENT EDITION.

B. SEE CEC CHAPTER 9 TABLE 5, MOST RECENT EDITION.

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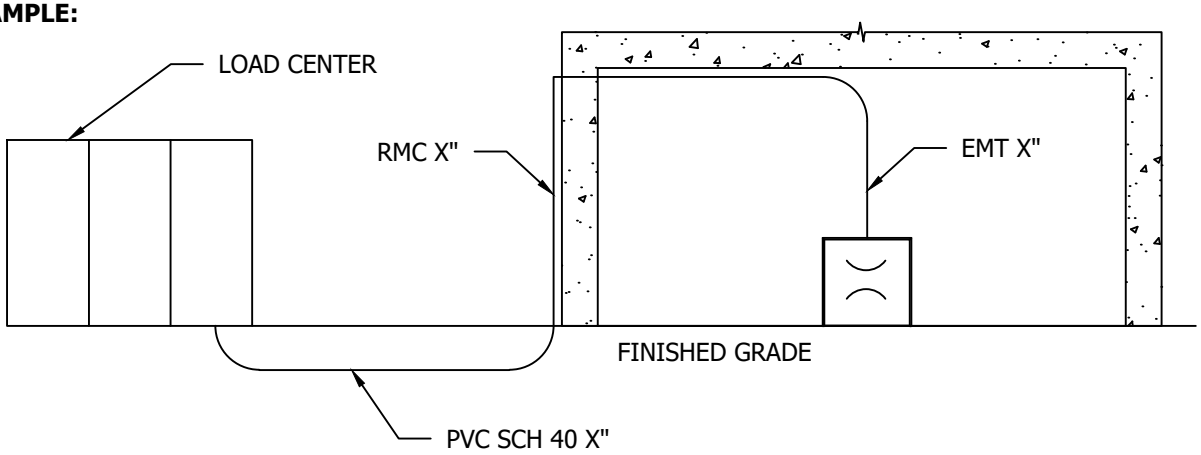
CONDUIT FILL:

USING THESE TABLES THE DESIGNER IS ABLE TO DETERMINE THE MINIMUM SIZED CONDUIT REQUIRED FOR ANY COMBINATION OF APPROPRIATELY RATED CIRCUIT WIRING. TO DO THIS THE SUM OF THE CROSS SECTIONAL AREA AND COUNT OF THE WIRE SIZES IS COMPARED TO THE SMALLEST PERCENTAGE FILL ALLOWABLE.

NOTE: MOST ALL EV CIRCUIT INSTALLATIONS WILL BE OVER 2 WIRES AND 40% FILL CROSS SECTION AREA WILL BE THE MOST COMMON ALLOWED CONDUIT FILL.

EXAMPLE:



DC FAST CHARGER IS 50kVA 3P 4W AT 208V WITH 150A BREAKER FEEDING THE CIRCUIT. THIS REQUIRES (4) #2 + (1) #6 GND THHN WIRES.

(4) #2 THHN: 4 X 0.1158 SQ IN.
(1) #6 THHN: 1 X 0.0507 SQ IN
TOTAL: 0.5139 SQ IN

COMPARISON OF CROSS SECTIONAL AREAS (SQ IN)			
CONDUIT	1"	1-½"	2"
PVC SCH 40	0.333	0.794	1.310
EMT	0.346	0.814	1.342
RMC	0.355	0.829	1.363

BY COMPARISON OF THESE CROSS SECTIONAL AREA OF CONDUCTORS TO THAT OF THE 40% FILL OF CONDUIT SIZES WE CAN DETERMINE THAT 1" CONDUIT IS INSUFFICIENT FOR PVC SCH 40, EMT, AND RMC. THIS BRANCH CIRCUIT WILL REQUIRE AT LEAST 1-½" SIZE CONDUIT FOR ANY OF THESE CONSTRUCTIONS.

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SDG&E ELECTRIC VEHICLE CHARGING STATION STANDARDS

CEC CONDUIT FILL CALCULATIONS AND TABLE

EV15.42

TABLE EV-15.50

VOLTAGE, PHASE, # OF POLES	MAXIMUM CONTINUOUS AMPS (FULL LOAD)	MAXIMUM POWER (kVA)	CIRCUIT BREAKER AMPERE RATING
120V, 1Ø, 1P	0.0-16.0	1.92	20
120V, 1Ø, 1P	16.01-20.0	2.40	25
120V, 1Ø, 1P	20.01-24.0	2.88	30
240V, 1Ø, 2P	0.0-16.0	3.84	20
240V, 1Ø, 2P	16.01-20.0	4.80	25
240V, 1Ø, 2P	20.01-24.0	5.76	30
240V, 1Ø, 2P	24.01-32.0	7.68	40
240V, 1Ø, 2P	32.01-40.0	9.60	50
240V, 1Ø, 2P	40.01-48.0	11.52	60
240V, 1Ø, 2P	48.01-56.0	13.44	70
240V, 1Ø, 2P	56.01-64.0	15.36	80
240V, 1Ø, 2P	64.01-80.0	19.20	100
208V, 1Ø, 2P	0.0-16.0	3.84	20
208V, 1Ø, 2P	16.01-24.0	5.76	30
208V, 1Ø, 2P	24.01-32.0	7.68	40
208V, 1Ø, 2P	32.01-40.0	9.60	50
208V, 1Ø, 2P	40.01-48.0	11.52	60
208V, 1Ø, 2P	48.01-56.0	13.44	70
208V, 1Ø, 2P	56.01-64.0	15.36	80
208V, 1Ø, 2P	64.01-80.0	19.20	100
480V, 1Ø, 2P	0.0-16.0	7.68	20
480V, 1Ø, 2P	16.01-24.0	11.52	30
480V, 1Ø, 2P	24.01-32.0	15.36	40
480V, 1Ø, 2P	32.01-40.0	19.20	50
480V, 1Ø, 2P	40.01-48.0	23.04	60
480V, 1Ø, 2P	48.01-56.0	26.88	70
480V, 1Ø, 2P	56.01-64.0	30.72	80
480V, 1Ø, 2P	64.01-80.0	38.40	100

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B	COMPLETELY REVISED	-	JES	JES	CZH	10/09/2020	E						
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TABLE EV-15.51

VOLTAGE, PHASE, # OF POLES	MAXIMUM CONTINUOUS AMPS (FULL LOAD)	MAXIMUM POWER (kVA)	CIRCUIT BREAKER AMPERE RATING
208V, 3Ø, 3P	0.0-16.0	5.76	20
208V, 3Ø, 3P	16.01-24.0	8.64	30
208V, 3Ø, 3P	24.01-32.0	11.52	40
208V, 3Ø, 3P	32.01-40.0	14.41	50
208V, 3Ø, 3P	40.01-48.0	17.29	60
208V, 3Ø, 3P	48.01-56.0	20.17	70
208V, 3Ø, 3P	56.01-64.0	23.05	80
208V, 3Ø, 3P	64.01-80.0	28.82	100
208V, 3Ø, 3P	80.01-160.0	57.64	200
208V, 3Ø, 3P	160.01-240.0	86.46	300
208V, 3Ø, 3P	240.01-320.0	115.28	400
208V, 3Ø, 3P	320.01-480.0	179.92	600
480V, 3Ø, 3P	0.0-16.0	13.30	20
480V, 3Ø, 3P	16.01-24.0	19.95	30
480V, 3Ø, 3P	24.01-32.0	26.60	40
480V, 3Ø, 3P	32.01-40.0	33.25	50
480V, 3Ø, 3P	40.01-48.0	39.90	60
480V, 3Ø, 3P	48.01-56.0	46.55	70
480V, 3Ø, 3P	56.01-64.0	53.20	80
480V, 3Ø, 3P	64.01-80.0	66.50	100
480V, 3Ø, 3P	80.01-120.0	99.76	150
480V, 3Ø, 3P	120.01-160.0	133.01	200
480V, 3Ø, 3P	160.01-200.0	166.27	250
480V, 3Ø, 3P	200.01-240.0	199.52	300
480V, 3Ø, 3P	240.01-320.0	266.03	400
480V, 3Ø, 3P	320.01-400.0	332.54	500
480V, 3Ø, 3P	400.01-480.0	399.05	600
208V, 3Ø, 3P	(CB X 0.8)	(CB * 0.8) * 208 * 1.732	CB
480V, 3Ø, 3P	(CB X 0.8)	(CB * 0.8) * 480 * 1.732	CB

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REV	CHANGE	DR	BY	DSN	APV	DATE	REV	CHANGE	DR	BY	DSN	APV	DATE
C	2022 REVISION	ARC	JES	IPJ	KRG	07/22/2022	F						
B	COMPLETELY REVISED	-	JES	JES	CZH	10/09/2020	E						
A	ORIGINAL EDITION	-	JK	JS	MDJ	12/7/2017	D						