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H  F								Broadway Window St Window St Window St Window St Broadway Window St Window St Broadway Window St Undow St Dames St Undow St Dames St Undow St Dames	Harbor Café
E								Seabright Santa Cruz Museum of Natural History Seabright State Beach Walton Light	Aldo's Harbor nta Cruz Harbor Twin Lakes State Beach house
								GENERAL NOTES	
								1. ALL WORK SHALL CONFORM WITH ALL APPLICABLE LOCAL, STA	TE, AND NATIONAL CODES.
								<ol> <li>ALL DIMENSIONS ARE APPROXIMATE. THE DRAWINGS ARE DIAG FITTINGS, OFFSETS, ETC. ARE NOT SHOWN. THESE DRAWINGS CONTRACTOR. CONTRACTOR SHALL VERIFY ALL DIMENSIONS I PIPING, PENETRATIONS, CONDUIT, WIRING, AND ALL COMPONEI</li> </ol>	GRAMMATIC TO THE EXTENT THAT ALL ARE FOR THE GUIDANCE OF THE IN THE FIELD FOR FABRICATION OF THE INTS INTO A COMPLETE AND OPERABL
D								<ul> <li>SYSTEM.</li> <li>4. WHERE DISCREPANCIES OCCUR BETWEEN THE PLANS AND SPI OWNER AND ENGINEER OF ANY DISCREPANCIES IN WRITING. A DOCUMENTS WITHOUT A DETERMINATION BY THE OWNER SHAIL</li> </ul>	ECIFICATIONS CONTRACTOR SHALL N ANY ADJUSTMENT OF THE CONTRACT LL BE AT THE CONTRACTOR'S OWN R
								<ul> <li>AND EXPENSE. THE MOST STRINGENT REQUIREMENTS SHALL A</li> <li>5. PRIOR TO SUBMITTING PROPOSAL, BIDDER SHALL EXAMINE ALL SHALL HAVE HAD VISITED THE CONSTRUCTION SITE. HE SHALL CONDITIONS UNDER WHICH HE WILL HAVE TO OPERATE AND W UNDER THIS CONTRACT. NO SUBSEQUENT ALLOWANCE WILL B THE CONTRACTOR FOR ANY ERROR OR NEGLIGENCE ON HIS PARTY</li> </ul>	APPLY AS DETERMINED BY THE OWNE - GENERAL CONSTRUCTION DRAWING - BE FAMILIAR WITH THE EXISTING /HICH WILL IN ANY WAY AFFECT THE W 3E MADE IN THIS CONNECTION IN BEH/ PART.
								<ol> <li>ALL DEVICES &amp; EQUIPMENT ARE NEW, UNLESS OTHERWISE NO</li> <li>THE PLANS AND SPECIFICATIONS DO NOT UNDERTAKE TO SHO BUT RATHER TO DEFINE THE REQUIREMENTS FOR A FULL AND OF THE END LISER FOR THIS REASON WHEN AN ITEM NOT SHO</li> </ol>	TED. W OR LIST EVERY ITEM TO BE PROVID WORKING SYSTEM FROM THE STANDF WN OR LISTED IS CLEARLY NECESSA
FOLD	-							<ul> <li>FOR PROPER CONTROL/ OPERATION OF EQUIPMENT WHICH IS S WHICH WILL ALLOW THE SYSTEM TO FUNCTION PROPERLY AT N</li> <li>8. INSTALL NAMEPLATES ON ALL EQUIPMENT WITH DESCRIPTION I ENGINEER</li> </ul>	SHOWN OR LISTED, PROVIDE AN ITEM NO INCREASE IN PRICE.
C								<ol> <li>COORDINATE EQUIPMENT LOCATIONS, CONTROL AND POWER V POINTS.</li> <li>NEW GENERATOR FLIEL TYPE TO BE DETERMINED BY OWNER C</li> </ol>	WIRING REQUIREMENTS AND CONNEC
TR								<ol> <li>GENERATOR VENDOR SHALL COMPLETE AND SUBMIT ALL REQU DOCUMENTATION TO THE LOCAL AIR QUALITY DISTRICT FOR GE</li> <li>CONTRACTOR SHALL SUPPLY INSTALL AND CONNECT THE CRU</li> </ol>	JIRED APPLICATION AND ENERATOR PERMITTING.
JOB #: 19-140.01								PER THE BACK-FEED ONE LINE DIAGRAM. THE INTENT OF THIS STANDBY SYSTEM FOR THE EXISTING STANDBY LOADS AS TO TO BE COMPLETELY REMOVED AND REPLACED. THIS WORK SH FOLLOWING.	WORK IS TO PROVIDE A RELIABLE ALLOW THE EXISTING STANDBY SYSTI HALL INCLUDE BUT NOT LIMITED TO TH
РLОТТЕD: 10/05/20								a) TRACE ALL CIRCUITS PRESENTLY SUPPLIED BY THE FUSED "EM". DETERMINE THE TYPE OF LOAD AND LOCATION FOR PG&E AS TO WHICH LOADS REQUIRE BACK-FEEDING DURIN SYSTEM.	DISCONNECT AND DISTRIBUTION PAN ALL ACTIVE CIRCUITS. CONSULT WITH JG CONSTRUCTION OF THE NEW STAN
BY: Alonzo DATE I								<ul> <li>b) INSTALL NEW TEMPORARY FEEDERS AND BRANCH CIRCUIT REQUIRING BACK-FEEDING. BACK-FEED CONNECTION TO E OF CONSTRUCTION.</li> </ul>	IS TO THE LOADS IDENTIFIED AS 3E MADE AT A LOCATION BEYOND THE
E SAVED: 10/05/20								<ul> <li>c) PROVIDE AND INSTALL PROTECTION, BARRIERS AND SIGNA EQUIPMENT AND CONDUCTORS. PG&amp;E TO REVIEW AND AP INSTALLATION.</li> <li>d) THE TEMPORARY DISTRIBUTION INSTALLATION SHALL COM</li> </ul>	PROVE PROTECTION PLAN PRIOR TO
a Cruz\Design\E001.dwg DA								<ul> <li>e) ANY INTERRUPTIONS TO EXISTING EQUIPMENT REQUIRED PG&amp;E PRIOR TO THAT WORK BEING PERFORMED.</li> <li>f) ALL TEMPORARY CONDUCTORS TO BE LISTED FOR TEMPOF PER 2019 C.E.C., ARTICLE 310.</li> </ul>	BY THIS WORK MUST BE APPROVED B
<ul> <li>Multi Sites\Sant</li> </ul>			<b></b>		1 1 1	- <b>1</b>		IJ. VERIFY ALL EQUIPMENT STUB-UP LOCATIONS.	
us\RSA\PC&E\Gen Resiliency			C 20201005 PLAN C				JOB NO 19-140.01 DSGN . DWN . CHKD . SUPV ABVD 1	No. E 49 20 Exp. 6/31/21	IFIC GAS AND ELECTI RANCISCO, CALIFORNIA
Z:\Drafting\Jc	ARCH e1size	1 2	B         20200702         GEN. D           A         20200624         GENER           REV         DATE	ATOR LOCATION DESCRIPTION	DSGN DWN CH	KD SUPV APVD	APVD 2 DATE 20201005 4	$\begin{array}{c c} & & & \\ \hline \\ \hline$	6





						JOB NO DSGN DWN	19-140.01	Stell PROFESS WAY	PG <mark>&amp;</mark> E	CRESS Corporate Real Estate Strategy and Services	CORPORATE PACIFIC SAN FRAN	REAL ESTATE STRATEGY AND S CAS AND ELECTR CISCO, CALIFORNIA
						CHKD SUPV APVD 1		No. E. 4920 Exp. 6/35/21 ★ CP. F. 6/35/21 ★	R <sub>1</sub> / <sub>A</sub> S	Rose Sing and Asso Electrical Consultant 131 S. Dunworth St. • Visalia, CA	ciates, Inc. s A 93292-6705	
DSGN	DWN	CHKD	SUPV	AF	 VD	APVD 2 DATE	20200908	0F CALLF0 10/5/2020	- ΥΛ	Phone: (559) 733-267	1	
						4	٥	٥	5			6

	DISCIPLINE	ELECTRICAL	GENERATOR RESILIENCY DESIGN					
١Y	FACILITY TYPE	SERVICE CENTER						
	FACILITY NAME	SANTA CRUZ SERV. CNTR.						
	SITE ID	346202	SITE PLAN - EXISTING/DEMOLITION					
	BUILDING ID							
	BUILDING NAME							
	FLOOR ID		HER CLASSIFICATION (CRESS) = SSIGNIFICA					

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				DSGN .	 SED PROFESSO	PG&E Corporate I	RESS e Real Estate Strategy and Services	PACIFIC SAN FRAN	C GAS AND ELECTRIC	COMPANY	FACILITY TYPE	SERVICE CENTER		GENERAI	OK KESILIENGY DESIGN
				CHKD .			Sing and Asso	oiatos Inc			SITE ID	346202		S	ITE PLAN - NEW
				APVD 1	★ Exp. 6/30/21 ★	R = {A S	Electrical Consultants 131 S. Dunworth St. • Visalia, CA Phone: (559) 733-2671	s A 93292-6705			BUILDING NAME		TIER		TION (CRESS) - 3 SIGNIFICANT
DSGN		/ AP	l VD	DATE 20200908	 0F CALIT 10/5/2020	I					ORDER NO			615 7TH AVE	E., SANTA CRÚZ, CA 95062
				4		5			6			7	8		9

 THE CONTRACTOR SHALL IDENTIFY ALL EXISTING POLE MOUNTED SITE LIGHTING FIXTURES THAT ARE CONNECTED TO UTILITY SECONDARY CIRCUITS INDEPENDENT FROM THE SYSTEMS BEING BACKED UP BY THE WORK IN THIS PROJECT. THE CONTRACTOR SHALL INSTALL A 1"C - 2 #8 + 1 #8 GND. FROM A 20 AMP, 1 OR 2 POLE CIRCUIT BREAKER INSTALLED IN THE NEAREST PANEL BACKED UP BY THE CURRENT PROJECT AND EXTEND THIS CIRCUIT TO THE EXISTING LIGHT FIXTURE AND CONNECT. THE CONTRACTOR SHALL VERIFY THE EXISTING FIXTURE OPERATING VOLTAGE. ALL REQUIREMENTS SET FORTH IN THE PROJECT PLANS AND SPECIFICATIONS SHALL APPLY TO THIS WORK. THE CONTRACTOR SHALL COORDINATE WITH THE PG&E FOR THE DISCONNECTING OF THE LIGHT FIXTURE FROM THE EXISTING

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DSGN	DWN	CHKD	SUPV	AF	VD	DATE	20201005		10/5/2020					
						APVD 2			OF CALIFOT	<i>-</i> ζA	Phone: (559) 733-267	1		
						APVD 1			EVECTRICA MAR	KX	Electrical Consultant 131 S. Dunworth St. • Visalia, C.	s A 93292-6705		
						SUPV			Exp. 6/3//21	m ra	$\sim$ Rose Sing and Asso	ciates, Inc.		
						CHKD	•		No. E 49 00					
						DWN	•				Corporate Real Estate Strategy and Services	SAN FRAN	ICISCO, CALIFORNIA	
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AND ELECTRIC COMPANY EMPLOYEES AND ITS AGENTS. INDEX OF SHEETS DRAWING NUMBER XXXX-GXXX-XX	
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DSGN . JOB NO 19-140.01 DSGN . CRESS PACIFIC GAS AND E								DWN	•	/	PO TO		Corporate Real Estate Strategy and Services	SAN FRAN	ICISCO, CALIFORNIA
JOB NO 19-140.01								DSGN	•		EP PROFESSO	DCOE	<b>UKEDD</b>	PACIFIC	GAS AND ELECTR
								JOB NO	19-140.01			®	CDECC	CORPORATE	REAL ESTATE STRATEGY AND SE

4 EXISTING SECONDARY CONDUITS. PULL NEW CABLE THROUGH EXISTING CONDUITS PER FEEDER

12 GENERATOR AND ATS MONITORING AND GENERATOR START CIRCUITS PER DETAIL #1/E502. 13 TO PG&E COMMUNICATION FACILITIES FOR STANDBY SYSTEM MONITORING PER DETAIL #1/E502.

15 1"C - 4 #12 + 1 #12 GND. + 1"C SPARE FOR GENERATOR BLOCK HEATER, BATTERY CHARGER, SERVICE AND GENERATOR SWITCHBOARD HEATERS AND LIGHT FIXTURES.

17 AUX. POWER PANEL TRANSFORMER PRIMARY FEEDER TO (N) DIST. SWBD #1 EQUIPMENT PER ONE-LINE DIAGRAM.

19 NEW UTILITY TRANSFORMER PAD, GROUNDING AND GUARDPOST PER PG&E REQUIREMENTS.



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		®					
	LAED PROFESS WAY	PG <mark>&amp;</mark> E	CRESS Corporate Real Estate Strategy and Ser	PACIFI vices SAN FRA	C GAS AND EL NCISCO, CALIFORN	ECTRIC C	s OMP
	No. E 48 20 Exp. 6/31/21	R ={A S	Rose Sing and A Electrical Cor 131 S. Dunworth St. • Via Phone: (559) 7	SSOCIATES, INC. Isultants salia, CA 93292-6705 733-2671			
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JOB NO 19-140.01

DSGN

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SUPV

DSGN DWN CHKD SUPV APVD DATE 20200908

APVD 1 APVD 2

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— <u>(E) SERVICE #5 1</u> 120/240V, 1PH, 3W, 100A

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NORTH

PB1

(N) XFMR "T-S4" 75kVA (E) SERVICE #4 120/240V, 1PH, 3W, 100A

- (3)



5 EXISTING SECONDARY CONDUITS. PULL NEW CABLE THROUGH EXISTING CONDUITS PER FEEDER SCHEDULE.

10 NEW 38"W x 91"H x 20"D JUNCTION BOX, ANCHOR SIMILAR TO DETAIL #3/E502. CAPTURE EXISTING FEEDERS TO SWITCHBOARD "WH" AND EXTEND TO NEW SWITCHBOARD "S1".

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AND ELECTRIC COMPANY EMPLOYI	EES AND
ITS AGENTS.	
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		JOB NO 19-140.01 DSGN . DWN .	ASS PROFESSION	PGE CCRESS Corporate Real Estate Strategy and Services CORP	DRATE REAL ESTATE STRATEGY AND SERVICES CIFIC GAS AND ELECTRIC COMF FRANCISCO, CALIFORNIA
		CHKD         .           SUPV         .           APVD 1         .           APVD 2         .	No. E 4920 Exp. $6/31/21$ $\checkmark$ OF CALIFORN $OF CALIFORN$	Rose Sing and Associates Electrical Consultants 131 S. Dunworth St. • Visalia, CA 93292-6705 Phone: (559) 733-2671	Inc.
DSGN DWN (	CHKD SUPV A	PVD DATE 20200908	10/5/2020	5	6



SEE DETAIL #2/E502 FOR EQUIPMENT SPECIFIC GROUNDING AND BONDING REQUIREMENTS.

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APPROX. S	CALE:	1/4"	=	1'



FLOOR ID ORDER NO TIER CLASSIFICATION (CRESS) - 3 SIGNIFICANT 615 7TH AVE., SANTA CRUZ, CA 95062





DR, TYP.	
	3"
	3/8" DIA. MOUNTING HARDWARE, 55 LBS 75 LBS 7
ATOR WEIGHT: 39,731 LBS.	3" DIA. GALV. STEEL PIPE & POST
ENSIONS SHOWN ARE TYPICAL ON GENERATOR SELECTED.	WITH PVC TAPE WHERE IN CONTACT WITH CONCRETE.     SIGNAL T.C.     AUX. POWER       PANEL     PANEL
	WEATHER-RESISTANT G.F.C.I.
	WITH 1-GANG DIECAST WEATHERPROOF "WHILE-IN-USE" COVER.
	B-LINE B22 FRAMING CHANNEL,
ANCHORING AND CONCRETE PAD PER STRUCTURAL DRAWINGS.	3/8" DIA. PIPE CLAMP, TYPICAL.
	SEE DETAIL #7/E501 FOR EXPOSED CONDUIT TRANSITION
	CONCRETE PAD PER
	18" DIA. x 24" DP. CONCRETE
NTS	(3) <u>NEW EQUIPMENT ELEVATION - GENERATOR PANELS</u>
· · · · · · · · · · · · · · · · · · ·	
	JOB NO 19-140.01 DSGN DSGN DSGN DSGN DSGN DSGN DSGN DSGN
	DWN     .       CHKD     .       SURV     No. E 4920       SURV     .
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<b>2</b> 4"		38" 30"	≁4"≠4"≠	38" 30"	¥4"¥4"¥	— 38" — — — — 4" — 4" —	2 24" <b>≁</b> 30"	
CONDUIT SPACE		CONDUIT SPACE		- — — — — — — —				
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		JOB NO 19-140.01		®	CDECC	CORPORATE	E REAL ESTATE STRATEGY AND SERVICES		DISCIPLINE	ELECTRICAL	
		DSGN .	ALL PROFESSION PROFESSION		<b>UKED</b>	PACIFI	PACIFIC GAS AND ELECTRIC COMPANY		FACILITY TYPE	SERVICE CENTER	_
		DWN .			Corporate Real Estate Strategy and Services	es SAN FRAN	NCISCO, CALIFORNIA		FACILITY NAME	SANTA CRUZ SERV. CNTR.	
		CHKD .							SITE ID	346202	-
		SUPV	Exp. 6/3/ /21	R A F	Rose Sing and As	sociates, Inc.		BUILDING	BUILDING ID		
		APVD 1	OF CALIFORNIA		Electrical Consult 131 S. Dunworth St. • Visalia Phone: (559) 733-	ultants Ilia. CA 93292-6705			BUILDING NAME		
		APVD 2				3-2671			FLOOR ID		
DSGN DWN CH	HKD SUPV APVD	DATE 20200908	10/5/2020						ORDER NO		_
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(E) SERVICE #1 - PG&E METER #1010047478 MAX DEMAND PER UTILITY COMP. RECORDS	A	
ADJUSTMENT PER C.E.C. SECTION 220.87	124 kVA	(345 AMPS @
(E) SERVICE #2 - PG&E METER #1009552553 MAX DEMAND PER UTILITY COMP. RECORDS 7.8 kVA	٨	
ADJUSTMENT PER C.E.C. SECTION 220.87	10 kVA	(27 AMPS @
(E) SERVICE #3 (CNG) - PG&E METER #NO DATA MAX DEMAND PER UTILITY COMP. RECORDS 21 kVA	۱.	
ADJUSTMENT PER C.E.C. SECTION 220.87	26.25 kVA	( 63 AMPS @
(E) SERVICE #4 - PG&E METER #(NONE) MAX DEMAND PER UTILITY COMP. RECORDS NO DATA	N	
ESTIMATED CONNECTED LOAD	17 kVA	(71 AMPS @
(E) SERVICE #5 - PG&E METER #(NONE) MAX DEMAND PER UTILITY COMP. RECORDS NO DATA	١	
ESTIMATED CONNECTED LOAD	17 kVA	(71 AMPS @
LOAD CALCULATION - STANDBY SYSTEM:		
	194 kVA	
TOTAL		
TOTAL	291 kVA	

$\bigcirc 1$	EXISTING EQUIPMENT TO BE REMOVED.
2	DISCONNECT METER SOCKET FROM LINE FEEDER AS SHOWN. SEAL EXISTING MET
3	PG&E TO REMOVE EXISTING PAD MOUNT
4	PG&E TO REMOVE EXISTING SECONDARY
5	PRIMARY DUCT PAD, GROUNDING ELECTF PG&E REQUIREMENTS.
6	GROUND AND BOND PER DETAIL #2/E502.
7	NEW ATS TO BE ASCO #4ADTSA3800N5X V BE INSTALLED IN NEW SWITCHGEAR BY S
8	SPACE AND HARDWARE FOR TWO ADDITION
9	TWO 3" CONDUIT STUB-OUTS.
10	TWO 4" CONDUIT STUB-OUTS FOR PV SYS
(11)	CIRCUIT BREAKER FRAME SIZE TO ACCOM
12	NEW TRANSFORMER TO BE INSTALLED IN
13	SEE PANEL SCHEDULE.
14	CONTRACTOR TO CONNECT LOAD SIDE O PANEL AS SHOWN.
15	CONTRACTOR TO VERIFY EXISTING EQUIF 250 REQUIREMENTS.
16	EXISTING SECONDARY CONDUITS. PULL I SCHEDULE.
17	TERMINATE EXISTING FEEDER CABLES TO REQUIRED. SPLICES ARE TO BE MADE US TON HYDRAULIC PRESS WITH CIRCUMFEF MASTIC LINED HEAT SHRINK TUBING.
18	NEW SWITCHBOARD TO MATCH THE SAME ASSOCIATED WITH THE EXISTING EQUIPM
19	PROVIDE AVAILABLE FAULT CURRENT PER 110.24.
20	PROVIDE IDENTIFICATION OF PRIMARY DIS ARTICLE 450.14.
21	THE CONTRACTOR SHALL PROVIDE A LOC 450.14. THE LOCK OFF DEVICE SHALL BE BREAKER AND BE SPECIFIC FOR THAT FR

NTS

## FEEDER SCHEDULE:

< 50G >	1"C - 3 #8 + 1 #10 GND (
125G	2"C - 3 #2 + 1 #6 GND (C
350G	3"C - 3 #350 kcmil + 1 #2
(400GS)	3"C - 3 #500 kcmil + 1 #1
(100GN)	2"C - 4 #2 + 1 #8 GND (C
200GN	2"C - 4 #3/0 + 1 #6 GND
800GN	TWO 4"C - 4 #500 kcmil
(100GN1)	2"C - 3 #2 + 1 #8 GND (C

NTS

# GENERATOR RESILIENCY DESIGN

ONE LINE DIAGRAMS

TIER CLASSIFICATION (CRESS) - 3 SIGNIFICANT 615 7TH AVE., SANTA CRUZ, CA 95062

# NOTES (THIS SHEET ONLY):

ET FROM LINE SIDE OF MAIN CIRCUIT BREAKER AND CONNECT NEW EXISTING METER SOCKET AND RISER HUB. PAD MOUNT TRANSFORMER.

G SECONDARY CONDUCTORS.

NDING ELECTRODES, GUARDPOST AND SECONDARY DUCTS PER

### TAIL #2/E502.

TSA3800N5X WITH ACCESSORIES 72EE2, 14A, 14B, 18B, 18G. ATS TO CHGEAR BY SWITCHGEAR MANUFACTURER - NOT BY CONTRACTOR. R TWO ADDITIONAL 225A FRAME CIRCUIT BREAKERS.

### S FOR PV SYSTEM CONNECTION.

SIZE TO ACCOMMODATE #500 kcmil CABLE CONNECTIONS. INSTALLED IN PLACE OF EXISTING PG&E TRANSFORMER.

LOAD SIDE OF CIRCUIT BREAKER FORMERLY SUPPLYING ATS TO LOAD

EXISTING EQUIPMENT IS BONDED AND GROUNDED PER C.E.C. ARTICLE

NDUITS. PULL NEW CABLE THROUGH EXISTING CONDUITS PER FEEDER

DER CABLES TO NEW CIRCUIT BREAKERS. EXTEND CABLES AS TO BE MADE USING TIN PLATED COPPER SLEEVES, INSTALLED VIA 10 TH CIRCUMFERENTIAL DIES AND INSULATED WITH HEAVY WALL, TUBING.

ATCH THE SAME QUANTITY AND RATING OF CIRCUIT BREAKERS STING EQUIPMENT.

T CURRENT PER DETAIL #7/E502 TO COMPLY WITH C.E.C. ARTICLE

PRIMARY DISCONNECT PER DETAIL #8/E502 TO COMPLY WITH C.E.C.

PROVIDE A LOCK OFF DEVICE THAT COMPLIES WITH C.E.C. SECTION /ICE SHALL BE BY THE SAME MANUFACTURER AS THE FEEDER CIRCUIT C FOR THAT FRAME SIZE.

D (CU-XHHW-2).

(CU-XHHW-2).

2 GND (CU-XHHW-2).

1 GND (CU-XHHW-2).

(CU-XHHW-2).

D (CU-XHHW-2).

nil + 1 #1/0 GND (CU-XHHW-2) EACH.

(CU-XHHW-2).

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ELECTRIC COMPANY AND IS INTEND	DED FOR		
USE ONLY BY AUTHORIZED PACIFIC	GAS		
AND ELECTRIC COMPANY EMPLOYE	ES AND		
ITS AGENTS.			
INDEX OF SHEETS XXXX-GXXX-X			
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<u>16</u>	100 - GENERAL CONDITIONS FOR ELECTRICAL WORK
	<ul><li>PART 1.00 - <u>ORDINANCES</u>, <u>REGULATIONS AND CODES</u></li><li>A. All work must conform to the requirements which fall within the scope</li></ul>
	of the regulations in the Codes or under the jurisdiction of any of the governing bodies listed.
6	1. The California Code of Regulations, Titles 19 thru 24.
	<ol> <li>The California Electrical Code as applicable under current state and local regulations (latest edition and supplements).</li> </ol>
	3. State Board of Health.
	<ol> <li>CAL-OSHA Regulations.</li> <li>Nothing in these Specifications or shown on the plans, shall</li> </ol>
	relieve the Contractor from full compliance with applicable portions of any of the above regulations pertaining to work which he is installing under this Contract
	B. <u>PERMITS AND FEES</u>
	Pay for and obtain all permits, inspection fees, etc., as required for the completion of all work included in this Contract. Any inspection
	Certificates required shall be obtained and delivered to the Owner.
	Before submitting his bid, the Contractor shall carefully examine the
	this work, along with the Specifications for same in addition to the drawings and Specifications governing the work of this trade. He
	himself with all the site conditions. No subsequent allowances will be made to the Contractor because of his negligence in
	complying with the above or his alleged inability to understand the requirements.
_	D. <u>CONDUCT OF THE WORK</u>
	a superintendent at all times to superintend the work.
	<ul> <li>E. <u>CONTRACTOR'S RESPONSIBILITY</u></li> <li>1. The Contractor shall be responsible for the safety and good</li> </ul>
	condition of all materials and equipment until final acceptance by the Owner. He shall erect and maintain suitable barriers, protective devices lights and warping signs where required for the protection
	of the public and employees about the buildings. He shall be fully responsible for any loss or injury to persons or property resulting
	<ol> <li>All requests for quotation documents supplied shall be</li> </ol>
	accompanied by disclaimer. F. SUBMITTALS
	<ol> <li>Shop drawings of power and signal service and distribution equipment and lighting fixture catalog cuts shall be submitted</li> </ol>
_	electronically for approval.
	orderly fashion with title sheet including Project, Engineer and Contractor, table of contents and indexed tabs dividing each
	group of materials or item of equipment. All items shall be identified by the specification paragraph number for which they are proposed. All equipment shall also be identical by the mark
	number as indicated on drawings. 3. Equipment or material furnished or incorporated in construction
	without prior approval of the Owner may be rejected and if rejected shall be removed from the structure and replaced with
	G. <u>RECORD DRAWINGS</u>
	See General Conditions.
	H. <u>CATALOG DATA AND OPERATING INSTRUCTIONS</u> Upon completion of the work in this Contract, the Owner shall be
_	furnished with a complete set of catalog data which describes each piece of equipment installed under this Contract. Two hard copies and one digital copy shall be provided.
	I. LOCATIONS
	<ol> <li>The work as laid out is to some extent diagrammatic, and the location thereon indicated may be approximate only. The Contractor, therefore, shall install all the againment, apparetus</li> </ol>
	conduit runs and the like as follows:
	<ul><li>b. Maintain ample head room in all rooms and passageways,</li></ul>
	clearance around all apparatus and equipment and under pipe lines for unrestricted passage and for easy servicing of all apparatus, equipment, devices and the like.
	c. Verify the exact locations of all fixtures and other apparatus or devices as indicated on the drawings. In the event these
	drawings do not sufficiently indicate the locations for all such fixtures, apparatus or devices, the Contractor shall obtain the exact locations from the Owner
	J. <u>VERIFICATION OF DIMENSIONS</u>
	<ol> <li>The Contractor shall, as work progresses, verify the dimensions of the spaces available for the installation of the work and he</li> </ol>
-	grading of each portion thereof.
	<ol><li>Where the work requires connections to be made to equipment that is furnished and set in place by others, the Contractor shall obtain exact locations and rough-in dimensions from the</li></ol>
	manufacturer of such equipment and he shall install the connections in a neat and workmanlike manner.
	K. <u>CUTTING AND PATCHING</u>
	installation of the equipment and materials as approved by the Owner and/or Engineer. All patching shall accurately match the
	L. <u>BORING</u>
	<ol> <li>Provide mechanical boring equipment to bore under existing asphalt, concrete, or other surfaces or objects as noted on the</li> </ol>
	drawings. All borings shall be a minimum of 24" under the substrate material unless otherwise authorized by the Owner.
	<ol> <li>Holes shall be bored not to exceed 1" larger diameter than the largest component remaining in the excavation.</li> </ol>
	<ol><li>Water or air pressure jetting are not permitted, unless they comply with the following requirements:</li></ol>
	a. All surfaces of the hole can be visually inspected with 6' maximum length.
	<ul> <li>All objects shall be supported continuously to prevent sagging.</li> </ul>
	c. The hole shall be filled with compacted damp sand and inspected by the Project Inspector of Materials Testing Lab
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-	I ne Contractor shall provide all foundations, supports and hangers,
	etc., as required to install the equipment as specified or shown on the drawings. All equipment shall be supported, braced and cross-braced in such manner as to prevent sway and/or lateral movement.
	the Contractor shall provide all foundations, supports and hangers, etc., as required to install the equipment as specified or shown on the drawings. All equipment shall be supported, braced and cross-braced in such manner as to prevent sway and/or lateral movement.
	The Contractor shall provide all foundations, supports and hangers, etc., as required to install the equipment as specified or shown on the drawings. All equipment shall be supported, braced and cross-braced in such manner as to prevent sway and/or lateral movement.
	The Contractor shall provide all foundations, supports and hangers, etc., as required to install the equipment as specified or shown on the drawings. All equipment shall be supported, braced and cross-braced in such manner as to prevent sway and/or lateral movement.

N. EXCAVATION AND BACKFILLING

- 1. Excavating required for the installation of the work shall be done by this Contractor. Underground lines outside the buildings shall be installed with a minimum cover of 24" except depth of utility services shall comply with respective utility company requirements.
- 2. The conduit shall be laid on material described below to afford bearing for the full length of the conduit. Any part of the trench excavated below grade shall be corrected with thoroughly compacted material approved by the Owner.
- 3. When the bottom uncovered at subgrade is soft and, in the opinion of the Owner, cannot support the conduit, a further depth shall be excavated and refilled to conduit foundation grade as required by the Owner.

### 4. Backfill.

- a. 6" Below, Around, and to 6" Above Conduit: Material shall be sand. Place carefully around and on top of conduit, taking care not to disturb conduit. Consolidate with vibrator.
- b. 6" Above Conduit to Grade: Material shall be sandy or silty loam, free of lumps, laid in 6" layers, uniformly mixed to proper moisture and compacted to required density. If backfill is determined to be suitable and required compaction is demonstrated by laboratory test, water compaction in 6" layers may be used, subject to review by Engineer.
- 5. No excavation below the level of, or adjacent to, foundations of footings shall be made except in a manner approved by the Owner.
- A red or yellow tracer tape stating "CAUTION ELECTRIC LINE BURIED BELOW" shall be installed 12" above conduit, full length of trench
- 7. Electrical conduit shall not be run in excavations provided for plumbing or heating pipes, unless separated by a minimum of 12 inches
- Verify location of all underground lines with Owner and utility companies before starting excavation. If any utility company facilities are identified and located within the perimeter of the building, the Contractor shall stop work, promptly notify the Owner and secure his instructions.
- 9. Ten (10) days before doing any excavation or trenching contact "Underground Service Alert", 1-800-642-2444, advise them of work schedule and comply with their recommendations.

### O. CLEANING UP

- 1. The Contractor shall keep the premises free from accumulations of his waste material or rubbish. At the completion of the work, he shall remove all his rubbish, tools, scaffolding and surplus materials from and about the buildings, leaving the premises in a clean condition.
- 2. All exterior surfaces of exposed equipment and material shall be thoroughly cleaned of all dirt, cement, plaster and other debris, including the exterior surfaces of all conduit, conduit fittings, conduit hangers, insulation and the like.
- 3. all surfaces to be painted shall be carefully wiped or otherwise cleaned; cracks and corners scraped out clean, grease and oil spots removed so that surfaces may receive paint without further preparation.
- 4. All fixtures and plated materials shall be thoroughly cleaned and polished

### P. DAMAGE BY BREAKS

The Contractor shall be responsible for all damage to any part of the premises caused by breaks in conduit or fixtures furnished and/or installed by him under this specification for a period of one (1) year from date of acceptance of the project by the Owner.

### Q. SITE CONDITIONS

- 1. Where existing utilities are shown on the plans, extreme care shall be exercised in excavating near these utilities to avoid any damage thereto, and the Contractor shall be held responsible for any such damage caused by this operation.
- The general location and arrangement of conduit, equipment, apparatus, etc., as shown in the drawings or herein specified and all installations shall be made in accordance therewith. Information on the drawings relative to existing services is approximate only. Minor deviations required to conform to actual locations shall be made without additional cost to the Owner.
- 3. Should existing utilities not shown on the plans be found during excavations, or identified, the Contractor shall promptly notify the Owner for instructions as to further action. Failure to do so will make the Contractor liable for any damage there arising from his operations after discovery of such not utilities not shown on the plans. These utilities shall be removed or relocated as directed by the Owner. An equitable adjustment in the Contract will be made for the additional work involved.
- 4. The Contractor shall use special precautions where excavations are made in the areas near electrical ducts since they may be high voltage ducts. All such ducts shall be exposed by careful hand excavation so as not to damage the ducts or cause injury to personnel and shall be suitably marked with warning signs, barricades, etc. as required.

### R. STANDARD PRACTICE

All work not shown in complete details shall be installed in conformance with the best standard practice for the trade.

### S. INTENT

It is the intention to provide systems that are complete in every respect without further cost to the Owner. Anything not shown in drawings, or indicated in the specifications, but required for complete operating systems shall be included as part of this Contract. This shall include all connections to existing services.

### T. SPECIAL NOTE

Attention of Contractor is hereby called to all work covered by notes on the drawings. Work covered by notes must be furnished and installed whether it is specifically mentioned in these specifications or

### U. GUARANTEE

Except as otherwise specified, all materials, apparatus equipment furnished and installed under the Electrical Section of this specification shall be new and free from all defects. Should any trouble develop within a period of one (1) year from date of acceptance of the work, due to inferior or faulty material and/or workmanship, the trouble shall be corrected and material and equipment replaced by the Contractor without expense to the Owner.

### V. <u>SERVICES</u>

The location of any existing utility services shown on the drawings is approximate and shall be checked by this Contractor for exact location. Refer to "EXCAVATION AND BACKFILLING" for additional requirements.

### W. LIST OF MATERIALS

Within thirty (30) calendar days after the award of the Contract, the Contractor shall submit seven (7) copies of a complete list of materials to be installed under this Contract, giving, in the case of each item of material to be used, the name of the article. All substitutes must be approved by the Owner as stipulated in Section 01620.

REV	DATE	DESCRIPTION		
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X.	ACCESS OPENINGS			e.	On roof or walk cover w	hen specifically shown on dra	wings.

6. Non-metallic rigid conduit shall be PVC Schedule 40 and may be

f. In masonry walls, not in same cells as rebars.

- a. Underground.
- Below concrete slab on grade
- c. In concrete slab on floors above grade
- d. In masonry walls, not in same cells as rebars

7. Flexible steel conduit may be used in dry locations for final connections to:

- a. Motors, transformers and other mechanical equipment, not to exceed 18 inches.
- b. Lighting fixtures, not to exceed 72 inches.
- c. Facilitate wiring in tight locations, when approved by the Engineer.
- 8. Flexible aluminum conduit may be used in walls or in attics to facilitate wiring in tight locations, when approved by the Engineer.
- 9. Liquid-tight flexible conduit shall be used in outdoor or wet interior locations for final connection to motors or other mechanical
- equipment, not to exceed 18 inches and not subject to physical damage. 10. Fittings:
- a. For rigid and intermediate steel conduits: fittings shall be galvanized rigid steel threaded type. Provide insulated grounding bushings at switchboard enclosures and panel enclosures for feeders.
- b. For electrical metallic tubing (EMT), fittings shall be: Zinc plated steel rain tight compression type installed with gaskets shall be used in all locations. All connectors shall have an insulated throat.
- c. For non-metallic conduits, fittings shall be PVC schedule 40 type. Use PVC schedule 40 adapters at all boxes and panelboards.
- d. Brush or dauber apply PVC cement.
- e. All PVC components (conduits, fittings and cement) shall be of same manufacturer.
- f. For flexible metallic conduits, fittings shall be zinc plated steel/malleable iron squeeze type.
- g. For liquidtight flexible metallic conduits, fittings shall be zinc plated steel/malleable iron compression type.
- h. Use of the following is prohibited:
- i. Crimp-on, tap-on or indenter type fittings.
- ii. Spray (aerosol) PVC cement.
- iii. Set screw couplings and connectors for use with electrical metal tubing (EMT).
- D. PULL BOXES
- 1. Pull Boxes shall meet all code requirements as to size for conduits terminating therein and to thickness of material used in fabrication and shall be weatherproof.
- 2. Weatherproof sheet steel pull boxes shall be fabricated of code gauge galvanized sheet steel with two coats of rust resistant finish and shall be furnished with gasket and made completely weathertight.
- 3. Approved manufacturers for metal boxes are Cooper B-Line, Milbank, Hoffman or approved equal.
- 4. Weatherproof concrete pull boxes, junction boxes and telephone boxes shall be manufactured by Christy Concrete Products, Utility Vault or approved equal. All pull boxes shall be H/20 rated and be equipped with H/20 rated galvanized steel checker plate cover marked "Electrical" or "Signals".
- E. <u>CONDUCTORS 600V (Wire)</u>
- 1. All wire installed in this contract shall be of a standard manufacturer as approved by the National Board of Fire Underwriters and be of the size as indicated on the drawings. All wire shall bear the Underwriter's label and shall be brought to the job in unbroken packages and approved by the Job Inspector before same is installed.
- 2. All power conductors #10 AWG and smaller shall be type THWN copper, unless otherwise noted. All conductors #8 AWG and larger shall be type THWN-2 copper, unless otherwise noted.
- 3. All underground 480 and 480/277 volt power conductors shall be
- type XHHW-2 copper, unless otherwise noted. 4. Number 12 AWG wire shall be the smallest gauge wire used,
- except for signal circuits, which shall be as shown on plans or as specified under other sections of these specifications.
- 5. All wire #8 AWG or larger shall be stranded.
- 6. The neutral conductor of all lighting feeders shall be of the same size as the phase conductors.
- 7. Splices on all wire less than #8 gauge shall be with insulated spring connectors, Ideal "Wing Nuts", 3M "Scotchlok" or equal.
- 8. Splices in wires #8 gauge and larger shall be made with crimp-on solderless connector, Scotch, Burndy or equal. Connectors to switches or bus bar shall be made with one-piece lugs for all wires, sized for conductors as shown on plans.
- 9. Each branch circuit shall be marked with the circuit number at the panel and at the first outlet nearest the panel. E-Z Code Markers (Thomas and Betts) or equal shall be used to label the circuits.
- F. TRANSFORMER, DRY TYPE
- 1. Transformer shall be Class H insulation with temperature rise not exceeding 115 degrees C in a maximum ambient of 40 degrees C, with rated nameplate load connected to the secondary side, at rated voltage. Unless otherwise noted, the transformer shall comply with NEMA TP1, Low Voltage Transformer Standard, in accordance with Title 20 and Assembly Bill 970.
- 2. Transformer shall be built in accordance with the latest revised IEEE, ANSI and NEMA standards.
- 3. Case temperature shall not exceed 35 degrees C above ambient.
- 4. Designs shall incorporate built-in vibration dampening systems.
- 5. Terminal compartment shall be located to insure termination of cable leads in temperature levels not to exceed 60 degrees C and to provide for side or bottom entrance of conduit. Enclosures shall be weatherproof and rodent proof. Ventilation openings shall be louvered type. Screening will not be acceptable.
- 6. Transformer shall be furnished with two taps above and below rated voltage, each 2 1/2%.
- 7. Transformer shall be suitable for non-linear loads and have a UL rating of K-4, when indicated on the drawings.

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- It shall be the responsibility of the Contractor to provide sufficient and convenient access openings, panels, etc., in the building construction where required for the maintenance of, installation and/or removal of all equipment, or other items of the various systems and equipment.
- Y. PURCHASE ORDERS AND ACCEPTANCE
  - 1. The Contractor shall file with the Owner two (2) certified copies of all purchase orders, for materials, equipment, appliances and rentals thereof within two (2) weeks from date of Notice to Proceed with the Contract if requested by the Owner.
  - 2. The Contractor shall file with the Owner two (2) certified copies of acceptance of purchase orders for materials, equipment, and appliances by the manufacturer, distributor or wholesale house within six (6) weeks from the date of Notice to Proceed with the Contract if requested by the Owner.
  - 3. Failure to provide same within the stipulated time shall be deemed sufficient cause for the Owner to withhold certificates of payment for work completed or materials and equipment provided by the Contractor or his subcontractors toward the completion of their Contracts.

END OF SECTION 16100

16200 - BASIC ELECTRICAL MATERIALS AND METHODS PART 1.00 - GENERAL

Drawings and general provisions of Contract, including General and Supplementary conditions, Divisions 0 and 1 and Section 16100 specifications apply to work of this section.

A. SCOPE OF WORK

- 1. This portion of the work includes the furnishing of all labor and materials necessary for the complete wiring system to outlets and all equipment shown on the drawings or covered by this Section of the Specifications and other Division 16 sections of the Specifications. In general, the work includes the following:
- Complete system of conduits, substructures and equipment for power, telephone and cable television services.
- b. Complete system of branch circuit wiring, conduit and
- c. Furnish and install lighting panelboards, lamps, lighting drawings.
- d. All hangers, anchors, sleeves, chases and supports for
- e. Furnish, install and connect wire, conduit and switches, etc. required for other equipment covered by other sections of
- All excavating and backfill as required for electrical work.
- q. The patching and repair of all work modified or damaged by the installation of work under this Contract.
- h. Outlet boxes and conduit system for telecommunications
- (voice and data).
- i. Terminal cabinets and backboards.
- j. Demolition work.
- 2. The Contractor shall furnish and install all work necessary to make complete systems, whether or not such details are mentioned in these Specifications or shown on the drawings, but which are necessary in order to make complete working systems, excepting only those portions that are specifically mentioned therein or plainly marked on the accompanying drawings as being installed by other Contractors.
- 3. Electrical Contractor must coordinate his work with the work of other trades so as to provide raceways, conductors and outlets in the correct location for the equipment served, including all built-in appliances, mechanical, and signal equipment and connect same. Electrical Contractor must provide power of the correct voltage and phase to each item of equipment.
- 4. Before construction starts, the Electrical Contractor shall arrange a coordination meeting with the General Contractor and all other subcontractors supplying equipment that requires electrical connections. All electrical requirements shall be verified and any problems shall be immediately reported to the Owner. Equipment items to verify shall include but not be limited to: Voltage, amps, phase, location, orientation, space requirements, type of connection, starter and disconnect location and provision control system operation and requirements, etc.
- 5. The above list is given for the convenience of the Contractor and is not considered all-inclusive.
- **B. TEMPORARY CONSTRUCTION POWER**
- Provide a temporary construction power system that is adequate for this project. Coordinate requirements and details with the General Contractor. All 120V, 15A and 20A receptacles shall have ground fault circuit interrupter protection.
- PART 2.00 WORK NOT INCLUDED
- A. The furnishing and installation of motors
- B. Access panels.
- PART 3.00 MATERIALS
- A. All materials, appliances and equipment except that furnished by the Owner shall be new, bear U.L. label and of the make, brand or quality specified or as accepted by the Owner as herein provided. This shall also apply to all parts of the work whether or not this particular paragraph is referred to by number.
- B. All apparatus, conduit systems, etc., shall be installed and interconnected so as to form complete systems as herein specified and/or shown on all the accompanying drawings. This Contractor shall furnish and install all work necessary to make complete working systems, excepting only those portions that are specifically mentioned herein or plainly marked on accompanying drawings as as being furnished by other contractors.
- C. RACEWAYS AND FITTINGS
- 1. Shall be as manufactured by Allied Tube and Conduit Corporation, AFC Cable Systems Inc., Carlon, Cantex, PW Pipe or approved
- 2. Galvanized rigid steel conduits (RSC) may be used in all
- 3. For underground runs in direct contact with earth, conduit shall be wrapped with PVC tape or shall have factory applied PVC coating.
- 4. Galvanized intermediate metallic conduit (IMC) may be used in indoor locations not in direct contact with earth.
- 5. Galvanized electrical metallic tubing (EMT) may be used in indoor dry locations in which it is:

- a. Not subject to physical damage.
- b. Not in direct contact with earth.
- c. Not in concrete slabs.
- d. Not in hazardous areas.

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- distribution equipment for lights, receptacles and power.
- fixtures, wall switches, convenience outlets, etc. as shown on
- fixtures, all electrical equipment and materials.
- these Specifications.

### 8. Acceptable manufacturers shall be Square D, General Electric, Eaton, Siemens or approved equal.

PART 4.00 - GENERAL REQUIREMENTS AND INSTALLATION A. <u>CONDUIT SYSTEMS</u>

- PVC 40, galvanized rigid steel wrapped with PVC tape or galvanized rigid steel with factory applied PVC coating shall be used for underground runs.
- 2. Where underground conduit cannot be run below footings the Contractor shall provide PVC-80 sleeves through the footings.
- 3. All conduit risers through slab shall use a rigid steel sweep and riser (wrapped with PVC tape or with factory applied PVC coating).
- 4. All conduit shall be delivered to the site of construction in their original bundles. Each length of conduit shall bear the label of the National Board of Fire Underwriters. All conduit subjected to rough usage while on the job before installation and not acceptable to the Owner shall be removed from the premises upon notice.
- 5. The joints in all conduits installed under concrete slabs on the ground, or underground, or exposed to the weather, shall be made liquid- and gas-tight. All underground conduit outside of the buildings shall be buried to a depth of not less than 24" below finish grade. Utility services shall comply with utility company requirements. Two or more conduit runs installed in a common trench shall be separated horizontally by at least four inches (4"). Electrical conduit runs installed in a common trench with other utility lines shall be separated horizontally from such lines by at least twelve inches (12").
- 6. Changes in direction shall be made with conduit sweep elbows or long radius bends made on the job. Where two or more conduits are grouped in exposed locations, the sweeps shall be struck from the same center forming concentric arcs.
- 7. All joints in conduit shall be made with standard coupling. In making joints, conduits must be truly and accurately cut and threaded (where applicable) with straight thread, smoothly reamed and squarely butted. All conduit shall be kept corked and dry during construction, using plastic caps or conduit pennies held in place with conduit bushings. Should dirt or moisture collect in any conduit, the Contractor shall swab them out to the satisfaction of the Owner.
- 8. All conduits where they enter panel enclosures, pull boxes or outlet boxes shall be secured in place by a galvanized locknut inside of box.
- 9. Where conduits are run exposed, the same shall be installed straight and true with reference to the adjacent construction.
- 10. All empty conduit shall be equipped with a nylon pull rope continuous from outlet to outlet or end-to-end.
- 11. Flexible connections in outdoor and damp locations shall be flexible liquid-tight conduit with water-tight connections.
- 12. The maximum allowed length of flex conduit at equipment connections is 18".
- 12. Expansion joints for conduit shall be provided where required to compensate for thermal expansion and contraction.
- 13. The use of a hole saw for making openings in enclosures is prohibited.
- 14. Any conduit entering underground pull boxes shall be sealed to prohibit water from entering the conduit. Conduits with conductors shall be sealed with a sealing compound after all conductors have been installed. Spare (empty) conduits shall be capped.
- E. CONDUCTOR IDENTIFICATION AND INSTALLATION
- 1. The drawings indicate the arrangement of outlets on each branch circuit and the circuit tags show the number of the circuit and the board to which it will be connected.
- 2. Circuits indicated with the same numbers shall be connected to the same breaker on the panelboard.
- 3. All feeders and branch circuits shall be tagged in all pull boxes and in the gutters of all panels to which they connect.
- 4. All wiring shall be done in identified neutrals.
- 5. No wire shall be installed until all work of other contractors that might cause injury to the said wire has been completed. Care shall be used to pull wires to insure that no damage occurs to the insulation. A wire lubricant shall be used for pulling in wires.
- 6. In making the connection of all branch circuits to the terminals of switches, base plugs, etc., the wires shall be looped around the binding screws or be fitted with connecting lugs. At the ceiling outlets, this Contractor shall leave not less than 6" of free ends on
- 7. No splices shall be permitted except in outlet boxes.

each wire for connections to the fixtures.

8. All power wiring shall be factory color-coded. Colors for each phase and the neutral shall be consistent throughout the system. Color code shall be as follows:

WIRE	120/208V	480Y/277V
Phase A	Black	Brown
Phase B	Red	Orange
Phase C	Blue	Yellow
Neutral	White	Gray
Equip. Ground	Green	Green

- 9. Conductors having white, gray or green covering shall not be used to indicate other than neutral or grounding. This limitation applies to all power, lighting and control circuits.
- 10. Installation of conductors shall be made in a neat and workmanlike manner to meet Code requirements and shall be run continuous without weld, splice or joint between boxes. Do not install wires in conduit unless the entire system of conduit and outlet boxes is permanently in place. All conductors shall be pulled using a UL approved wire lubricant. the bending radius of any conductor shall not be less than what is allowed in C.E.C. Article 312.
- 11. On all bolted electrical connections, the contractor shall use Belleville washers.
- 12. All wiring to be neatly bundled and tied with nylon cord or plastic
- 13. Splices in underground boxes shall be made with crimp-on compression connectors and insulated with heat shrink sleeves or with splice kits listed by the manufacturer for wet locations. Wire nuts are not permitted. Signal system conductors may only be spliced in underground boxes where specifically approved by the Owner
- 14. All cable terminations shall be made using two hole, long barrel, tin plated copper lugs installed with a hydraulic press using circumferential dies. Single hole lugs will be allowed at transformer termination if factory provisions do not allow for two hole lug terminations.
- F. <u>GROUNDING</u>

straps.

1. The conduit system, supports, cabinets, switchboards, etc., and neutral conductors must be permanently and effectively grounded in accordance with Title 24 of the California Code of Regulations. The neutral shall only be grounded at the main service location unless specifically noted otherwise on the drawings or required by the California Electrical Code.

FACILITY TYPE SERVICE CENTER

DISCIPLINE

BUILDING ID

FLOOR ID

ORDER NO

BUILDING NAME

ELECTRICAL

ACILITY NAME SANTA CRUZ SERV. CNTR.

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- 2. This Contractor shall exercise every precaution to obtain good contacts at all panel boxes, pull boxes, etc.; where it is not possible to obtain good contacts, the conduits shall be bonded around the boxes with a #6 AWG gauge conductor with ground clamps.
- 3. All equipment cases, generator frames, etc. shall be completely grounded to satisfy applicable code requirements.
- 4. Pull a green equipment ground conductor in all power conduits, both metallic and non-metallic.
- 5. Each disconnect switch shall have a ground connector (lay-in wire type) which shall be used for grounding the disconnect enclosure. The ground wire shall continue and be connected to the enclosure of the equipment served.

G. MOUNTING HEIGHTS OF EQUIPMENT

- 1. Unless otherwise specified elsewhere or shown on the plans, the following mounting heights shall apply: i. Panelboards: 6'-0" to top of box.
- ii. Disconnect Switches: 4'-0" to center line.
- 2. All equipment support structures shall have framing channel backed,
- .25" thick aluminum plate. 3. The end of all framing channels shall have end caps manufactured
- by the framing channel manufacturer. H. IDENTIFICATION OF SWITCHES AND APPARATUS
- 1. All equipment installed or modified in this project shall be properly identified via engraved nameplates with 3/8" high minimum, white lettering on a red background and resistant to fading per C.E.C. Article 702.7.
- 2. A laminated site plan shall be installed at the service entrance equipment location(s) indicating the location of all power generating equipment. The laminated plan shall be unaffected by the environment where it is installed.
- 3. All equipment and devices shall be labeled as to supply panel and circuit designation.

### PART 5.00 - MISCELLANEOUS

- A. MISCELLANEOUS EQUIPMENT
- 1. Contractor shall be responsible for electrical hook-up and connections to all electrical equipment whether furnished by this Contractor or others, including wiring, conduit, disconnects, circuit breakers, etc., even if not shown on drawings. Verify all locations and requirements with equipment supplier before rough-in.
- B. INTERRUPTION OF SERVICE
- 1. Interruption of service in existing buildings shall not be made at a time which will inconvenience the Owner. Before making any final connections to the existing buildings or doing any other work that will interrupt the service, the Contractor shall consult with the Owner and schedule the work at Owner's convenience even if it is necessary to make such connections after regular working hours.
- 2. This Contractor shall do all rerouting and reconnecting of existing electrical facilities made necessary by this construction. Care shall be taken not to disrupt existing facilities. If any facilities are disrupted, this Contractor shall replace or repair them at his expense and to the satisfaction of the Owner.
- C. GUARANTEE AND TESTS
- 1. All electrical equipment testing and related costs shall be included in the contractor's bid.
- 2. Contractor shall obtain approval from the Owner of proposed independent testing agencies before any testing is started.
- 3. Equipment of all kinds installed by this Contractor shall be tested to determine whether it fulfills the requirements of these specifications. The Contractor shall furnish all labor necessary to adjust the operation of the apparatus and make the connections for the tests. After the tests have been completed, the Contractor shall restore all connections, apparatus, etc., to their original condition.
- 4. All bolted connections in the generator switchboard shall be torque tested by an independent testing agency per NETA requirements
- 5. Should any piece of apparatus or any material or work fail in any of these tests, it shall be immediately removed and be replaced with new material by this Contractor at his expense and the portion of the work replaced be again tested by the Contractor.
- 6. The entire installation shall be free from short circuits and improper grounds. Panels and circuits shall be tested for grounds and shorts. Each individual circuit shall be tested at the panel with the equipment connected for proper operation. Ground tests shall meet the requirements of the California Electrical Code. Upon completion of the work, a final inspection by the Owner and other interested authorities shall be conducted. This Contractor shall guarantee to repair or replace at his expense any material or equipment that develops defects or is determined not to be in conformance with the plans and specifications, during a period of one year after work is accepted by the Owner.
- 7. The Grounding Electrode System at the generator electrical equipment shall be tested by an independent testing agency in accordance with the three point fall of potential method as specified in IEEE Standard 81-1983. Maximum ground resistance shall be 25 Ohms. A copy of the test report shall be submitted to the Owner and engineer of record.
- 8. The independent testing agency performing the above mentioned tests shall be NETA or NICET certified or approved by the electrical engineer
- 9. All feeder cables #2 and larger shall be tested for insulation resistance. Test report must include number of cable per phase and type of cable insulation.
- 10. Three copies of test report shall be submitted to the Electrical Engineer prior to the final job walk.
- F. UTILITY COMPANY SERVICE CHARGES
- All service charges shall be paid by the Owner. Monthly energy charges shall be paid by the General Contractor.
- Remove and/or relocate electrical facilities as required to clear areas
- for new construction.

END OF SECTION 16200

- 16425 SWITCHBOARDS 100% RATED
- PART 1.00 GENERAL

G. DEMOLITION

- A. CONDITIONS AND REQUIREMENTS: 1. Refer to the drawings, general conditions, supplementary conditions,
- and Division 01 requirements.
- B. DESCRIPTION

1. Distribution switchboards (600 volts and below)

# GENERATOR RESILIENCY DESIGN

## **SPECIFICATIONS**

TIER CLASSIFICATION (CRESS) - 3 SIGNIFICANT 615 7TH AVE., SANTA CRÚZ, CA 95062

		ampacity, arrangem
E.	<u>Q</u> L	JALIFICAT
	1.	Manufacti specified experienc

- A. <u>SWITCHBOAI</u>
- 1. Acceptable a. Indust
- B. FABRICATIO 1. Switchboa
- 2. Descriptio Cu Ground
- 3. Bus to be inch, brace
- drawings. 4. All frames
- Provide ac all structure
- 5. Switchboa using elec shall be m drawings.
- Provide fu in unused
- Provide hi
- 8. All power manufact assembly

# Align all sv

- C. MAIN CIRCU
- 1. Individuall 2. 100% Rate
- 3. 65KAIC M 4. Main C.B. insulated
- than 2500. device. 5. Solid State breaker fr
- by insertio so that its employ the
- a. Adjusta
- b. Adjusta
- c. Adjusta

C.	REFERENCES		
	1. American Nation Electricity Meter	nal Standards Institute (ANSI) C12 for ing.	
	2. ANSI C57.13 Re	equirements for Instrument Transformers.	
	3. National Electric Molded Case Ci	al Manufacturers' Association (NEMA) AB1 rcuit Breakers.	G
	4. NEMA PB2 Dea	d Front Distribution Switchboards.	
	5. Underwriters Lal	boratories (UL) UL891	
D.	SUBMITTALS		
	1. Submit shop dra under provisions	iwings for equipment and component devices s of Section 01300.	
	2. Include outline a ampacity, integra	and Support point dimensions, voltage, main bus, ated short circuit ampere rating, circuit breaker	
F	QUALIFICATIONS	d sizes.	
<b>_</b> .	1. Manufacturer: C	Company specializing in manufacturing products	
	specified in this experience.	Section with minimum five years documented	
PART	2.00 - PRODUCTS	<u>}</u>	Η
A.	SWITCHBOARDS -	100% RATED	
	1. Acceptable Man	ufacturers:	
в	a. Industrial Ele	ectrical Mfg. (IEM)	
D.	1. Switchboard for	indoor services, shall NEMA type 1, Switchboards	
	for outdoor servi	ices shall NEMA type 3R.	
	Cu Ground Bus.		
	<ol> <li>Bus to be Silver inch, braced at 1 drawings.</li> </ol>	plated Cu, rated at not more than 1000A per square 100KAIC RMS Symmetrical, ratings as shown on	
	<ol> <li>All frames of Sw Provide added ri all structures.</li> </ol>	ritchboards shall be a minimum of 11 gauge steel. igidity using steel member gussets in all corners of	F
	<ol> <li>Switchboards, in using electrostat shall be manufac drawings.</li> </ol>	ncluding all steel members and boxes, shall be painted tically applied polyester powder coated paint. Color cture's standard gray or specific color as shown on	
	6. Provide full heig	ht Bussing in all sections tapped to accept hardware	
	<ul><li>7. Provide hinged v</li></ul>	wiring gutters for easy access to load side cables.	
	8. All power conne	ctions shall be torqued and marked to equipment	
	manufacturer's s a assembly plant.	specification to insure structure rigidity before leaving	
	9. Align all switchb	oards from the front of the structures	
C.	MAIN CIRCUIT BRE	AKERS	E
	<ol> <li>100% Rated of F</li> </ol>	Frame Size when Mounted in Switchboard.	L
	3. 65KAIC Minimur	m Rating or as noted on Drawings.	
	4. Main C.B.'s rated insulated case d than 2500A shal device.	d at 2500A and larger, Circuit Breaker shall be of the lesign with solid state trip device. Main C.B.'s smaller Il be of the Molded Case type containing solid state trip	
	<ol> <li>Solid State Trip breaker frames. by insertion of in so that its remov employ the follow a. Adjustable G</li> </ol>	Device shall be interchangeable between compatible Continuous ampere rating of breaker determinded iterchangeable rating plug. Rating plug interlocked val automatically trips the breaker. Trip unit shall also wing function as indicated on plans. Ground Fault Pick-Up (G).	
	b. Adjustable L	ong Time Pickup and Delay (L).	
	c. Adjustable S	Short Time Pickup and Delay (S).	D
	d. Instantaneou	us trip (I).	
	operation.	ation of mode of the following an automatic the	
D.	FEEDER CIRCUIT	BREAKERS	
	<ol> <li>Larger than 8000</li> <li>800A and Small</li> </ol>	er: Group Mounted and Chassis Mounted.	
	3. 100% Rated of F	Frame Size when individually Mounted or Mounted	
	4. 65KAIC Minimur	m Rating or as noted on Drawings.	
	5. Solid State Trip breaker frames. by insertion of in	Device shall be interchangeable between compatible Continuous ampere rating of breaker determinded interchangeable rating plug. Rating plug interlocked (al automatically trins the breaker. Trip unit shall also	F
	employ the follow	wing functions.	С
	a. Adjustable G	Ground Fault Pick-Up.	
	c. Adjustable S	Short Time Pickup and Delay.	
	d. Instantaneou	us trip.	
	e. Visual indica operation.	ation of mode of trip following an automatic trip	
PART	3.00 - <u>EXECUTION</u>		
Α.	EXAMINATION		
	<ol> <li>verity surfaces a</li> <li>Verify field measurements</li> </ol>	surements are as shown on drawings.	
	3. Verify that requir	red utilities are available, in proper location, and	В
	<ul><li>4. Beginning of inst</li></ul>	tallation means installer accepts conditions	
В.	INSTALLATION		
	1. Install in location manufacturer's w	n shown on drawings in accordance with written instructions.	
	2. Tighten accessit	ble bus connections and mechanical fasteners	
	after placing swi	tchboard.	
	EN	D OF SECTION 16425	
SIGN		WARNING: THIS DOCUMENT CONTAINS CONFIDENTIAL,	A
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AND ELECTRIC COMPANY EMPLOYEES AND

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S AGENTS. DEX OF SHEETS

AWING NUMBER

E701

RAWING NUMBER

		<u>ن</u>		0
	1 <u>16620 - EMERGENCY/STANDBY POWER SYSTEMS</u> <u>GENERATOR SET</u>	2		3
	PART 1.00 - <u>GENERAL</u> A. <u>SCOPE</u>	2. Perfo a. \ c	ormance /oltage regulation shall be pl constant load between no loa	us or minus 0.5 percent for ar
G	<ol> <li>Provide complete factory assembled generator set equipment with digital (microprocessor-based) electronic generator set controls, digital governor, and digital voltage regulator.</li> </ol>	v k b. F	voltage variation with any ste oad shall not exceed plus or	ady load from no load to full minus 0.5 percent.
	<ol> <li>Provide factory test, startup by a supplier authorized by the equipment manufacturer(s), and on-site testing of the system.</li> <li>The superstancet manufacturer shall warrant all equipment</li> </ol>	r v r	no load to steady state rated variation with any steady load not exceed plus or minus 0.5	load. Random frequency I from no load to full load shal %.
	3. The generator set manufacturer shall warrant an equipment provided under this section, whether or not is manufactured by the generator set manufacturer, so that there is one source for warranty and product service. Technicians specifically trained and certified by the manufacturer to support the product and employed by the concreter set supplier shall service the generator sets.	C. T ki a c	The diesel engine generator s oad of 100% nameplate kW applicable derating factors, w operating temperature.	set shall accept a single step and power factor, less ith the engine generator set a
	<ul> <li>by the generator set supplier snall service the generator sets.</li> <li>4. The generator shall meet all of the following standards: The generator set shall be EPA and CARB Emissions Certified for</li> </ul>	d. M T n	Motor starting capability shall The generator set shall be ca minimum of 90% of rated no	be a minimum of 1,150 kVA. pable of recovering to a load voltage following the
	non-road applications and meet all local emission standards and requirements. It shall meet all local County or Regional APCD requirements.	a fi a p 2	application of the specified k factor applied to the generato application of this load, consi- performance and engine spec	/A load at near zero power r set. Maximum voltage dip o dering both alternator ed changes shall not exceed
	CODES AND STANDARDS     1. The generator set installation and on-site testing shall conform to	- 3. Cons	struction	
н	<ul> <li>the requirements of the following codes and standards, as applicable. The generator set shall include necessary features to meet the requirements of these standards.</li> <li>a. CSA 282, 1989 Emergency Electrical Power Supply for</li> </ul>	a. T s b v	The engine generator set sha steel base to maintain alignm base shall incorporate a batte within the rails.	Il be mounted on a heavy-dut ent between components. Th ery tray with hold-down clamp
	<ul> <li>Buildings</li> <li>b. IEEE446 – Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications</li> </ul>	b. A b b r	All switches, lamps, and meter be oiltight and dusttight. All a be installed within a UL/NEM no exposed points in the cont	ers in the control system shall ctive control components shal A 3R enclosure. There shall I crol (with the door open) that
	<ul> <li>c. NFPA37 –</li> <li>d. NFPA70 – National Electrical Code. Equipment shall be</li> </ul>	4. Conr	nections	
	suitable for use in systems in compliance to Article 700, 701, and 702. • NFPA110 – Emergency and Standby Power Systems. The	a. I s n t	The generator set load conne silver or tin plated copper bus mechanical or compression to yoe as shown on the drawing	ections shall be composed of bars, drilled to accept erminations of the number and Sufficient lug space shall
	generator set shall meet all requirements for Level 1 systems. Level 1prototype tests required by this standard shall have been performed on a complete and functional unit, component level type tests will not substitute for this requirement	p s b. F	Power connections to auxiliar	y devices shall be made at th
F FOLD	<ol> <li>The generator set and supplied accessories shall meet the requirements of the following standards:</li> </ol>	- c. (	common distribution panel.	es to other system componer
	<ul> <li>NEMA MG1. Alternator shall comply with the requirements of the current version this standard as they apply to AC alternators.</li> </ul>		shall be made on a permanent assembly. Labels describing shall be provided.	ntly labeled terminal block
	<ul> <li>b. UL142 – Sub-base Tanks</li> <li>c. UL1236 – Battery Chargers</li> </ul>	B. <u>ENGINE</u> The hors shall be	Sepower rating of the engine sufficient to drive the alterna	at its minimum tolerance leve tor and all connected accesso
	<ul> <li>UL2200. The generator set shall be listed to UL2200 or submit to an independent third party certification process to verify compliance as installed.</li> </ul>	Two cycl features 1. An e	le engines are not acceptable shall include: lectronic governor system sh	e. Engine accessories and nall provide automatic isochro
	<ol> <li>The control system for the generator set shall comply with the following requirements.</li> </ol>	frequ shall provi temp	uency regulation. The govern be controlled as a function of ide fast, stable operation at v perature conditions. The cont	ning system dynamic capabilit of engine coolant temperature varying engine operating rol system shall actively contr
F	<ul> <li>a. CSA C22.2, No. 14 – M91 Industrial Control Equipment.</li> <li>b. EN50082-2, Electromagnetic Compatibility – Generic Immunity Requirements, Part 2: Industrial.</li> </ul>	the fi gene acce The	erator set. Fuel rate shall be erator set. Fuel rate shall be elerating to start disconnect s	propriate to the state of the regulated as a function of sta peed, accelerating to rated sp de a programmable warm up
	c. EN55011, Limits and Methods of Measurement of Radio Interference Characteristics of Industrial, Scientific and	idle a contr	and cooldown at idle function rol system shall disable the a	While operating in idle state Iternator excitation system.
	d. FCC Part 15, Subpart B.	2. Ond opera at the syste	ation in 122 degrees F (50 d e alternator air inlet. Radiato em with 0.5 in H2O restriction	system rated for full load egrees C) ambient as measur r fan shall be suitable for use n. Radiator shall be sized basi
	<ul> <li>e. IEC8528 part 4. Control Systems for Generator Sets</li> <li>f. IEC Std 801.2, 801.3, and 801.5 for susceptibility, conducted, and radiated electromagnetic emissions.</li> </ul>	temp the e Radi	core temperature that is 200 perature, or prototype tested engine/radiator/fan operation fator shall be provided with a	higher than the rated operation to verify cooling performance in a controlled environment. duct adapter flange. The
	<ul> <li>g. UL508. The entire control system of the generator set shall be UL508 listed and labeled.</li> </ul>	equit 50/50 parts	pment manufacturer shall fill 0-ethylene glycol/water mixtu s shall be guarded against ac	the cooling system with a ire prior to shipping. Rotating cidental contact.
	<ul> <li>h. UL1236 –Battery Chargers.</li> <li>4. The generator set manufacturer shall be certified to ISO 9001 International Quality Standard and shall have third party</li> </ul>	<ol> <li>Elect witho</li> <li>4. Posit</li> </ol>	tric starter(s) capable of three out overheating. tive displacement, mechanic	e complete cranking cycles al, full pressure, lubrication oil
D	certification verifying quality assurance in design/development, production, installation, and service, in accordance with ISO 9001. C. <u>ACCEPTABLE MANUFACTURERS</u>	pumj 5. Full f elem	p. flow lubrication oil filters with nents and dipstick oil level inc	replaceable spinon canister licator.
	Acceptable generator manufacturers are as follows: 1. Tier 1 & 2 facilities	6. An e Fuel suita	ngine driven, mechanical, po filter with replaceable spinor ble for operation of the gene	ositive displacement fuel pump n canister element. Fuel coole rator set at full rated load in th
	<ul> <li>CAT</li> <li>Cummins</li> <li>2 Tier 3 and below</li> </ul>	ambi oper 7. Repl	ient temperature specified sh ation due to the design of the laceable drv element air clea	all be provided if required for e engine and the installation.
	a) 500kW and above • CAT • Cummins	8. Flexi	ible supply and return fuel lin	es.
FOLD	b) Below 500kW • Cummins • Kohler	and s	solidstate voltage regulator. ant heater	alternator, 40-ampere minim
	Generac  D. <u>REQUIREMENTS OF REGULATORY AGENCIES</u>	a. E h c	Engine mounted, thermostation neater(s) for each engine. He on the project drawings. The	cally controlled, coolant ater voltage shall be as show coolant heater shall be UL499
С	<ol> <li>An electric generating system, consisting of a prime mover, generator, governor, coupling and controls, must have been tested, as a complete unit, on a representative engineering prototype model of the equipment to be sold.</li> </ol>	li b. T s	isted and labeled. The coolant heater shall be ir silicone hose connections. S	nstalled on the engine with teel tubing shall be used for
	2. The generator set must conform to applicable California Electrical Code and applicable authorities having jurisdiction including CSFM.	C Id II V	connections into the engine of ength of pipe run exceeds 12 nstallation shall be specifical /enting of the system. The c	oolant system wherever the 2 inches. The coolant heater ly designed to provide proper polant heaters shall provisions
म- भ	<ol> <li>The generator set must be available with the Underwriters Laboratories listing (UL 2200) as a stationary engine generator assembly.</li> </ol>	t v c r	o isolate the heater for replace without draining the coolant for quick disconnect/automatic so neater element to be replaced	cement of the heater element om the generator set. The ealing couplers shall allow the d without draining the engine
s #: 19–140.01–	4. The generator shall meet all of the following standards: The generator set shall be EPA and CARB Emissions Certified for non-road applications and meet all local emission standards and requirements. It shall meet all local County or Regional APCD	c. T ii	cooling system or significant The coolant heater shall be p nstalled at the engine thermo	coolant loss. rovided with a DC thermostat ostat housing. An AC power
10/05/20 JOB	<ul><li>requirements.</li><li>5. The generator control and remote annunciation shall be compatible with the transfer microprocessor based logic controller integrated in</li></ul>	c c d. T	connection box shall be provi connection to the coolant hea The coolant heater(s) shall be	ded for a single AC power Iter system. e sized as recommended by th
DATE PLOTTED: B	the main switchboard. The transfer controller shall communicate through open protocol to energy management system or data network to provide remote status indication.	e 1 N s	engine manufacturer to warm 104F (40C) in a 40F (4C) am NFPA110 requirements, or th starting and load pickup requ	the engine to a minimum of bient, in compliance with the temperature required for irements of this specification.
3/20 BY: Cris	PART 2.00 - <u>PRODUCTS</u> A. GENERATOR SET	11. Prov recor shall	ide vibration isolators, spring mmended by the generator s	/pad type, quantity as et manufacturer. Isolators required by site location.
2 SAVED: 09/06	1. Ratings	12. Start antin engir	ting and Control Batteries sha nony type, 12/24VDC, sized	all be calcium/lead as recommended by the
(E702.dwg DATE	<ul> <li>as indicated on the drawings.</li> <li>b. The generator set shall be as indicated on the drawings,</li> <li>based on site conditions of Altitude 1000 ft ambient</li> </ul>	conn three temp	ectors. The batteries shall be complete 15-second cranking perature when fully charged.	e capable of a minimum of ng cycles at 40F ambient Provide a 10 amp, 12/24VDC
anta Cruz\Design\	<ul> <li>c. The generator set rating shall be based on standby service.</li> </ul>	equa	al.	
- Multi Sites\Sa				
en Resiliency -				
\$\RSA\PG&E\G				
\Drafting\Jobs		REV DATE	DESCRIPTIC	)N

### cent for any landom ad to full

### steady state Jency load shall

ngle step rator set at

.150 kVA.

power Itage dip on

heavy-duty onents. The wn clamps

stem shall nents shall nere shall be

posed of

umber and bace shall be size as

made at the I-mounted

components l block nctions

rance level d accessories.

ic isochronous c capabilities nperature to

vely control e of the tion of starting, o rated speed. warm up at

n idle state, the system. ull load as measured le for use in a

sized based ed operation formance of onment.

The with a Rotating cycles

rication oil canister

fuel pump. Fuel cooler, l load in the quired for tallation.

ere minimum,

e as shown l be UL499

ne with used for rever the int heater de proper provisions

r element et. The I allow the ne engine

nermostat, C power power

nded by the nimum of

num of 12/24VDC

13. Provide exhaust silencer(s) for each engine of size and type as recommended by the generator set manufacturer and approved by the engine manufacturer. The mufflers shall be critical grade. Exhaust system shall be installed according to the engine manufacturer's recommendations and applicable codes and standards.

# C. AC GENERATOR

- 1. The AC generator shall be; synchronous, four pole, 2/3 pitch, revolving field, drip-proof construction, single prelubricated sealed bearing, air cooled by a direct drive centrifugal blower fan, and directly connected to the engine with flexible drive disc. All insulation system components shall meet NEMA MG1 temperature limits for Class H insulation system and shall be UL1446 listed. Actual temperature rise measured by resistance method at full load shall not exceed 125 degrees Centigrade.
- 2. The generator shall be capable of delivering rated output (kVA) at rated frequency and power factor, at any voltage not more than 5 percent above or below rated voltage.
- 3. A permanent magnet generator (PMG) shall be included to provide a reliable source of excitation power for optimum motor starting and short circuit performance. The PMG and controls shall be capable of sustaining and regulating current supplied to a single phase or three phase fault at approximately 300% of rated current for not more than 10 seconds.
- 4. The subtransient reactance of the alternator shall not exceed 15 percent, based on the standby rating of the generator set.
- D. GENERATOR SET CONTROL

The generator set shall be provided with a microprocessor-based control system that is designed to provide automatic starting, monitoring, and control functions for the generator set. The control system shall also be designed to allow local monitoring and control of the generator set, and remote monitoring and control as described in this specification.

The control shall be mounted on the generator set, or may be mounted in a free-standing panel next to the generator set if adequate space and accessibility is available. The control shall be vibration isolated and prototype tested to verify the durability of all components in the system under the vibration conditions encountered.

The generator set mounted control shall include the following features and functions:

1. Control Switches

- a. Mode Select Switch. The mode select switch shall initiate the following control modes. When in the RUN or MANUAL position the generator set shall start, and accelerate to rated speed and voltage as directed by the operator. A separate push-button to initiate starting is acceptable. In the OFF position the generator set shall immediately stop, bypassing all time delays. In the AUTO position the generator set shall be ready to accept a signal from a remote device to start and accelerate to rated speed and voltage.
- b. EMERGENCY STOP switch. Switch shall be Red "mushroomhead" pushbutton. Depressing the emergency stop switch shall cause the generator set to immediately shut down, and be locked out from automatic restarting.
- c. RESET switch. The RESET switch shall be used to clear a fault and allow restarting the generator set after it has shut down for any fault condition.
- d. PANEL LAMP switch. Depressing the panel lamp switch shall cause the entire panel to be lighted with DC control power. The panel lamps shall automatically be switched off 10 minutes after the switch is depressed, or after the switch is depressed a second time.
- 2. Generator Set AC Output Metering. The generator set shall be provided with a metering set including the following features and functions:
- a. Digital metering set, 1% accuracy, to indicate generator RMS voltage and current, frequency, output current, output KW, KWhours, and power factor. Generator output voltage shall be available in line to line and line to neutral voltages, and shall display all three-phase voltages (line to neutral or line to line) simultaneously.
- b. Analog voltmeter, ammeter, frequency meter, power factor meter, and kilowatt (KW) meter. Voltmeter and ammeter shall display all three phases. Meter scales shall be color coded in the following fashion: green shall indicate normal operating condition, amber shall indicate operation in ranges that indicate potential failure, and red shall indicate failure impending. Metering accuracy shall be within 1% at rated output. Both analog and digital metering are required.
- c. The control system shall monitor the total load on the generator set, and maintain data logs of total operating hours at specific load levels ranging from 0 to 110% of rated load, in 10% increments. The control shall display hours of operation at less than 30% load and total hours of operation at more than 90% of rated load.
- d. The control system shall log total number of operating hours, total kWH, and total control on hours, as well as total values since reset.
- 3. Generator Set Alarm and Status Display.
- a. The generator set control shall include LED alarm and status indication lamps. The lamps shall be high intensity LED type. The lamp condition shall be clearly apparent under bright room lighting conditions. Functions indicated by the lamps shall include:
- i. The control shall include five configurable alarm-indicating lamps. The lamps shall be field adjustable for any status, warning, or shutdown function monitored by the genset. They shall also be configurable for color, and control action (status, warning, or shutdown).
- ii. The control shall include green lamps to indicate that the generator set is running at rated frequency and voltage, and that a remote start signal has been received at the generator set. The running signal shall be based on actual sensed voltage and frequency on the output terminals of the generator set.
- iii. The control shall include a flashing red lamp to indicate that the control is not in automatic state, and red common shutdown lamp.
- iv. The control shall include an amber common warning indication lamp.
- a. The generator set control shall indicate the existence of the warning and shutdown conditions on the control panel. All conditions indicated below for warning shall be field-configurable for shutdown. Conditions required to be annunciated shall include:
- low oil pressure (warning)
- low oil pressure (shutdown)
- oil pressure sender failure (warning)
- low coolant temperature (warning)
- high coolant temperature (warning) high coolant temperature (shutdown)

high oil temperature (warning)

- engine temperature sender failure (warning)
- low coolant level (warning)
- fail to crank (shutdown)
- fail to start/overcrank (shutdown)
- overspeed (shutdown)
- low DC voltage (warning)
- high DC voltage (warning)
- weak battery (warning) low fuel day tank (warning)
- high AC voltage (shutdown)
- low AC voltage (shutdown)
- under frequency (shutdown)
- over current (warning)
- over current (shutdown)
- short circuit (shutdown)
- over load (warning)
- emergency stop (shutdown) low fuel level (alarm)
- (4) configurable conditions
- b. Provisions shall be made for indication of four customer specified alarm or shutdown conditions. Labeling of the customer-specified alarm or shutdown conditions shall be of the same type and quality as the above-specified conditions. The nonautomatic indicating lamp shall be red, and shall flash to indicate that the generator set is not able to automatically respond to a command to start from a remote location.

4. Engine Status Monitoring.

- a. The following information shall be available from a digital status panel on the generator set control :
- engine oil pressure (psi or kPA)
- engine coolant temperature (degrees F or C)
- engine oil temperature (degrees F or C) engine speed (rpm)
- number of hours of operation (hours)
- number of start attempts battery voltage (DC volts)
- b. The control system shall also incorporate a data logging and display provision to allow logging of the last 10 warning or shutdown indications on the generator set, as well as total time of operation at various loads, as a percent of the standby rating of the generator set.
- 5. Engine Control Functions.
- a. The control system provided shall include a cycle cranking system, which allows for user selected crank time, rest time, and # of cycles. Initial settings shall be for 3 cranking periods of 15 seconds each, with 15-second rest period between cranking periods.
- b. The control system shall include an idle mode control, which allows the engine to run in idle mode in the RUN position only. In this mode, the alternator excitation system shall be disabled
- c. The control system shall include an engine governor control, which functions to provide steady state frequency regulation as noted elsewhere in this specification. The governor control shall include adjustments for gain, damping, and a ramping function to control engine speed and limit exhaust smoke while the unit is starting.
- d. The control system shall include time delay start (adjustable 0300 seconds) and time delay stop (adjustable 0600 seconds) functions.
- e. The control system shall include sender failure monitoring logic for speed sensing, oil pressure, and engine temperature which is capable of discriminating between failed sender or wiring components, and an actual failure conditions.
- 6. Alternator Control Functions:
- a. The generator set shall include a full wave rectified automatic digital voltage regulation system that is matched and prototype tested by the engine manufacturer with the governing system provided. It shall be immune from misoperation due to load induced voltage waveform distortion and provide a pulse width modulated output to the alternator exciter. The voltage regulation system shall be equipped with three phase line to neutral RMS sensing and shall control buildup of AC generator voltage to provide a linear rise and limit overshoot. The system shall include a torque matching characteristic, which shall reduce output voltage in proportion to frequency below an adjustable frequency threshold. Torque matching characteristic shall be adjustable for roll-off frequency and rate, and be capable of being curve-matched to the engine torque curve with adjustments in the field. The voltage regulator shall include adjustments for gain, damping, and frequency rolloff. Adjustments shall be broad range, and made via digital raise-lower switches, with an alphanumeric LED readout to indicate setting level. Rotary potentiometers for system adjustments are not acceptable.
- b. A microprocessor-based protection device shall be provided to individually monitor all phases of the output current of the generator set and initiate an alarm (over current warning) when load current exceeds 110% of the rated current of the generator set on any phase for more than 60 seconds. The device shall shut down and lock out the generator set when output current level approaches the thermal damage point of the alternator (over current shutdown). The protective functions provided shall be in compliance to the requirements of NFPA70 article 445.
- c. A microprocessor-based protection device shall be provided to monitor all phases of the output current for short circuit conditions. The control/protection system shall monitor the current level and voltage. The controls shall shut down and lock out the generator set when output current level approaches the thermal damage point of the alternator (shor circuit shutdown). The protective functions provided shall be in compliance to the requirements of NFPA70 article 445.
- d. Controls shall be provided to monitor the KW load on the generator set, and initiate an alarm condition (over load) when total load on the generator set exceeds the generator set rating for in excess of 5 seconds. Controls shall include a load shed control, to operate a set of dry contacts (for use in shedding customer load devices) when the generator set is overloaded.

	JOB NO 19-140.01 DSGN . DWN .	Set PROFESS WAR	PG&E CRESS Corporate Real Estate Strategy and Services	CORPORATE REAL ESTATE STRATEGY AND SERVICES PACIFIC GAS AND ELECTRIC COMPANY SAN FRANCISCO, CALIFORNIA
	CHKD . SUPV APVD 1	2 K m m 2 K m No. E. 49 20 m Exp. 6/31/21 ★ CECTBICA w	Rose Sing and Asso Electrical Consultants 131 S. Durworth St. • Visalia, CA	ciates, Inc.
DSGN DWN CHKD SUPV APVD	APVD 2 DATE 20200908	97. OF CALIFON 10/5/2020	<b>Ξ Λ</b> Phone: (559) 733-2671	
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- e. A microprocessor-based AC over/under voltage monitoring system that responds only to true RMS voltage conditions shall be provided. The system shall initiate shutdown of the generator set when alternator output voltage exceeds 110% of the operator-set voltage level for more than 10 seconds, or with no intentional delay when voltage exceeds 130%. Under voltage shutdown shall occur when the output voltage of the alternator is less than 85% for more than 10 seconds. The system shall monitor individual phases and be connected line to neutral on 3-phase 4-wire generator sets, and for systems that are solidly grounded.
- 7. Other Control Functions
- a. The generator set shall be provided with a network communication module to allow LonMark compliant communication with the generator set control by remote devices. The control shall communicate all engine and alternator data, and allow starting and stopping of the generator set via the network in both test and emergency modes
- b. A battery monitoring system shall be provided which initiates alarms when the DC control and starting voltage is less than 8 VDC or more than 16 VDC. During engine cranking (starter engaged), the low voltage limit shall be disabled, and DC voltage shall be monitored as load is applied to the battery, to detect impending battery failure or deteriorated battery condition.
- c. The contractor shall provide generator system monitoring connections to a location determined by the owner.
- 8. Control Interfaces for Remote Monitoring:
- a. The control system shall provide four programmable output relays. These relay outputs shall be configurable for any alarm, shutdown, or status condition monitored by the control. The relays shall be configured to indicate: (1) generator set operating at rated voltage and frequency, (2) common warning, (3) common shutdown. (4) switch off auto.
- b. A fused 10 amp switched 12/24VDC power supply circuit shall be provided for customer use. DC power shall be available from this circuit whenever the generator set is running.
- c. A fused 10 amp 12/24VDC power supply circuit shall be provided for customer use. DC power shall be available from this circuit at all times from the engine starting/control batteries.
- d. The control shall be provided with a direct TCP/IP ethernet communication link for network interface compatible with Backnet and ALC protocols.
- OTHER EQUIPMENT TO BE PROVIDED WITH THE GENERATOR
- 1. A main generator mounted circuit breaker. The breaker shall be mounted in the generator connection box. The line side connections are to be made at the factory. Output lugs shall be provided for the load side connections.
- 2. Outdoor Weather-Protective Enclosure
- a. The generator set shall be provided with an outdoor enclosure, with the entire package listed under UL2200. The package shall comply with the requirements of the National Electrica Code for all wiring materials and component spacing. The total assembly of generator set, enclosure, and sub-base fuel tank (when used) shall be designed to be lifted into place using spreader bars. Housing shall provide ample airflow for generator set operation at rated load in an ambient temperature of 100F. The housing shall have hinged access doors as required to maintain easy access for all operating service functions. All doors shall be lockable, and include retainers to hold the door open during service. Enclosure roof shall be cambered to prevent rainwater accumulation. Openings shall be screened to limit access of rodents into the enclosure. All electrical power and control interconnections shall be made within the perimeter of the enclosure.
- b. All sheet metal shall be primed for corrosion protection and finish painted with the manufacturers standard color using a two step electro-coating paint process, or equal meeting the performance requirements specified below. All surfaces of all metal parts shall be primed and painted. The painting process shall result in a coating that meets the following requirements:
- Primer thickness, 0.5-2.0 mils. Top coat thickness, 0.8-1.2
- Gloss, per ASTM D523-89, 80% plus or minus 5%. Gloss retention after one year shall exceed 50%.
- Crosshatch adhesion, per ASTM D3359-93, 4B-5B.
- Impact resistance, per ASTM D2794-93, 120-160 inch-pounds. Salt Spray, per ASTM B117-90, 1000+ hours.
- Humidity, per ASTM D2247-92, 1000+ hours.
- Water Soak, per ASTM D2247-92, 1000+ hours.
- c. Painting of hoses, clamps, wiring harnesses, and other non-metallic service parts shall not be acceptable. Fasteners used shall be corrosion resistant, and designed to minimize marring of the painted surface when removed for normal installation or service work.
- d. Enclosure shall be constructed of minimum 12 gauge steel for framework and 14 gauge steel for panels. All hardware and hinges shall be stainless steel.
- e. A factory-mounted exhaust silencer shall be installed inside the enclosure. The exhaust shall exit the enclosure through a rain collar and terminate with a rain cap. Exhaust connections to the generator set shall be through seamless flexible connections.
- f. The enclosure shall include the following maintenance provisions:

ii. External radiator fill provision.

- i. Flexible coolant and lubricating oil drain lines, that extend to the exterior of the enclosure, with internal drain valves.
- g. The generator set shall be provided with a sound-attenuated housing which allows the generator set to operate at full rated load in an ambient temperature of up to 100F. The enclosure shall reduce the sound level of the generator set while operating at full rated load to a maximum of 73 dBA at any location 7 meters from the generator set in a free field environment.
- h. The enclosure shall be insulated with non-hydroscopic materials
- 3. For diesel units the fuel system shall include a base mounted 72 hour fuel supply based on 100% load, double wall base mounted fuel tank. it shall have a stub-up area convenient for electrical conduit entry. shall have the structural integrity to support the engine-generator set and carry the UL 142 mark. Minimum features shall include all welded construction, five gallon fill/spill box, 2" extended main vent 12' above grade, lockable fuel filler cap, fuel gauge, low fuel level alarm, fuel line check valve, vent and fittings for fuel supply, return, fill and emergency vent. This tank must be supplied by the engine-generator set manufacturer and be installed before shipment.
- a. Supply the basetank with emergency venting per NFPA 37.

FACILITY TYPE SERVICE CENTER

DISCIPLINE

SITE ID

BUILDING ID

FLOOR ID

ORDER NO

BUILDING NAME

ELECTRICAL

ACILITY NAME SANTA CRUZ SERV. CNTR.

346202

PART 3.00 - OPERATION

- A. SEQUENCE OF OPERATOR
- 1. Generator set shall start on receipt of a start signal from remote equipment. The start signal shall be via hardwired connection to the generator set control and a redundant signal over the required network connection.
- 2. The generator set shall complete a time delay start period as programmed into the control.
- 3. The generator set control shall initiate the starting sequence for the generator set. The starting sequence shall include the following functions:
- 4. The control system shall verify that the engine is rotating when the starter is signaled to operate. If the engine does not rotate after two attempts, the control system shall shut down and lock out the generator set, and indicate "fail to crank" shutdown.
- 5. The engine shall fire and accelerate as quickly as practical to start disconnect speed. If the engine does not start, it shall complete a cycle cranking process as described elsewhere in this specification. If the engine has not started by the completion of the cycle cranking sequence, it shall be shut down and locked out, and the control system shall indicate "fail to start".
- 6. The engine shall accelerate to rated speed and the alternator to rated voltage. Excitation shall be disabled until the engine has exceeded programmed idle speed, and regulated to prevent over voltage conditions and oscillation as the engine accelerates and the alternator builds to rated voltage.
- 7. On reaching rated speed and voltage, the generator set shall operate as dictated by the control system in isochronous state.
- 8. When all start signals have been removed from the generator set, it shall complete a time delay stop sequence. The duration of the time delay stop period shall be adjustable by the operator.
- 9. On completion of the time delay stop period, the generator set control shall switch off the excitation system and shall shut down.
- 10. Any start signal received after the time stop sequence has begun shall immediately terminate the stopping sequence and return the generator set to isochronous operation.
- B. PARALLELING AND LOAD MANAGEMENT (FOR MULTIPLE GEN. ONLY) 1. Each generator plant with multiple generators shall have a master
- 2. When a start signal is received all generators shall start and self parallel to a common bus using circuit breakers and/or contactors integral to the generator.

control panel that provides paralleling and load management control.

- 3. When all available generators are online the master control panel shall shut down unneeded generation based on demand and re-start and parallel generation if the programmed demand value is exceeded.
- 4. If a generator fails the master control panel shall shed load based on a programmable priority schedule.

PART 4.00 - OTHER REQUIREMENTS

- A. <u>SUBMITTALS</u>
- 1. Within 10 days after award of contract, provide a pdf file that is well organized with index tabs with the following information for review:
- a. Manufacturer's product literature and performance data, sufficient to verify compliance to specification requirements.
- b. A paragraph by paragraph specification compliance statement, describing the differences between the specified and the proposed equipment.
- c. Manufacturer's certification of prototype testing.
- d. Manufacturer's published warranty documents
- e. Shop drawings showing plan and elevation views with certified overall dimensions, as well as wiring interconnection details.
- f. Interconnection wiring diagrams showing all external connections required; with field wiring terminals marked in a consistent point to point manner.
- g. Manufacturer's installation instructions.
- B. FACTORY TESTING
- 1. The generator set manufacturer shall perform a complete operational test on the generator set prior to shipping from the factory. A certified test report shall be provided. Equipment supplied shall be fully tested at the factory for function and performance.
- 2. Factory testing may be witnessed by the owner and consulting engineer. Costs for travel expenses will be the responsibility of the owner and consulting engineer. Supplier is responsible to provide two weeks notice for testing.
- 3. Generator set factory tests on the equipment shall be performed at rated load and rated power factor. Generator sets that have not been factory tested at rated power factor will not be acceptable. Tests shall include: run at full load, maximum power, voltage regulation, transient and steadystate governing, single step load pickup, and function of safety shutdowns.
- C. INSTALLATION
- 1. Equipment shall be installed by the contractor in accordance with final submittals and contract documents. Installation shall comply with applicable state and local codes as required by the authority having jurisdiction. Install equipment in accordance with manufacturer's instructions and instructions included in the listing or labeling of UL listed products.
- 2. Installation of equipment shall include furnishing and installing all interconnecting wiring between all major equipment provided for the on-site power system. The contractor shall also perform interconnecting wiring between equipment sections (when required), under the supervision of the equipment supplier.
- 3. Equipment shall be installed on concrete housekeeping pads. Equipment shall be permanently fastened to the pad in accordance with manufacturer's instructions and seismic requirements of the site.
- 4. Equipment shall be initially started and operated by representatives of the manufacturer.
- 5. All equipment shall be physically inspected for damage. Scratches and other installation damage shall be repaired prior to final system testing. Equipment shall be thoroughly cleaned to remove all dirt and construction debris prior to initial operation and final testing of the system.
- D. ON-SITE ACCEPTANCE TEST
- The complete installation shall be tested for compliance with the specification following completion of all site work. Testing shall be conducted by representatives of the manufacturer, with required fuel supplied by Contractor. The Engineer shall be notified in advance and shall have the option to witness the tests.
- 2. Installation acceptance tests to be conducted onsite shall include a "cold start" test, a two hour full load test, and a one step rated load pickup test. Provide a resistive load bank and make temporary connections for full load test.

# GENERATOR RESILIENCY DESIGN

# **SPECIFICATIONS**

TIER CLASSIFICATION (CRESS) - 3 SIGNIFICANT 615 7TH AVE., SANTA CRÚZ, CA 95062

# E. TRAINING

# G. WARRANTY

- H. OPERATION AND MAINTENANCE MANUALS

1. The equipment supplier shall provide training for the facility operating personnel covering operation and maintenance of the equipment provided. The training program shall be not less than 4 hours in duration and the class size shall be limited to 5 persons. Training date shall be coordinated with the facility owner.

### F. SERVICE AND SUPPORT

1. The manufacturer of the generator set shall maintain service parts inventory at a central location which is accessible to the service location 24 hours per day, 365 days per year.

2. The generator set shall be serviced by a local service organization that is trained and factory certified in generator set service. The supplier shall maintain an inventory of critical replacement parts at the local service organization, and in service vehicles. The service organization shall be on call 24 hours per day, 365 days per year. 3. The manufacturer shall maintain model and serial number records

of each generator set provided for at least 20 years.

1. The generator set and associated equipment shall be warranted for a period of not less than 5 years from the date of commissioning against defects in materials and workmanship.

2. The warranty shall be comprehensive. No deductibles shall be allowed for travel time, service hours, repair parts cost, etc.

1. The generator supplier will provide an organized pdf file with tabs for

END OF SECTION 16620

the complete operation and maintenance manuals.

![](_page_12_Picture_193.jpeg)

![](_page_13_Figure_0.jpeg)

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3.	FOOTINGS, STEMWALLS & PIERS	00 PSI 00 PSI DE ARE BASED ON F'C = 2500 PSI AT 28 REQUIRED.			'	_		
4.	MATERIALS USED IN THE CONCRETE MIX SHALL REQUIREMENTS: AGGREGATE (NORMAL-WEIGHT CONCRETE, 1-1 PORTLAND CEMENT (TYPE II. U.N.O.)	COMPLY WITH THE FOLLOWING /2" MAX) ASTM C-33 ASTM C-150		2	EDGE 1 1/2" = 1'-	<u>E OF S</u>	LAB	
5.	ADMIXTURES	NOT ALLOWED W/O APPROVAL POTABLE D DELIVERED IN ACCORDANCE WITH THE	-					
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8.	LEVEL FINISH WITHOUT FINS. DESIGN OF FORM THE REQUIREMENTS OF ACI 318-14 SECTION 26 UNLESS NOTED OTHERWISE, ALL EXPOSED ED RECEIVE A 3/4" MINIMUM CHAMFER OR A 1/2" MI	WORK SHALL TAKE INTO CONSIDERATION .11.1.2. GES OF CONCRETE SURFACES SHALL NIMUM TOOLED RADIUS & THE TOP OF ALL				CC FOL	NC. SLAB - SEI INDATION PLAI	E – N
9.	ALL CONCRETE SHALL BE THOROUGHLY CONS PLACEMENT AND SHALL BE THOROUGHLY WOF BOLTS, OTHER EMBEDDED ITEMS AND INTO TH CONCRETE AND/OR ROCK POCKETS SHALL BE	ALL RECEIVE A SMOOTH TROWELED FINISH. DLIDATED BY SUITABLE MEANS DURING RKED AROUND REINFORCEMENT, ANCHOR E CORNERS OF FORMS. ANY "HONEYCOMB" REMOVED AND REPLACED WITH SOUND						0
10.	CONCRETE. ALL CONCRETE FLATWORK SHALL BE WET CUF RETAINING CURING, OR BY COMBINATIONS THE PROCEDURES. KEEP CONTINUOUSLY MOIST FC FINISHING OPFRATION IS COMPLETE	RED BY MIST CURING, BY MOISTURE- REOF IN ACCORDANCE WITH ACI 301 IR NOT LESS THAN 7 DAYS AFTER THE						
11.	ALTERNATELY, A CURING COMPOUND MEETING 148, TYPE 1 SPECIFICATIONS AND STATE OF CA EMISSIONS STANDARDS MAY BE USED SUCH AS REINFORCING STEEL SHALL BE BILLET STEEL (	ASTM C-309 TYPE 1, CLASS B AND AASHTO LIFORNIA AIR REGULATION BOARD SOLVENT S 'EUCLID' SUPER DIAMOND CLEAR VOX.						
12.	#4 (13 MM) AND SMALLER	DE 40 (GRADE 300) DE 60 (GRADE 420)				MOIS	TURE BARRIE	R –
13. 14.	FABRICATING DETAILS SHALL CONFORM TO AC "MANUAL OF STANDARD PRACTICE". SPLICE LENGTHS OF REINFORCING BARS SHAL 318. REFER TO DETAILS ON THESE PLANS.	I 315, "ACI DETAILING MANUAL" AND CRSI		3		STRUC	TION .	JOIN
15.	ALL WELDING OF REINFORCING STEEL SHALL E UNLESS OTHERWISE NOTED. WELDING OF REI DETAILED ON THE DRAWINGS AND SHALL BE IN ACI 318-14 SECTION 26.6.4.1 AND 25.5.7.2.	E WITH LOW HYDROGEN ELECTRODES NFORCING ALLOWED ONLY WHERE ACCORDANCE WITH SPECIFICATIONS PER						
17.	ALL VERTICAL REINFORCING BARS AT WALLS, S A STANDARD ACI 90° OR 180° HOOK INTO THE F REQUIRED BY THE BUILDING CODE. ALSO SEE I	CRETE. STEMWALLS, PEDESTALS, ETC. SHALL HAVE OUNDATION BELOW WITH EMBEDMENT DETAILS, THESE PLANS.						1/8
18.	UNLESS OTHERWISE NOTED, ALL REINFORCING AS FOLLOWS: SURFACES POURED AGAINST EARTH FORMED SURFACES EXPOSED TO GROUND OR	S SHALL HAVE A MINIMUM CONCRETE COVER		-	<b>∖</b>			
	#5 AND SMALLER #6 AND LARGER FORMED CONCRETE NOT EXPOSED TO GROUN BEAMS, JOISTS & GIRDERS	D OR WEATHER		F		0		
19.	WHERE GROUT IS SPECIFIED ON THE DRAWING NON-METALLIC GROUT. USE MASTERBUILDERS SUBSTITUTE.	SS USE A HIGH STRENGTH, NON SHRINK, "MASTERFLOW 713 GROUT" OR APPROVED						
20.	NO PIPES OR DUCTS SHALL BE PLACED IN CON SPECIFICALLY DETAILED.	CRETE WALLS OR SLAB UNLESS						
<u>SPE</u> 1.	SPECIAL INSPECTION NOTES SPECIAL INSPECTIONS REQUIRED BY THIS COL IS DONE ON THE PREMISE OF A FABRICATOR R SUCH WORK WITHOUT SPECIAL INSPECTION. A OF THE FABRICATOR'S WRITTEN PROCEDURAL DEPIODIC AUDITING OF STREAM	E ARE NOT REQUIRED WHERE THE WORK EGISTERED AND APPROVED TO PERFORM IPPROVAL SHALL BE BASED UPON REVIEW AND QUALITY CONTROL MANUALS AND		$\sim$	СОИТ	[ROI ]	IOINT	
2.	SPECIAL INSPECTOR'S BACKGROUND AND QUA THE ENFORCEMENT AGENCY FOR APPROVAL A INSPECTIONS ARE MADE.	LIFICATIONS SHALL BE FORWARDED TO T LEAST 3 DAYS BEFORE ANY		(4)	NO SCALE		~ !	
З. <i>Д</i>	INSPECTORS SHALL SUBMIT THEIR REPORTS D WITH COPIES TO THE ARCHITECT, STRUCTURA OWNER.	IRECTLY TO THE ENFORCEMENT AGENCY L ENGINEER, GENERAL CONTRACTOR AND						
τ.	WITH THE PLANS OR SPECIFICATIONS. ANY WO RELATIVE THERETO THAT IS NOT SUFFICIENTLY PLANS, THE CONTRACTOR SHALL CONTACT TH EXPLANATIONS AS MAY BE NECESSARY.	ORK TO BE DONE OR ANY MATTER ( DETAILED OR EXPLAINED ON THESE E ARCHITECT FOR SUCH FURTHER						
5.	IN ACCORDANCE WITH 2019 C.B.C. SECTIONS 1 A SPECIAL INSPECTOR WHO SHALL PROVIDE S CONSTRUCTION ON THE FOLLOWING TYPES OF A. CONCRETE: PER CBC SECTION 1705.3 AND FOLLOWING ITEMS PEOUNDE SPECIAL INFO	TU AND 1704.2, THE OWNER SHALL EMPLOY PECIAL INSPECTION DURING WORK: TABLE 1705.3 WITH EXCPETIONS. THE PECTION: ALL CONCRETE EXCEPT: OLAR						
	<ul> <li>ON-GRADES, SIDEWALKS AND DRIVEWAYS</li> <li>B. EXPANSION BOLT, SCREW ANCHOR AND A VERIFY INSTALLATION IN ACCORDANCE WI NOTE SHEET OR DETAILS.</li> </ul>	DHESIVE ANCHORS: INSTALLATION TO TH APPLICABLE ICC REPORTS NOTED ON						
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TIER CLASSIFICATION (CRESS) - 3 SIGNIFICANT 615 7TH AVE., SANTA CRUZ, CA 95062

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RAGE SCHEDULE							
EMBEDMENT	EDGE DISTANCE	ICC	QUANTITY				
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2"	6"	ESR-1917	4, (1 EA. CORNER)	G			
3 1/4"	6"	ESR-1917	4, (1 EA. CORNER)				

MANUFACTURER.

# DULE

![](_page_15_Figure_7.jpeg)

![](_page_15_Picture_8.jpeg)