ENERGY SERVICES AGREEMENT – SOLAR

San Mateo Medical Center

This Energy Services Agreement (<u>"Agreement</u>") is made and entered into as of this ______ day of _____, 2023 (the "Effective Date"), between FFP BTM Solar, LLC, a Delaware limited liability company ("Provider"), and County of San Mateo ("Purchaser"; and, together with Provider, each, a "Party" and together, the "Parties").

RECITALS

- A. Purchaser desires that Provider install and operate a solar photovoltaic system at the Premises (as hereafter defined) for the purpose of providing Energy Services (as hereafter defined), and Provider is willing to have the Installation Work performed by using one or more qualified contractors holding the appropriate licenses required in the jurisdiction where the System will be installed;
- B. Provider is in the business of designing, constructing, owning, financing, and operating solar photovoltaic systems for the purpose of selling power generated by the systems to its purchasers;
- C. California Government Code sections 4217.10 et seq. authorizes a public entity to enter into energy service contracts, facility financing contracts, and related agreements to implement the State's conservation and alternative energy supply source policy;
- D. Purchaser's governing body has made those findings required by Government Code section 4217.12 that the anticipated cost to the Purchaser for Energy Services provided by the System under this Agreement is expected to be less than the anticipated marginal cost to the Purchaser of electrical energy that would have been consumed by Purchaser in the absence of its purchase of the Energy Services;
- E. Provider and Purchaser acknowledged those certain General Terms and Conditions of Energy Services Agreement between FFP BTM Solar, LLC and Purchaser dated as of June 23, 2022 ("<u>General Termsand</u> <u>Conditions</u>"), which are incorporated by reference as set forth herein; and
- F. The terms and conditions of this Energy Services Agreement, excluding the General Terms and Conditions incorporated herein, constitute the "Special Conditions" referred to in the General Terms and Conditions.

In consideration of the mutual promises set forth below, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties hereby agree as follows:

Incorporation of General Terms and Conditions. The General Terms and Conditions are incorporated herein as if set forth in their entirety

- Initial Term. The initial term of this Agreement shall commence on the Effective Date and shall continue for Twenty (20) years from the Commercial Operation Date (as defined in the General Terms and Conditions), unless and until extended or terminated earlier pursuant to the provisions of this Agreement (the "Initial Term"). After the Initial Term, this Agreement may be renewed for additional five (5) year terms (a "Renewal Term"). After the Initial Term, this Agreement may be renewed for additional five (5) year terms (a "Renewal Term"). At least one hundred and eighty (180) days, but no more than three hundred and sixty-five (365) days, prior to the expiration of the Initial Term, Provider shall give written notice to Purchaser of the availability of the Renewal Term. Purchaser shall have sixty (60) days to agree to continuation of this Agreement for the Renewal Term. Absent agreement to the Renewal Term this Agreement shall expire on the Expiration Date. The Initial Term and the subsequent Renewal Term, if any, are referred to collectively as the "Term".
- 2. <u>Schedules</u>. The following Schedules hereto are hereby incorporated into this Agreement:

Schedule 1	Description of the Premises, System and Subsidy
Schedule 2	Energy Services Payment

Schedule 3	Early Termination Fee
Schedule 4A	Estimated Annual Production
Schedule 4B	Guaranteed Annual Production
Schedule 5	Notice Information
Schedule 6	Site-Specific Information and Requirements
Schedule 7	Scope of Work
Schedule 8	Criteria & Codes
Schedule 9	Submittal & Project Acceptance
Schedule 10	General Electric Specifications
Schedule 11	Photovoltaic System Specifications
Schedule 12	Solar Photovoltaic Roof Structure Mounting Specifications
Schedule 13	Solar Photovoltaic Canopy Structure Specifications
Schedule 14	50% Designs

3. <u>Purchase Requirement; Energy Services Payment</u>. "<u>Energy Services</u>" means the supply of electrical energy output from the System. Purchaser agrees to purchase one hundred percent (100%) of the Energy Services generated by the System and made available by Provider to Purchaser during each relevant month of the Term. While the Energy Services are calculated and billed on a per kWh basis as set forth in Schedule 2 of these Special Conditions, they represent a package of services and benefits.

4. <u>Milestone Dates</u>.

- 4.1 The Guaranteed 90% Design Date for the Site is 30 business days from NTP.
- 4.2 The Guaranteed Permit Submission Date for the Site is 15 business days following the Purchaser's written approval of the 100% Design Set.
- 4.3 The Guaranteed Construction Start Date is 450 calendar days from the NTP, with day for day extensions if the areas of solar development are not available to start System construction and provided that the Local Electric Utility is prepared to begin its construction on any required utility, (distribution or transmission), upgrades, if any.
- 4.4 The Guaranteed Commercial Operation Date is 250 calendar days after the Construction Start Date, which date may be extended on account of Force Majeure Events or otherwise pursuant to the Agreement.
- 5. <u>Privacy</u>. Purchaser acknowledges that the System may collect certain information about Purchaser's electricity usage and the System performance. Such information may be stored and processed in the United States or any other country in which Provider or its third-party service providers, or its or their respective affiliates, subsidiaries, or service providers, maintain facilities. Purchaser consents to any such transfer of information outside of Purchaser's country.
- 6. <u>Net Energy Metering; Liquidated Damages</u>. Provider represents that it intends to comply with the Local Electric Utility customer requirements of all applicable interconnection and net metering agreements and shall not perform any action that would cause Purchaser to breach the terms and conditions of such interconnection agreements with the Local Electrical Utility so as to maintain the effectiveness of such agreements to preserve the Net Energy Metering (NEM) 2.0 grandfathering for the Initial Term. If after Commercial Operation, Provider's negligent or willful actions or omissions cause Purchaser to breach the Purchaser's interconnection agreements, and such breach leads to the permanent loss of NEM 2.0 grandfathering, Provider will compensate the Purchaser the lost monetary value of the grandfathering by crediting the Purchaser on each monthly billing for the duration of the loss of grandfathering as follows:
 - (a) For loss of NEM 2.0 grandfathering: 10% of the kWh Rate of the Energy Services Payment.

Provided, however, that in the event of a change in Applicable Law that occurs after the Commercial

Operation Date and results in a loss of NEM 2.0 grandfathering, Provider shall have no liability with respect to compensating Purchaser as set forth herein. Provided further that Purchaser shall ensure any correspondence with the Local Electric Utility regarding the tariff and changes to the interconnection agreement are shared with Provider. Purchaser acknowledges that the credit above is Purchaser's sole remedy with respect to such loss.

- 7. <u>Estimated Annual Production</u>. The annual estimate of electricity generated by the system for each year of the initial term is set as forth in Schedule 4A of the Special Conditions ("<u>Estimated Annual Production</u>").
- 8. <u>Guaranteed Annual Production</u>. The annual estimate of guaranteed electricity generated by the system for each year of the initial term is set as forth in Schedule 4B of the Special Conditions ("<u>Guaranteed Annual Production</u>").
- 9. <u>Minimum Guaranteed Output</u>. If the System fails to generate the Guaranteed Annual Production for a full Term Year (such amount, the "<u>Minimum Guaranteed Output</u>"), otherthan as a result of the acts or omissions of Purchaser or the Local Electric Utility (including a Disruption Period), or an Event of Force Majeure, Provider shall credit Purchaser an amount equal to Purchaser's Lost Savings (as calculated below) on the next invoice or invoices issued during the following Term Year. The formula for calculating Lost Savings for the applicable Term Year is as follows:

Lost Savings = $(MGO *WPR - AE) \times RV$

MGO = Minimum Guaranteed Output, as measured in total kWh, for System for the applicable Term Year.

WPR = Weather Performance Ratio, measured as the ratio of the actual insolation over typical (pro-forma) insolation shall only apply if the ratio is less than 1.00.

AE = Actual Electricity, as measured in total kWh, delivered by the System for the Term Year.

RV = (ATP - kWh Rate)

ATP = Average tariff price, measured in \$/kWh, for the applicable Term Year paid by Purchaser with respect to the Premises. ATP with respect to the System under this Agreement shall be in accordance with the following schedule.

Term	ATP (\$/kWb)	Term Voor	ATP (\$/IzWb)
I Cal	(\$/ K ** 11)	I cal	(\$/K ¥¥ II)
1	\$0.1700	11	\$0.2285
2	\$0.1751	12	\$0.2353
3	\$0.1804	13	\$0.2424
4	\$0.1858	14	\$0.2497
5	\$0.1913	15	\$0.2571
6	\$0.1971	16	\$0.2649
7	\$0.2030	17	\$0.2728
8	\$0.2091	18	\$0.2810
9	\$0.2154	19	\$0.2894
10	\$0.2218	20	\$0.2981

kWh Rate = the kWh Rate in effect for the applicable Term Year, measured in \$/kWh.

Lost Savings Cap = System size (DC) as installed in megawatts, multiplied by \$27,000. For the avoidance of doubt, the Lost Savings Cap is applicable to each Term Year.

If the RV is zero or less, then no Lost Savings payment shall be due to Purchaser. Such payment for any Lost Savings shall be made by Provider no later than sixty (60) days after the end of the Term Year during which such Lost Savings occurred (or following the date of termination, in the event of an early termination of this Agreement).

- 10. <u>Allowed Disruption Time</u>. Notwithstanding the provisions in Section 4.3 of the General Terms and Conditions to the contrary, during the initial Term, Purchaser shall be afforded two (2) periods annually which may be used consecutively or in separate periods of at least twelve (12) hours each ("<u>Allowed Disruption Time</u>") during which the System shall be rendered non-operational. Purchaser shall not be obligated to make payments to Provider for electricity not received during the Allowed Disruption Time, nor shall Purchaser be required to reimburse Provider for any other lost revenue during the Allowed Disruption Time, including any lost revenue associated with any reduced sales of Environmental Attributes, and Provider shall be credited for the estimated lost production the System would have produced during such Allowed Disruption Time toward satisfaction of its Minimum Guaranteed Output, as set forth in Section 8 of the Special Conditions, such estimated lost production to be calculated in the same manner as set forth in Section 4.3 of the General Conditions.
- 11. <u>Sunlight Access</u>. Purchaser will take all reasonable actions as necessary to prevent other buildings, structures or flora from overshadowing or otherwise blocking access of sunlight to the System.
- 12. <u>Use of System</u>. Purchaser will not use electrical energy generated by the System for the purposes of heating a swimming pool within the meaning of Section 48 of the Internal Revenue Code.

IN WITNESS WHEREOF and in confirmation of their consent to the terms and conditions contained in this Agreement and intending to be legally bound hereby, Provider and Purchaser have executed this Agreement as of the Effective Date.

PROVIDER: FFP BTM SOLAR, LLC

By:

Name: Yumitake Furukawa Title: Vice President

In witness of and in agreement with this Agreement's terms, the parties, by their duly authorized representatives, affix their respective signatures:

COUNTY OF SAN MATEO

By: President, Board of Supervisors, San Mateo County

Date:

ATTEST:

By: Clerk of Said Board

SCHEDULES

A. Premises	222 W 39TH AVENUE, SAN MATEO, CA 94403
Site diagram attached:	X Yes □No
B. Description of Solar System	Behind the meter, net energy metering, roof-mounted and canopy solarstructures as further detailed in Schedules
Solar System Size:	<u>637.45</u> kW (DC) (this is an estimate (and not a guarantee) of the Systemsize; Provider may update the System Size prior to the Commercial Operation Date.)
C. Anticipated Subsidy or Rebate	\$0.00

Schedule 2 – Energy Services Payment

Purchaser shall pay to Provider a monthly payment (the "<u>Energy Services Payment</u>") for the Energy Services provided by the System during each calendar month of the Term equal to the product of (x) Actual Monthly Production for the System for the relevant month multiplied by (y) the kWh Rate.

The "<u>Actual Monthly Production</u>" means the amount of energy recorded by Provider's metering equipment during each calendar month of the Term.

The kWh Rate with respect to the System under this Agreement shall be in accordance with the following schedule:

Term Year	kWh Rate (\$/kWh)	Term Year	\$/kWh Rate (\$/kWh)
1	\$0.2013	11	\$0.2013
2	\$0.2013	12	\$0.2013
3	\$0.2013	13	\$0.2013
4	\$0.2013	14	\$0.2013
5	\$0.2013	15	\$0.2013
6	\$0.2013	16	\$0.2013
7	\$0.2013	17	\$0.2013
8	\$0.2013	18	\$0.2013
9	\$0.2013	19	\$0.2013
10	\$0.2013	20	\$0.2013

<u>Distribution Upgrades.</u> Within thirty (30) days of receipt of notice from the Local Electric Utility of distribution upgrade costs required by the Local Electric Utility, Purchaser will provide written notice (email is acceptable) to Provider of Purchaser's election of one of the following options:

- a. Purchaser will bear all of the reasonably documented scope change costs, and the kWh rate as stated in Table 1 will remain unchanged.
- b. For every \$0.01 per watt DC of such costs, the kWh rate in Table 1 will increase \$0.00065 per

kWh.

<u>Scope Changes (ITC Eligible)</u>. If changes in project scope occur that are eligible for the Federal Investment Tax Credit (including but not limited to adverse geotechnical conditions, changes to scope of work to be completed by Purchaser's contractors, or the inclusion of spare conduit) and the costs directly related such changes go beyond those contemplated as part of the development and implementation of the System in this Agreement, Provider will provide documentation demonstrating the direct and actual time and materials costs relating to such costs to Purchaser as defined in this Document. Within thirty (30) days after Purchaser receives such documentation, Purchaser willprovide written notice to Provider of Purchaser's election of one of the following options:

- c. Purchaser will bear all of the reasonably documented scope change costs, and the kWh rate as stated in Table 1 will remain unchanged.
- d. For every \$0.01 per watt DC of such costs, the kWh rate in Table 1 will increase \$0.00055 per kWh.Provider shall then be responsible for all associated costs and payments.

<u>Scope Changes (Non-ITC Eligible)</u>. If changes in project scope occur that are not eligible for the Federal Investment Tax Credit (including but not limited to distribution upgrade costs required by the Local Electric Utility, ADA compliance costs not related to System configuration or construction) and the costs directly related such changes go beyond those contemplated as part of the development and implementation of the System in this Agreement, Provider will provide documentation demonstrating the direct and actual time and materials costs relatingto such costs to Purchaser as defined in this Document. Within thirty (30) days after Purchaser receives such documentation, Purchaser will provide written notice to Provider of Purchaser's election of one of the following options:

- a. Purchaser will pay the entire amount of such associated costs, and the kWh rate as stated in the PPA Rate Table will remain unchanged.
- b. For every \$0.01 per watt DC of such associated costs, the kWh rate in the PPA Rate Table will increase \$0.00065 per kWh, Provider shall then be responsible for all associated costs and payments.

Schedule 3 – Early Termination Fee

The Early Termination Fee with respect to the System under this Agreement shall be calculated in accordance with the following:

Early Termination	Column 1 Early Termination Fee	Purchase Date Occurs on the 91 st day following:	Column 2 Early Termination Fee
Occurs in Year:	where Purchaser does <u>not</u>	(Each "Anniversary" below	where Purchaser takes
	take Title to the System	shall refer to the anniversary	Title to the System
	(\$/Wdc including costs of	of the Commercial Operation	(\$/Wdc, does <u>not</u> include
	removal)	Date)	costs of removal)
1*	\$5.87		
2	\$4.41		
3	\$4.11		
4	\$3.92		
5	\$3.77		
6	\$3.62	5 th Anniversary	\$3.12
7	\$3.53	6 th Anniversary	\$3.03
8	\$3.48	7 th Anniversary	\$2.98
9	\$3.43	8 th Anniversary	\$2.93
10	\$3.37	9 th Anniversary	\$2.87
11	\$3.32	10 th Anniversary	\$2.82
12	\$3.26	11 th Anniversary	\$2.76
13	\$3.20	12 th Anniversary	\$2.70
14	\$3.14	13 th Anniversary	\$2.64
15	\$3.07	14 th Anniversary	\$2.57
16	\$3.00	15 th Anniversary	\$2.50
17	\$2.93	16 th Anniversary	\$2.43
18	\$2.86	17 th Anniversary	\$2.36
19	\$2.78	18 th Anniversary	\$2.28
20	\$2.70	19 th Anniversary	\$2.20

At Expiration (the end of the Initial Term), the amount in Column 1 shall be deemed to be zero (0). *Includes Early Termination prior to the Commercial Operation Date.

Schedule 4A– Estimated Annual Production

Estimated Annual Production commencing on the Commercial Operation Date with respect to System under this Agreement shall be as follows:

Term Year	Estimated Production (kWh)	Term Year	Estimated Production (kWh)
1	1,005,500	11	956,341
2	1,000,473	12	951,560
3	995,470	13	946,802
4	990,493	14	942,068
5	985,540	15	937,357
6	980,613	16	932,671
7	975,710	17	928,007
8	970,831	18	923,367
9	965,977	19	918,750
10	961,147	20	914,157

The values set forth in the table above are estimates (and not guarantees), of approximately how many

kWhs are expected to be generated annually by the System assuming the System size indicated in Schedule 1 and based on initial System designs. Provider may deliver to Purchaser an updated table on or about the Commercial Operation Date based on the actual System size and design.

Schedule 4B – Guaranteed Annual Production

Guaranteed Annual Production commencing on the Commercial Operation Date with respect to System under this Agreement shall be as shown in the table below.

Term Year	Guaranteed Production (kWh)	Term Year	Guaranteed Production (kWh)
1	904,950	11	860,707
2	899,080	12	856,404
3	895,923	13	852,122
4	891,444	14	847,861
5	886,986	15	843,622
6	882,551	16	839,404
7	878,139	17	835,207
8	873,748	18	831,030
9	869,379	19	826,875
10	865,032	20	822,741

The values in the in the table above shall represent 90% of the P50 production estimate based on Provider's as-built design production models. P50, as used herein, means the 50% probability that the Actual Electricity for such Term Year will be at least the as-built design production for such Term Year. Provider may deliver to Purchaser an updated table on or about the Commercial Operation Date based on the actual System size and design.

Schedule 5 – Notice Information

Purchaser:

County of San Mateo 555 county center floor 2, Redwood City, CA 94063 (650) 369-4715 slin@smcgov.org

Provider:

c/o Forefront Power, LLC Attn: Director, Energy Services 100 Montgomery St., Suite 725 San Francisco, CA 94104

With a copy to

c/o Forefront Power, LLC Attn: Legal Department 100 Montgomery St., Suite 725 San Francisco, CA 94104 Email: FPLegal@forefrontpower.com

Financing Party:

[To be provided by Provider when known]

Schedule 6 – Site Specific Information and Requirements

In accordance with Section 7.2(f) of the General Terms and Conditions, the following information references any known restrictions on the use of the Premises for the construction, ownership, use and operation of the System, including any land use restrictions, known underground structures or equipment, or limitations arising under permits or applicable law, as well as any additional Environmental Documents, reports or studies in the possession or control of the Purchaser, which shall each have been delivered to Provider as of the Effective Date:

Type of Information	Information Delivered to Provider as of the
Building Design Plan Sets	
Dunung Design Fian Sets	1 PG&F and MSB Conduits as -
	huilt -
	https://drive.google.com/file/d/11
	uWeOB1iUGK6i5OalXnlYOnTI
	vkHcSvg/view?usp=drive link
	2. Security camera Schematic sketch
	-
	https://drive.google.com/file/d/1y
	0DQw9Qp3U_kwvfCiD3e5aPgN
	Or7kzJm/view?usp=drive_link
	3. Electrical MSB switch gear
	submittals -
	https://drive.google.com/file/d/13i
	=
	FolDRlvhLKAbEPtBrNewOszl8q
	BlR/view?usp=drive_link
	4. Reference roofing submittal
	(Note: Link Building roofing
	submittal not yet completed.
	Expected to be the same material

1		CONFIDENTIAL AND PROPRIET
		as the reference submittal) -
		https://drive.google.com/file/d/1U
		7B1RPoS0qHxo0UrYK2I_ww-
		bkDhEiFn/view?usp=drive_link
	5.	PG&E Interconnection
		application (sent May 10, 2022) -
		https://drive.google.com/file/d/1U
		Cc1nP7JPk9qpRVkd96KUL35ap
		Vp-o60/view?usp=drive link
	6.	SageEnergy Single Line for
		Interconnection Application (sent
		May 10 2022) -
		https://drive.google.com/file/d/1h
		GFw9bs5vFwmX79 BVHIAO1r
		GE iB0Ks/view?usp=drive link
	7	Existing Solar Systems as built
	/.	documentation
		https://drive.coogle.com/file/d/11
		nups://drive.google.com/me/d/11
		VDCU2/ ALEUIGENWSIN5XZ
	0	<u>vBGH8/view/usp=drive_link</u>
	8.	Admin roof feeders to the MSB
		(sent on June 1, 2022) -
		https://drive.google.com/file/d/11
		QcCcAITN2r-
		<u>TgcUy410aR0j5yR6/v1ew?usp=dr</u>
		ive_link
	9.	Summary of conduit
		infrastructure provided by the
		purchaser -
		https://drive.google.com/file/d/1w
		MqaXz6nWvVVauPDOiH6UhyK
		<u>qB8xXLGv/view?usp=drive_link</u>
	10.	Tree canopy clearance
		instructions (sent on August 17,
		2022) -
		https://drive.google.com/file/d/1U
		eyVld7KO9hLvtBslRmemJHxo1
		a AG3m/view?usp=drive link
	11.	Existing retaining wall footing
		information -
		https://drive.google.com/file/d/17
		W5HNe5NJ nfNmc5jCW6WCxt
		SxWNqZJJ/view?usp=drive link
	12.	Admin Building Drawings -
		https://drive.google.com/drive/fol
		ders/1u7FonibxkDFSEFH3nFM2r
		wHWiPYWOgrJ?usp=drive link
		<u>_</u>
	13	Link Building Drawings –
	10.	https://drive.google.com/drive/fol
		ders/1NUhSPI2h-
		zRNNIO0S7veBig-
		I 4W5vRbN?usp=drive link
		<u>L+wywww.usp_unvc_nnk</u>
	14	Site Work Drawings
	14.	https://dwive.gc.s.l.
		https://drive.google.com/drive/fol
		$\frac{\text{ders}/13q}{91/\text{m} \times \text{dz4} \text{V} \text{vp} \text{V} \text{Ce3z}}$
		<u>901EccSqEOX?usp=drive_link</u>

	15. PGE&E Pad Drawings – <u>https://drive.google.com/drive/fol</u> <u>ders/1oGGvbzNTbMdLRWZoYz</u> <u>BH0OihGRPk35p9?usp=drive_li</u> <u>nk</u>
	16. Site Photometrics - <u>https://drive.google.com/file/d/1f</u> <u>HyfHcZ2F7Y-</u> <u>OxZPtoGkLtOo2_Nk-</u> <u>dTz/view?usp=drive_link</u>
	17. Updated site work ASI #005 CADs - https://drive.google.com/drive/fol ders/1U29BXCFQTakuMNcqtmk GwfkTMZoa_Y8O?usp=drive_lin k
Phase I environmental site assessment	https://drive.google.com/file/d/1DjYzZ36OpLgsj WaM4zD9OUf-7aV5UMdk/view?usp=drive_link
Reports on site sampling (soil or groundwater)	https://drive.google.com/file/d/1b1qD_0obTIm2 m- SyRcWvdKtkrEmh6jKW/view?usp=drive_link Sent on June 13, 2022
Land use restrictions imposed by governmental authorities	Not Applicable

Type of Information	Information Delivered to Provider as of the Effective Date
Lease restrictions on proposed solar installation	Not Applicable
Cleanup plan, corrective action plan or permits applicable to Premises	Not Applicable
Open spill reports or unresolved release reports	Not Applicable
Known underground storage tanks, foundations, utilities	Site Composite Utility Plan - https://drive.google.com/file/d/1y0DQw9Qp3U_k wvfCiD3e5aPgNOr7kzJm/view?usp=drive_link
Utility easements or public rights of way	Property Line Survey (sent on May 23, 2023) - https://drive.google.com/file/d/1kZhE- DxK2Zyae8d1YCb6_9TwKKGCdEP0/view?usp= drive_link
Completed closure or "cap" on buried waste or other materials	Not Applicable
Systems in place for extracting and collecting methane, groundwater or leachate	Not Applicable

Subject to the control of a trustee, group of entities or entities	Not Applicable
other than landlord and/or Purchaser	

<u>Schedule 7 – Scope of Work</u>



Project Scope

Key deliverables and milestones of each scope element shall include but not be limited to:

I. FUNDING

1. For a Power Purchase Agreement (PPA) Contract, provide complete procurement, construction and operational phase funding per the approved and executed Contract, resulting in no capital cost to the Purchaser.

II. DESIGN PHASE

- 1. Preliminary design of the PV systems to meet the targeted forecasted electrical production at each site or to the maximum system size limits allowed by the footprint available or to an agreed-upon size with the Purchaser. Sizing shall include accurate and detailed modeling of system production for each specific site based on shading, available tariffs and other site constraints using industry standard modeling tools. The goal is to meet Purchaser's requirements for LEED Silver criteria. Preliminary design shall include plans, design criteria and a brief description of thePV system sufficient for presentation and discussion with the Purchaser.
- 2. Detailed design and complete construction drawings of the PV systems and all ancillary work sufficient for permitting and construction. Drawings must fully describe all aspects of the construction work including fencing (if applicable), directional boring/trenching, excavations, elevated racking and mounting systems, electrical systems, signage, foundations, lighting, ADA, access, etc. Firm will provide Electrical, Structural and all other required engineers of record to provide a complete, stamped drawing set as required to permit and construct a complete photovoltaic Project. The electrical construction drawings shall show and include all conduit below and above finished grade/finish, single-line-diagram showing, but not limited to, the interconnection of the PV system, etc. All plans and specifications must be reviewed and approved by Project Development Unit of Purchaser of San Mateo before submitting for approval by Purchaser's building/planning, and any other Local Authority(ies) Having Jurisdiction (AHJs) over Project.
- 3. All permitting and permitting fees required to complete the project with the exception of CEQA. The Purchaser is the lead agency for CEQA permitting. Provider must support the Purchaser in preparing CEQA documentation, adhere to CEQA requirements, and implement all CEQA mitigation identified by the Purchaser.

III. CONSTRUCTION PHASE

- 1. **Installation** of all equipment necessary for a complete, interconnected and operational solar PV system, including, but not limited to:
 - Solar PV modules, including modules where noted
 - Inverters
 - Interconnection to the existing switchgear including line-side connection. All electrical connectors, cabling & components necessary for a complete solar system
 - Coordination with the Purchaser and Purchaser's agents for electrical service shut down.
 Provider shall take all reasonable efforts to minimize the quantity and duration of

ATTACHMENT A1: SCOPE OF WORK

San Mateo County Solar Photovoltaic Project



electrical service shutdown(s). Any disruption to the electrical service should occur during the weekend or after hours to limit the impact to the occupied building.

- All mounting systems, including canopy structures, ground or roof mount as applicable
- All monitoring equipment necessary to remotely access and download real-time and historical PV energy production, with capability to provide reporting sufficient for WREGIS REC registration, and to remotely access and download real-time and historical site energy consumption data. Historical data on 15-minute interval shall be readily available for the full operating history of the PV system.
- Any balance of system items for a complete, interconnected and operational solar PV system
- All lighting, security or other ancillary equipment described in the contract documents
- Installation of modules and appropriate racking systems, in areas of public rooftop, as detailed in design drawings, with understory of modules clean and aesthetically suitable.
- 2. Battery Energy Storage System (BESS) Provider: N/A
- 3. Utility interconnection applications, including tariff change requests, processing costs and coordination with the local utility-companies such as PG&E necessary to achieve interconnect and permission to operate.
- 4. Safety. Provide safety officer onsite to assure site safety at all time. All incidents shall be properly investigated, reported and documented.
- 5. Coordinate and schedule **weekly project meetings** from Notice to Proceed (NTP) through project closeout with all stakeholders. Provider to maintain formal meeting minutes and 'three week look-ahead' schedule and distribute to all attendees within 48 hours from the meeting and an updated master project schedule each month. Frequency of meetings are allowed to change upon the stakeholder availability and approval from the Purchaser.
- 6. Coordination with and support of inspectors, the Purchaser, Architect, Design and Construction subProviders and their consultants during design, construction, commissioning and close-out. Coordination with on site contractor Truebeck Construction Inc. and facility staff. The existing buildings are operational and construction activities are ongoing. There is very limited parking and all deliveries, access, material staging etc. will need to be coordinated between Provider and the existing building staff/construction teams. All PV construction personnel will need to attend the Truebeck Construction Inc. safety training. Truebeck Construction Inc. Senior Super intendant is main authority on site to oversee all construction activities and will need to approve any requested material staging. Provider is responsible to coordinate and schedule all inspections with AHJ 4Leaf. Inspections are not to be scheduled on Fridays to the greatest extent possible.
- 7. **Project Commissioning**, including all associated tasks and documentation related to successfully commissioning the system. Commissioning shall include assisting any third-party commissioning agents/inspectors with their process and providing documentation as requested.
- 8. Final PV **"as-built" Construction Documents** clearly conformed with all changes during construction.
- 9. Provision of a comprehensive **Operations & Maintenance Manuals** for each installed system, per requirements listed in Schedule 9.
- 10. Conduct a **training** for Purchaser staff, with orientation to the Operations & Maintenance Manuals, systems and safety procedures. Trainings are to be video recorded.
- 11. Secure storage facility at job Site for all PV system equipment and supplies, including any required

security.



- 12. Legal toilet and hand wash sink facilities at job Sites.
- 13. Daily cleanup to "broom clean" conditions.
- 14. Return disturbed areas to **pre-construction conditions** including repair of all damaged pavement/concrete, restriping, landscape restoration, irrigation restoration, equipment track marks & scuffs on finished concrete surfaces and removal of USA markings.
- 15. Installation of Purchaser-approved **project information signage** and removal at completion of project.
- 16. **Project closeout**, inclusive of obtaining AHJ "closed and certified" status for all project-associated AHJ applications.

IV. OPERATIONAL PHASE

- 1. All Providers must offer a comprehensive **onsite training**, and supporting documentation, to facility staff in PV system operations, safety and maintenance consistent with the System Warranty, Performance Guarantee and O&M contract provisions.
- 1. An Annual Report that details the following:
 - Annual production in kWh
 - Total energy produced to date in kWh in comparison to pre-solar energy consumption
 - Significant issues encountered and mitigation measures taken
 - Maintenance performed during that year for each individual PV system
 - Actual Performance compared with estimated performance, performance guarantee, and any true-up period accounting
- 2. Work sites and adjacent areas are to be cleaned of debris and left in an orderly fashion. All improvements made in constructing the System are to be maintained.
- 3. O&M personnel must maintain safe operating conditions, wear identifying clothing, check-in with site personnel prior to commencing work, and minimize impact on Purchaser activities.
- 4. Throughout the Term, Provider shall at all times comply with the Local Electric Utility customer requirements of all applicable interconnection and net metering agreements so as to maintain the effectiveness of such agreements to preserve the prevailing Net Energy Metering (NEM) agreement for a full 20 years from the date of Permission to Operate (PTO) from the Local Electric Utility. Provider shall not perform any action that would result in the breach of the terms and conditions of such agreements

V. PROVIDER CONSTRUCTION MILESTONES

Site(s)	Design Complete, Package Submitted	Permit Received	Construction Start	Substantial Completion	Final Completion
San Mateo Medical Center Project - Roofs	Dec-23	Apr-24	Mar-25	June-25	July-25
San Mateo Medical Center Project - Canopies	Dec-23	Apr-24	Unground Nov-24 Steel and panels – Dec- 24	Mar - 25	July - 25

<u>Schedule 8 – Criteria & Codes</u>

I. <u>GENERAL CRITERIA</u>

- 1. All Project construction is to be completed in accordance with the final Construction Schedule, mutually agreed to by both Parties and appended hereto.
- 2. The Purchaser shall be responsible for specifying and conducting tree removal and/or trimming as needed to meet production guarantee of PV system arrays Purchaser is responsible for any ongoing tree trimming as needed to ensure the systems meet the performance guarantees.
- 3. Provider shall notify the Purchaser in writing of any proposed change orders (PCO), requests for information (RFI), or construction change directives (CCD), with all supporting information regarding the RFIs or changes that impact the System energy production or physical appearance. At minimum, the Provider must detail for hours (using union/DIR rates), equipment rental (using CalTran rates), insurance/bonds breakdown, and profit/overhead (not exceeding 15% including the sub tiers). Purchaser shall have 10 business days to respond to all PCOs, RFIs, or CCDs. Provider shall take all liability and pay all costs for any work performed in relation to a PCO, RFI, or CCD without written approval of Purchaser.
- 4. The Provider shall coordinate site access through all phases of the project with key stakeholders and Purchaser identified staff at least 24 hours prior to any personnel arriving on site. All deliveries, access needs, material staging must be approved by General Contractor as they are responsible for maintaining site security and site logistics. The Provider shall coordinate with and provide access and support to all inspectors, Purchaser staff or consultants during testing and inspections of all systems. Exclusive of local ordinances, Site access and logistics is the responsibility of Truebeck Construction Inc. and all access requirements, material staging, parking, etc must be coordinated with the project's general contractor. Due to construction workers on site for new building construction and the existing building being fully operational, there is very limited local parking or staging areas. Access to the electric utility meter and utility lockable disconnect will be provided upon request. No new access roads are planned; however, should the need arise, Purchaser and Provider shall agree upon reasonable accommodations and compensation. Purchaser to permit using on site water and power as available for construction at no charge to Provider, with the exception of fire hydrants. Use of generators must be approved by the AHJ prior to on site use., subject to BAAQMD and local ordinances.
- 5. The Provider shall coordinate closely with the Purchaser to ensure all construction activities minimizeimpact on operations and events at the sites. Construction fencing shall enclose entire work area if applicable.
- 6. Access during regular weekday working hours. The General Contractor is responsible for site security and site access. All access requirements must be coordinated and approved by General Contractor.
- 7. Provider is responsible for on-site installation supervision throughout the duration of the project.
- 8. Where applicable, all active work areas must be fenced off from start of work at that area until completion or until area is safe for entry, whichever is longer. Temporary fencing and access control layouts shall be submitted to the Purchaser and approved for each site prior to commencing construction where applicable. Temporaryfencing shall also be installed to protect trees and vegetation adjacent to work areas from construction damage where applicable. Fencing is not required on roof installations.
- 9. Provider is to meet applicable codes and specifications with regard to dust during construction and 8/26/2020 A2 -

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seek to minimize dust migration from the construction site.

- 10. Provider acknowledges that adjacent facilities will remain in operation during all or a portion of the Work, and it shall take all reasonable precautions to minimize noise as required by applicable laws and the Contract Documents. Notice of proposed noisy operations, including without limitation, operation of pneumatic demolition tools, concrete saws, and other equipment, shall be submitted to Purchaser a minimum of forty-eight (48) hours in advance of their performance. Provider shall further prevent any of its employees or its Sub-Provider employees from playing any recorded music devices or radios or wearing any radio headphone devices for entertainment while working on the project.
- 11. Drugs Tobacco, and Alcohol Provider shall take such steps as are reasonably necessary to ensure that employees of Provider or any of its Sub-Provider's employees do not use, consume, or work under the influence of any alcohol, tobacco or illegal drugs while on the project. Likewise, Provider shall prevent its employees or Sub-Provider's employees from bringing any animal onto the project. Provider shall not violate any written Purchaser policies
- 12. Provider is responsible for all generated trash. Purchaser owned dumpsters and trash bins may not beused for storage or disposal.
- 13. Provider shall clean all work areas on a daily basis and equipment after project completion. Provider shall ensure that work areas are clear of construction debris, spoils and that all demolition and repair has been completed and surfaces are swept prior to releasing work areas to public access.
- 14. All staff are to wear identifying clothing at all times when on-site. All personnel on site must first complete the general contractor's safety orientation and wear full PPE as, required on an active construction site at all times.
- 15. Two (2) or more ground guides shall lead the vehicle across the area of travel for all driving and delivery on the Premises. The speed limit on-the Premises shall be five (5) miles per hour (maximum) or less if conditions require. General Contractor shall designate a construction entry point to eachsite.
- 16. During the operational phase, all staff or Sub-Providers must check in at the office of the respective facility upon arrival at the site.
- 17. All electrical enclosures shall match existing conditions, including CMU walls, gates, and fences.
- 18. Provider is responsible for all aspects of safety of the construction zone. All personnel within the perimeter of the construction zone shall wear proper personal protective equipment (PPE) without any exception.

II. SOLAR PV CRITERIA

- 1. The Provider shall be responsible for identifying the appropriate conductor route in coordination with the Purchaser. Provider shall adhere to the number of tie-ins at each site as required by the Purchaser. Any change from a physical tie-in to a NEM-A arrangement must be approved in writing bythe Purchaser.
- 2. The Provider shall work with the Purchaser as-needed to provide visualizations of proposed systems and assessment of potential glare or reflectivity issues.
- 3. Warranties The Provider shall be required to provide the following minimum warranties consistent with Net Energy Metering requirements and the California Public Utility Code 387.5(d)(4), the Provider shall provide a warranty of not less than 10 years to protect against defects and more than a 15% degradation of electrical generation output that may occur as a result of faulty installation. Standard

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warranty coverage should be at least twenty-five (25) years for any PV modules, at least ten (10) years for all inverters, or consistent with current Net Energy Metering Requirements for PV System warranty requirements, whichever is greater. Meters must have a 1-year warranty to ensure against defective workmanship, system or component breakdown, or degradation in electrical output of more than 15% from their originally rated electrical output during the warranty period. For meters that are integrated into the inverter, the meter warranty period must be 10 years.

III. GENERAL CODES, GUIDELINES AND STANDARDS

The Provider shall be required to comply with all applicable California public works and project requirements including, but not limited to:

- 1. Americans with Disabilities Act (ADA).
- 2. American National Standards Institute (ANSI).
- 3. American Society for Testing and Materials (ASTM)
- 4. California Building Code (CBC).
- 5. California Electrical Code (most recent).
- 6. California Environmental Quality Act (CEQA).
- 7. California Fire (CalFire) Solar Photovoltaic Installation Guidelines.
- 8. California Geological Survey (CGS).
- 9. California Labor Code
- 10. California Title 20 and 24.
- 11. Federal Communications Commission (FCC).
- 12. Local and State Fire Code.
- 13. Institute of Electrical and Electronics Engineers (IEEE) 1547: Standard for Interconnecting Distributed Resources with Electric Power Systems.
- 14. International Electrotechnical Commission (IEC) Technical Committee 82 (TC82).
- 15. National Fire Protection Association (NFPA), National Electric Code (NEC), Including NFPA 70 and NEC Article 690
- 16. National Electrical Manufacturers Association (NEMA).
- 17. Occupational Safety and Health Administration (CAL-OSHA).
- 18. Local Utility requirements including Net Energy Metering Rules, Interconnection Requirements and Tariffs.
- 19. Storm Water Pollution Prevention Plan (SWPPP).
- 20. Underwriters Laboratories (UL) Standards, including 1703: Flat-plate Photovoltaic Modules and Panels and 1741: Standard for Inverters, Converters, Controllers, and Interconnection System Equipment for Use with Distributed Energy Resources.
- 21. Uniform Solar Energy Code ICC.
- 22. All applicable State and Local Codes and Ordinances.
- 23. Purchaser Specifications and Requirements.
- 24. Office of Statewide Health Planning and Development (OSHPD)

Provider shall be solely responsible for any and all tax law compliance, including, without limitation, compliance with the requirements related to any use of the Investment Tax Credit. Purchaser shall notmake or cause to be provided any legal guidance or opinions related to taxation matters.

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IV. EQUIPMENT AND INSTALLATION STANDARDS

All system design, equipment and installation must conform to the following codes, standards and rating methodologies.

- 1. All design, equipment and workmanship must comply with the requirements of the local electrical utility. The Provider must ensure all proposed equipment is acceptable to the local electrical utility and meets the interconnection and code requirements.
- 2. If any equipment using hazardous materials (i.e. Cadmium or other hazardous materials) are included in the Project, then the environmental impact of the hazardous material usage must be discussed, including any special maintenance requirements and proper disposal/recycling of the equipment at the end of its useful life. Equipment containing hazardous materials must comply with the EPA Landfill Disposal Requirements. Any additional costs related to equipment containing hazardous materials must be clearly identified.
- 3. CPUC approved Electric Rule 21 Generating Facility Interconnections.
- 4. UL1741 (Inverters, Converters and Controllers for Independent Power Systems).
- 5. UL1741-SB (UL 1741 SB specifies the test methods needed to validate compliance with grid protection and grid support functions)
- 6. UL1703 (Standard for Flat Plate Photovoltaic Modules and Panels).
- 7. IEEE 929 (2000) Recommended Practice for Utility Interface of Photovoltaic (PV) Systems.
- 8. IEEE 1262 (1995) Recommended Practice for Qualifications of Photovoltaic (PV) Modules.
- 9. NEC Article 690.
- 10. All applicable Utility Guidelines and Standards for PV Systems, electrical utility systems and metering requirements, including net energy metering requirements.
- 11. Conform to the Utility's Distribution Interconnection Handbook
- 12. Wind uplift requirements per the American Society of Civil Engineers Standard for Minimum Design Loads for Buildings and Other Structures (ASCE 7), and must be able to withstand applicable design wind speeds for that location (at least 85 mph or 105 mph, as applicable (3-second gusts).
- 13. All other applicable codes.

I. <u>LIGHTING SYSTEMS</u>

- Purchaser shall furnish canopy lighting system fixtures for Provider's use when installing the PV System. The fixtures shall conform to all requirements as defined by the applicable codes, laws, rules, regulations, and standards of applicable code enforcing authorities, including but not limited to the Local Electric Utility and Governmental Authorities.
- 2. Canopy lighting systems shall be designed to meet the Illuminating Engineering Society of North America (IESNA) requirements for parking lot areas, to meet or exceed minimum values and maximum uniformity ratios as listed in the IESNA criteria.

- 3. Lighting shall meet all Title 24 requirements for installations in California.
- 4. All lighting sources shall be LED type.
- 5. Lighting control system shall be connected to the existing lighting controls in each area.
- 6. New design shall cover all areas of the parking lots (in the area of the work) to leave no dark spots and meet IESNA and requirements for all areas previously covered by light standards removed under this contract. Existing fixtures may remain, if not in direct conflict with canopies or causing shading of new canopies.
- 7. The proposed photometrics plan is provided in the Schedule 6.

V. CALIFORNIA PUBLIC WORKS COMPLIANCE

The Provider shall be required to comply with all applicable California public works and project requirements including, but not limited to:

- 1. This project is subject to compliance monitoring and enforcement by the Department of Industrial Relations. Provider and any subcontractors will be required to enter certified payroll reports directly into the DIR electronic eCPR system.
- 2. No contractor or subcontractor may be awarded a contract for public work on a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5.
- 3. The Provider has obtained from the Director of the Department of Industrial Relations the general prevailing rate of per diem wages and the general prevailing rate for holiday and overtime work in the locality in which this work is to be performed for each craft, classification or type of worker needed to execute the Contract. These per diem rates, including holiday and overtime work, as well as employer payments for health and welfare, pension, vacation, and similar purposes, are on file at the Purchaser, and are also available from the Director of the Department of Industrial Relations. Pursuant to California Labor Code Sections 1720 et seq., it shall be mandatory upon the Provider, and upon any subcontractor under such Provider, to pay not less than the said specified rates to all workers employed by them in the execution of the Contract. The following are hereby referenced and shall be made a part of the Contract and the Provider stipulates to the provisions contained therein.
 - i. Chapter 1 of Part 7 of Division 2 of the Labor Code (Section 1720 et seq.)
 - ii. California Code of Regulations, Title 8, Chapter 8, Subchapters 3-6 (Section 16000 et seq.)
- 4. Any worker employed to perform work on the Project and such work is not covered by any classification listed in the published general prevailing wage rate determinations or per diem wages determined by the Director of the Department of Industrial Relations, shall be paid not less than the minimum rate of wages specified therein for the classification which most nearly corresponds to the employment of such person in such classification.
- 5. Holiday and overtime work, when permitted by law, shall be paid for at the rate set forth in the prevailing wage rate determinations issued by the Director of the Department of Industrial Relations or at least one and one-half (1½) times the specified basic rate of per diem wages, plus employer payments, unless otherwise specified in the Contract or authorized by law.
- 6. These per diem rates, including holiday and overtime work, and employer payments for health and welfare, pension, vacation, and similar purposes, are on file at the administrative office of

the Purchaser, located as noted above and are also available from the Director of the Department of Industrial Relations. It is the Provider's responsibility to ensure the appropriate prevailing rates of per diem wages are paid for each classification. It shall be mandatory upon the Provider to whom the Contract is awarded, and upon any subcontractor under such Provider, to pay not less than the said specified rates to all workers employed by them in the execution of the Contract.

- 7. In accordance with the provisions of Labor Code Section 3700, the Provider shall secure payment of compensation to all employees. The Provider shall certify in the Contract as follows: "I am aware of the provisions of Section 3700 of the Labor Code, which requires every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the work of this contract."
- 8. It is the policy of the Purchaser that in connection with all work performed under contracts, there be no discrimination against any prospective or active employee engaged in the work because of race, color, ancestry, national origin, religious creed, sex, age, or marital status. The Provider agrees to comply with applicable federal and California laws, including, but not limited to, the California Fair Employment and Housing Act, beginning with Government Code section 12900 and Labor Code section 1735. In addition, the Provider agrees to require like compliance by any subcontractors employed on the work by such Provider.
- 9. The Provider and all Subcontractors shall comply with the provisions of California Labor Code including, but not limited to sections 1777.5, 1777.6, and 1777.7 concerning the employment of apprentices. The Provider and any Subcontractor under him shall comply with the requirements of said sections, including applicable portions of all subsequent amendments in the employment of apprentices; however, the Provider shall have full responsibility for compliance with said Labor Code sections, for all apprenticeable occupations, regardless of any other contractual or employment relationships alleged to exist.
- 10. The Provider shall provide a Drug-Free Workplace Certification pursuant to the requirements mandated by Government Code Sections 8350 et seq., the Drug-Free Workplace Act of 1990. The Drug-Free Workplace Act of 1990 requires that every person or organization awarded a contract or grant for the procurement of any property or service from any State agency must certify that it will provide a drug-free workplace by performing certain specified acts.
- 11. The Provider agrees that it will abide by and implement the Purchaser's Alcoholic Beverage and Tobacco-Free Premise Policy, which prohibits the use of alcoholic beverages and tobacco products, of any kind and at any time, on Purchaser-owned or leased buildings, on Purchaser property and in Purchaser vehicles. The Provider shall procure signs stating "ALCOHOLIC BEVERAGE AND TOBACCO USE IS PROHIBITED" and shall ensure that these signs are prominently displayed at entrances to work areas at all times.
- 12.All other applicable California Public Works Code requirements.

VI. Bonding

1. Performance and Payment Bonds. Provider shall deliver to Purchaser evidence that the prime contractor performing the construction and installation services of the Systems maintains payment and performance bonding in favor of the Provider and meeting the following

requirements. Such evidence shall be provided to the Purchaser prior to the commencement of construction on any Property:

- iii. Performance Bond. A bond issued by a corporate surety authorized to issue surety insurance in California, in a form commonly used for such purposes, in an amount equal to one hundred percent (100%) of the contract price payable under the contract securing the faithful performance of the contractor of its agreement with Provider; and
- iv. Payment Bond. A bond issued by a corporate surety authorized to issue surety insurance in California, in a form commonly used for such purposes, in an amount equal to one hundred percent (100%) of the contract price payable under the contract securing the payment of all claims for the performance of labor or services on, or the furnishing of materials for, the performance of the Contract.

VII. Insurance

- 1. Provider's Insurance. Provider shall maintain the following insurance coverages in full force and effect from the date that any preparatory installation activities begin at the Site throughout the contract Term:
- (a) Workers' Compensation Insurance as required under Applicable Laws;

(b) Employers' Liability Insurance with limits not less than \$1,000,000 for bodily injury per accident, \$1,000,000 for bodily injury by disease per policy and \$1,000,000 for bodily injury by disease per employee;

(c) Commercial Automobile Liability Insurance which will apply to all non-owned, leased and hired automobiles with a combined single limit of not less than \$1,000,000 per accident for bodily injury and property damage;

(d) Commercial General Liability Insurance with limits of not less than \$2,000,000 per occurrence, \$2,000,000 aggregate, which may be meet with a combination of primary and excess umbrella coverage,

(e) Builders Risk Insurance. Provider shall procure and maintain builders' risk insurance (all-risk coverage) on a one hundred percent completed value basis on the insurable portion of the project for the benefit of the Purchaser, and the Provider and subcontractor as their interest may appear, and

(f) Pollution Liability Insurance shall be included as part of the Commercial General Liability Insurance coverage, which may be meet with a combination of primary and excess umbrella coverage.

(g) Provider shall also require any company providing engineering and design services for the System to carry Professional Liability Insurance with limits of not less than \$1,000,000 per occurrence.

Any and all deductible costs shall be borne by the Provider. Excess or Umbrella Liability Insurance is acceptable as a supplement to meet the minimum liability coverage limits required above in (c) and (d), however, the excess or umbrella coverage must be primary non-contributory insurance with the same breadth of coverage as the base policy. Additionally, upon the Commercial Operation Date, Provider shall carry commercially adequate property loss insurance for the System. Provider's liability insurance policies will be written on an occurrence basis and, except for Workers' Compensation Insurance, will include Purchaser as an additional insured as its

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interest may appear and shall contain a waiver of subrogation in favor of Purchaser and any joint operation parties with respect to coverage for workers' compensation and employers' liability. All insurance required to be maintained by Provider shall be primary and non-contributory insurance underlying any other applicable insurance, including but not limited to similar or complimentary insurance maintained by Purchaser. All such insurance shall be carried by insurance carriers acceptable to Purchaser, acceptance not to be unreasonably withheld, and shall not be materially changed without thirty (30) days prior written notice to Purchaser. In addition, each insurance certificate shall contain a provision stating that the insurer shall give Purchaser thirty (30) days prior written notice in the event of cancellation of the insurance. Provider shall not self-insure in part or in whole any risks for which insurance is herein required without the prior written approval of Purchaser. If Provider fails to maintain insurance policies required in this Agreement and fails to promptly cure following Notice from Purchaser, Purchaser may procure such insurance coverage and deduct and retain the amount of the premiums from any sums due to Provider. It shall be Provider's responsibility to require and confirm that each sub-contractor meets the minimum insurance requirements specified in the Agreement. Provider shall list the Purchaser as additionally insured. Purchaser and its officers, agents, employees, and servants shall be named as additional insured on any such policies of insurance, which shall also contain a provision that (a) the insurance afforded thereby to the Purchaser and its officers, agents, employees, and servants shall be primary insurance to the full limits of liability of the policy and (b) if the Purchaser or its officers, agents, employees, and servants have other insurance against the loss covered by such a policy, such other insurance shall be excess insurance only. Provider shall, upon demand of Purchaser, deliver to Purchaser copies of the certificates of insurance.

2. Generally. Upon a Party's request, made no more than once per calendar year, the other Party shall deliver to the requesting Party certificates of insurance evidencing such respective coverage referenced above, which will specify that the requesting Party will be given at least thirty (30) days' prior Notice by the applicable insurer in the event of any cancellation or termination of coverage. Such insurance will (a) be on an occurrence basis; (b) be primary coverage without right of contribution from any insurance of the requesting Party; (c) provide for a severability of interests clause; and (d) permit waivers of subrogation against the requesting Party. All insurance maintained hereunder shall be maintained with companies either rated no less than A- VII as to Policy Holder's Rating in the current edition of A.M. Best's Insurance Guide (or with an association of companies each of the members of which are so rated). Provider's insurer may be an Affiliate of Provider. In the event that any policy furnished by either Party provides for coverage on a "claims made" basis, the retroactive date of the policy will be the same as the Effective Date, or such other date, as to protect the interest of the other Party. Furthermore, for all policies furnished on a "claims made" basis, a Party's provision of such coverage will survive the termination of this Agreement and the expiration of any applicable warranty period, until the expiration of the maximum statutory period of limitations in the State of California for actions based in contract or in tort.

Schedule 9 – Submittal & Project Acceptance



I. DESIGN PHASE

- A. The Purchaser shall review and approve design documentation based on the requirements specified herein. The design drawings and associated documents shall represent 100% of the intended and agreed upon scope for the PV project. The Provider shall be solely responsible for providing complete design and engineering, compliant with all applicable laws and the requirements of the Agreement, by and through appropriately licensed design professionals, including, without limitation, licensed architects and registered professional engineers employed or under direct contract with Provider. The design professionals so engaged shall serve as the Architect or Engineer of Record
- B. On the Effective Date, Provider will be given Notice to Proceed (NTP) for the design phase of the project. Upon NTP, Provider may begin due diligence and site discovery in close coordination with Purchaser staff for site access and scheduling.
- C. The Provider shall conduct design review meetings, maintain and distribute formal meeting minutes for each stage of the process, which shall include, at a minimum, the following design stages:

<u>Design Stage</u>	Time from Notice to Proceed with Design
90% Final Design	within 30
	business days

- D. The Provider shall submit an electronic submittal package for each Design Stage including, but not limited to the items outlined in Table 1 on the following page.
- E. The Provider shall submit the design stage package no less than five (5) business days prior to the design review meeting. The Provider shall address all Purchaser comments in writing no morethan five (5) business days from the date formal Purchaser comments have been received. Purchasercomments shall be incorporated into each successive stage of the design review. Comment responses shall be provided for each phase of design review. Purchaser shall respond to Provider's comments with revisions within ten (10) business days. Any resubmissions to the Purchaser permitting and plan checking dept must be full packages with associated engineer stamps and updated titleblock. Piecemeal resubmission is not acceptable.
- F. The Purchaser will formally approve, in writing, each phase of the design upon the Purchaser's determination that the design is progressing at or beyond the percentage completion expected at stage. The Provider shall not enter a subsequent design phase without the approval of the Purchaser. The Provider is solely responsible for obtaining approvals from the Purchaser and all otherAuthorities Having Jurisdiction (AHJs).
- G. Drawing sheets to be submitted in one full coordinated plan set document, with exceptions for roof systems for coordination with roofing contractor.





Table 1 – Design Submittal Packages

Sul	bmittal Requirement	50% Design	90% Final
1.	Cover Sheet (TOC, project details, designers of record, PV summary table ¹ , etc.)	Х	Х
2.	PV System Sizes & Production Estimates ²	Х	Х
3.	Site Plan (including array names, any interconnection details, conduit routes)	Х	Х
4.	Site Plan (including topographic survey, GPR/UG Utilities, easements)	Х	Х
5.	N/A	Х	Х
6.	Interconnection Equipment Assessment ³	Х	Х
7.	Interconnection Plan		Х
8.	Electrical Site Plan Drawings, incl. Balance of System	Х	Х
9.	Electrical Single Line Diagrams with Utility Meter #s	Х	Х
10.	DC String Wiring Plans (with corresponding inverter locations & IDs)	Х	Х
11.	Electrical Grounding Details	Х	Х
12.	N/A	Х	Х
13.	N/A	Х	Х
14.	Structural Drawings and Calculations		Х
15.	Array Elevation Plan View		Х
16.	Equipment Pad, Mounting Details and Elevations	Х	Х
17.	Signage Details	Х	Х
18.	Monitoring System and Metering Details	Х	Х
19.	Lighting Plan, Details and Photometric Plans	Х	Х
20.	All Specifications Related to Scope of Work	Х	Х
21.	Equipment Manufacturer's Cut Sheets and Details		Х
22.	Interconnection Application Revisions & Any Utility Correspondence		Х
23.	Complete list of all Subcontractors incl. specialty		Х
24.	Site Specific Construction Management Plan		Х
25.	Construction Schedule	Prelim	Detailed
26.	Provider's Commissioning Protocol (see Section III below)		Х
27.	Complete Design Package Sufficient for AHJ Review		Х

Notes:

- 1. PV System Summary Table shall include the following with details for each array: Array No/Name, Dimensions, Azimuth, Tilt, Module Model/Count, Inverter Model/Count, Nameplate, No. of Strings, Canopy Column Count.
- System size spreadsheet shall include by site: system size, year-one AC production (kWh) and yield (kWh/kWp). Production shall be estimated using approved, industry standard modeling software (e.g. PVSyst). System designs shall be within 5% of contracted target production and must be formally approved by District

ATTACHMENT A3: SUBMITTALS & PROJECT ACCEPTANCE

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- I. The Provider shall conduct an interconnection equipment assessment for each interconnection site. Any issues with existing Purchaser or Utility equipment that may prevent the system from interconnection to the Utility must be identified at the time of the 50% Design submittal.
- J. The Provider shall submit a complete specification packet as part of the 90% Submittal. Specification Divisions that shall be included, if they are part of the Scope of Work for the Project, are:
 - 1. Electrical (General and Solar PV)
 - 2. Cutting and Patching
 - 3. Subsurface Investigation
 - 4. Concrete Forming, Reinforcing, and Finishing
 - 5. Structural Steel Framing
 - 6. Metal Fabrications
 - 7. Roof Patch and Repair
 - 8. Painting and Coating
 - 9. Signage
 - 10. Testing and Commissioning
 - 11. Exterior Lighting and Controls
 - 12. Earthwork
 - 13. Vegetation Clearing and Control
 - 14. Pavement Specialties and Striping
 - 15. Fencing and Gates
- K. The Provider shall submit complete electronic copies of all Final Approved Permit Set drawings prior to Construction.

II. CONSTRUCTION PHASE

- A. Purchaser shall provide formal NTP for construction upon receipt of acceptable 100% Design PlanSet with all necessary AHJ approvals and all required proof of bonding.
- B. Prior to beginning construction, Provider shall:
 - Provide a comprehensive onsite Construction Management and Safety Plan for the construction of the Project in accordance with all applicable laws, policies and OSHA compliant safety practices. Plan should include, at a minimum, address of local emergency medical facilities, project directory, information on Subcontractors-, coordination with Purchaser staff during specific construction tasks, and communication protocols.
 - 2. Provide an updated Detailed Construction Schedule and a three-week look-ahead.





- 3. Obtain all required permits and approvals from the AHJ(s) and the Utility(ies) prior to starting Construction, in coordination with the Purchaser, and shall make copies available to the Purchaser of all permit applications and approvals.
- C. The Provider shall provide Manufacturers' Installation Manuals for major project components, including, but not limited to: PV modules, inverters, racking or mounting structure, monitoring systems, other major electrical equipment, and lighting. When approved by the Purchaser, recommended installation standards shall become the basis for commissioning, inspecting and accepting or rejecting actual installation procedures used on the work.
- D. Prior to ordering equipment and materials, the Provider shall verify all measurements at each project site and notify the Purchaser in writing on any discrepancies between the drawings and sitemeasurements.
- E. Any proposed changes to design shall be submitted in writing to the Purchaser for approval beforeany changes are made. Submittal for changes shall contain all necessary details of the proposed changes and an updated system size and production spreadsheet.
- F. <u>CONSTRUCTION SUBMITTALS</u>: The following documents and schedules shall be provided by the Provider as listed:

Construction Submittal	Submittal Schedule
1. Construction Mgt & Safety Plan	No later than 15 days prior to site mobilization.
2. Construction Schedule	 Three week look-ahead schedule updated and submitted weekly prior to the weekly meeting. Detailed schedule regularly maintained and provided every two weeks or as-requested.
3. Manufacturers' Installation Manuals	No later than 5 days after construction kickoff meeting.
4. Weekly Meeting minutes	No later than 48 hours following each weekly project meeting.
5. Test Reports	As available
6. Factory Tests	As available
7. Field Tests	As available
8. Design Deviations/ Requests for Information	As-needed. All deviations shall be accurately and legibly detailed by the Provider and approved by Designer of Record, then presented to the Purchaser/Purchaser's Reps in the form of an RFI. All changes shall be recorded on as-built drawings at the time of the change.
9. Proposed Change Orders	Prior to commencing any changed work, and in the form specified for changes in scope of work in the Agreement, Provider shall submit a proposed change order. No after-the-fact change orders will be accepted by Purchaser.

Table 2 – Construction Submittals

III. COMMISSIONING PHASE

ATTACHMENT A3: SUBMITTALS & PROJECT ACCEPTANCE

San Mateo County Solar Photovoltaic Project



- A. The Provider shall notify the Purchaser and Purchaser representatives prior to commencing commissioning and provide a schedule for all commissioning activities.
- B. Provider shall provide electricians and support to Purchaser and Purchaser representative for verification of commissioning and workmanship, including providing reasonable notice prior to conducting commissioning activities so Purchaser representatives may observe.
- C. A detailed/comprehensive Commissioning Report; submitted 15 days after commissioning has been completed on a site-by-site basis.
- D. Commissioning shall proceed per the approved commissioning plan submitted during the Design Phase. At a minimum, system commissioning protocol shall include:
 - 1. Conductors
 - 1.1. AC & DC conductor inspection / megger testing
 - 1.2. Wire management check
 - 1.3. DC string Voc and Isc testing and recording where possible
 - 1.4. Confirm all conduits & junction boxes are installed properly/watertight
 - 2. Inspection of DC fusing and disconnects
 - 3. Inspection of AC components: AC Disconnect, Main Switch Board, AC Combiner Panel Boards, Breakers, Fuses, Terminations, Phasing, OCPD operation, etc.
 - 4. Grounding & bonding system inspection & continuity testing
 - 5. Inverters
 - 5.1. Inverter inspections & tests per manufacturer instructions
 - 5.2. Inverter start-up & confirm proper inverter settings
 - 5.3. Inverter output tests Confirm PV system AC output as expected based on design, insolation and inverter readings
 - 6. IV Curve Trace, Performance testing and recording where possible
 - 7. Thermal Imaging
 - 7.1. Check all electrical components while systems are energized
 - 7.2. Spot check, Modules, Inverters, Disconnects, AC system etc.
 - 8. Torque spot check on mechanical and electrical terminations
 - 9. Inspection of corrosion control measures
 - 10. Confirm signage and placards meet plans
 - 11. Workmanship evaluation
 - 12. Inspection of DAS / CT metering and monitoring equipment
 - 13. Weather station component inspection and performance audit
 - 14. Confirm web-based monitoring interface operations
 - 15. Lighting Controls
 - 15.1. Confirm canopy lighting levels match photometric design
 - 15.2. Verify component installations
 - 15.3. Confirm lighting controls function as specified
 - 16. Commissioning of any other major electrical infrastructure installed on the project per manufacturer requirements

IV. <u>CLOSEOUT PHASE</u>

ATTACHMENT A3: SUBMITTALS & PROJECT ACCEPTANCE



San Mateo County Solar Photovoltaic Project

- A. Provider shall submit complete digital "as-built" Record Drawings for all sites for review and approval. Final as-built plans shall be provided in both AutoCAD (CAD) and portable document format (PDF) prior to Commercial Operation Date (COD). Provider shall submit one set of final compiled Record Drawings for the Purchaser. The Record Drawings shall incorporate all changes from permit plan sets captured on all as-built sketches, details, and clarifications. Locations of work buried under or outside each building, including, without limitation, all utilities, plumbing and electrical lines and conduits. All deviations from the sizes, locations and other features of installations shown in Issue for Construction (IFC) plan sets and contract documents must be captured in detail in as-built Record Drawings. All horizontal boring, trench routes and depths to be recorded and transferred from logs to record drawings. All canopy column footing depths shall also be recorded and coordinated into as built drawings.
- B. The Provider shall submit documentation of Punch List Completion for items under control of the Provider within 30 days of the Purchaser issuing the Final Punch List. The document must be signed and show proof of completion of each item.
- C. The Provider shall submit executed Performance Guarantee (PeGu) Agreement amendment(s), if any, within 30 days of Permission to Operate (PTO) at all sites. All performance tables and commercial operation dates must be updated with the final as-built statistics.
- D. Any other Project documentation required by the Purchaser.
- E. The Provider shall submit to the Purchaser <u>a comprehensive Operations and Maintenance (O&M)</u> <u>Manual for each system</u>, within 30 days of the Utility granting Permission to Operate (PTO) for that system. O&M manuals shall consist of one (1) hard copy and (3) soft copies on USB flash drive in PDF format, provided as a single, bookmarked PDF document. The document shall be a wellorganized, comprehensive and custom document created for each site which includes, but is not limited to:
 - 1. System Description and Overview
 - 2. Simplified site plan that shows array naming convention, inverter locations, and disconnects
 - 3. Predicted performance data, including expected production over time
 - 4. Safety Details, including shut down procedures
 - 5. Contact information for the system installer and maintenance personnel
 - 6. As-built drawings. During construction, Provider shall incorporate all information on all As-Builts, sketches, details, and clarifications, and prepare one set of final Record Drawings for the Purchaser. The Record Drawings shall incorporate onto one set of electronic drawings, all changes from all As-Builts, sketches, details, and clarifications. The Provider shall deliver the Record Drawings to the Purchaser at completion of the construction. Locations of work buried under or outside each building, including, without limitation, all utilities, plumbing and electrical lines and conduits. All deviations from the sizes, locations and other features of installations shown in Issue for Construction (IFC) plan sets and contract documents.
 - Complete material list of all items furnished and installed, including but not limited to the following: PV Modules, inverters, wiring, combiner boxes, panelboards, switch gear, optimizers, disconnects, boxes, metering and DAS equipment, etc. PV System operation details
 - 8. System testing and commissioning documentation
 - 9. PTO and any other pertinent Utility documentation



- 10. Maintenance information, including schedules and responsibilities for ongoing maintenance
- 11. Troubleshooting and repair, including responses to typical issues
- 12. All warranties, cut sheets and manuals for major equipment
- 13. Performance guarantee details, including schedule of performance reporting and example format
- 14. Monitoring system login and operation details
- 15. Any other information that may be required for the Purchaser to easily and safely interact with, confirm performance, troubleshoot, maintain and/or service thematerials and equipment installed under this Contract.
- 16. CAD (electronic format) "as-built" files of all drawings, provided as separate files from the Manual PDF

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V. <u>Project Closeout Submittals</u>

Provider shall deliver the following document submittals to Purchaser in order to attain Purchaserapproval for the listed project closeout milestone.

Table 3 – Closeout Document Submittals

PTC) Ready Status
1	Documentation from AHJ as needed for interconnection
2	Schedule for Project Closeout
3	Commissioning Protocol
4	Utility Interconnection Request Submitted
Cor	nmercial Operation Date - COD (All PTO Ready Status items plus:)
5	Utility Permission-to-Operate (PTO) Notice
6	Provider Commissioning Documentation
7	AHJ(s) Completion Documentation
8	As-Built Plan Sets (w/ Data Sheets for Major Equip.)
9	Reserved
10	As-Built Performance Modeling & 8760 Data
11	Punchlist – Major/Safety Items Signed Off by Purchaser/Inspectors
12	O&M Manual Draft
13	Major Equipment Cut Sheets/Warranty Documentation
14	DAS Login Access and Credentials & Verification of Function
15	Subcontractor Notices of Completion
16	Provider Formal Commercial Operation Notice
Fina	al Completion/Acceptance (All COD items plus:)
17	Punchlist – All Lists Signed Off
18	O&M Manual Final
19	Sage Cx/Inspection Completed
20	Operation and Safety Training (for Purchaser)
21	All Change Orders/Payments Finalized
22	Final Amended Executed Contracts (PPA & PeGu)
23	Inverter/Data Logger Serial Numbers, IDs, Locations Provided and Functional
24	Record of all trenching/boring routes & depths and canopy column footing depths.
24	Purchaser Notice of Acceptance

For the Purposes of a PPA Contract, achieving the above milestones shall be interpreted as follows:

- 1. <u>Commercial Operation Date (COD)</u>: Provider may begin recording energy delivered for thepurposes of charging the Purchaser.
- 2. <u>Final Completion</u>: Purchaser will begin paying for energy delivered upon Final Completion.


VI. <u>Submittal Dates</u>

Provider

Submittal Item	Date
90% Design Submittal	30 BD from NTP
Final Approved Permit Set, Submitted to AHJ	15 BD from Purchasier's written approval of 100% Design Set
Construction Management Plan	30 BD from NTP
Construction Schedule Submittal	30 BD from NTP
Commissioning Reports	September 1, 2025
O&M Manual, All Sites	September 1, 2025
Punch List Completion Documents, All Sites	September 1, 2025
As Built – Record Drawings	September 1, 2025
O&M Contract Agreement Amendment(s), All Sites	September 1, 2025
PeGu Agreement Amendment(s), All Sites	September 1, 2025

Schedule 10 – General Electric Specifications



PART 1 - GENERAL

- 1.01 RELATED DOCUMENTS
 - A. Section 26 60 00: Photovoltaic System Specification
 - B. Section 05 90 02: Solar PV Canopy Structure Specification
 - C. Section 05 90 04: Solar PV Roof-Mount Specification
 - D. Other relevant Purchaser Specifications

NOTE: Where this specification and other specifications or bridging-documents are in conflict, the more stringent shall apply. Provider shall identify conflicts and confirm recommended equipment or procedures with the Purchaser.

1.02 CODES & REFERENCES

- A. The design and installation shall conform to all requirements as defined by the applicable codes, laws, rules, regulations and standards of applicable code enforcing authorities (Latest Edition unless otherwise noted). The following are key standards that shall be followed. The Architect/Engineer of Record and Provider shall ensure all applicable codes are followed:
 - 1. ASTM International (ASTM) (www.astm.org), including:
 - a. E3010, Standard Practice for Installation, Commissioning, Operation, and Maintenance Process (ICOMP) of Photovoltaic Arrays
 - 2. American National Standards Institute (ANSI)
 - 3. Americans with Disabilities Act (ADA)
 - 4. California Building Code (CBC), with State of California Amendments
 - 5. California Energy Commission Title 24 Building Energy Efficiency Requirements
 - 6. California Department of Forestry and Fire Protection, Office of the State Fire Marshal Solar Photovoltaic Installation Guidelines
 - 7. California Office of Statewide Health Planning and Development (OSHPD)
 - 8. Code of Federal Regulations (CFR)
 - 9. Factory Mutual (FM)
 - 10. Institute of Electrical and Electronics Engineers (IEEE)
 - 11. International Building Code (IBC)
 - 12. National Electrical Testing Association (NETA)
 - 13. Local Fire Permit Requirements
 - 14. National Electrical Manufacturers Association (NEMA)
 - 15. National Fire Protection Association (NFPA), National & California Electrical Code
 - 16. Occupational Safety and Health Administration (OSHA)
 - 17. Purchaser Specifications and Requirements
 - 18. Underwriters Laboratory (UL), including:
 - a. UL 2703 Standard for Mounting Systems, Mounting Devices, Clamping/Retention Devices, and Ground Lugs for use with Flat-Plate Photovoltaic Modules.
 - 19. Utility company standards and requirements
 - 20. All other applicable Codes and Ordinances



1.03 GENERAL

- A. "Purchaser" shall refer to Purchaser as defined in the Energy Services Agreement, who is owner of the site where project will be located, regardless of system ownership, and include any representative of the site owner, such as consultants or inspectors. "Contract" refers to the design-build or construction contract and any associated design-build bridging documents. "Provider" refers to the entity performing the work, inclusive of Engineer and Architect of Record for design-build contracts.
- B. This specification defines the general electrical work required for complete and fully functioning photovoltaic systems at each site. The design and installation shall conform to all requirements as defined by the applicable codes, laws, rules, regulations and standards as specified in the Agreement.
- C. The Provider shall include all items and all work reasonably inferred by these specifications and the Contract Documents, including any design-build bridging documents. If the Provider is in doubt as to the intent of any portion of these specifications or the Contract Documents, or necessary information is omitted, the Provider shall notify the Purchaser in writing for clarifications or corrections to be provided by addendum.
- D. All design documents, cut sheets, and technical specifications shall be submitted, reviewed and accepted by the Purchaser per the guidelines specified in the Contract.

1.04 WORK INCLUDED

- A. The work shall include the design of the electrical system, materials, equipment, fabrication, installation and tests in conformity with applicable codes and professionally recognized standards.
- B. The electrical design shall be fully developed, including but not limited to the following:
 - 1. Description and supportive calculations for all power and grounding systems.
 - 2. Evaluation of existing switchgear and Utility transformers for interconnection compatibility.
 - 3. Location and layout of all system equipment.
 - 4. Site plans, elevations, schedules, equipment arrangement and detailed drawings
 - 5. Single line diagrams including local utility system tie-ins.
 - 6. All other drawings, calculations, details, and schedules required for the system design.
- C. All required construction documents and compliance documentation.
- D. Temporary power and lighting as required for construction.
- E. All required incidental work directly related to the construction of the System, such as excavating, directional boring, backfilling, roof flashing, , , pavement repair, , and testing.
- F. Any other electrical work as might reasonably be implied as required to fulfill the contracted scope, even though not specifically mentioned herein or shown on the drawings
- G. Design and construction coordination with all other disciplines and trades.
- H. All other utilities, labor, materials, apparatus, tools, equipment, transportation, and special or occasional services as required to fulfill the contracted scope.



1.05 CONDITIONS AT SITE

- A. Provider is responsible for familiarizing themselves with the site construction drawings. No extra payment will be allowed for work required that was discernible from the site construction drawings.
- B. Lines of other services that are damaged as a result of this work shall promptly be repaired at no expense to the Purchaser and to the complete satisfaction of the Purchaser.

1.06 QUALITY ASSURANCE

A. GENERAL

1. Construction Documents shall be designed and signed by a validated, registered professional engineer in the State of California.

B. CONFORMANCE

- 1. All equipment and accessories to be the product of a manufacturer regularly engaged in its manufacture.
- 2. Supply all new equipment and accessories free from defects and listed by Underwriter's Laboratories, Inc., or bearing its label or label of a Nationally Recognized Testing Laboratory (NRTL).
- 3. All items of a given type shall be the products of the same manufacturer, or equal.
- 4. If after contract is awarded, minor changes and additions are required by aforementioned authorities, they shall be included at Provider's expense.
- 5. If after contract is awarded, minor changes and additions are required to maintain code compliance, they shall be included at Provider's expense.

C. COORDINATION

1. Provider shall become familiar with the conditions at each job site and plan the installation of the electrical work to conform with the existing conditions so as to provide the commercially reasonable assembly of the combined work of all trades within the Provider's scope.

D. COORDINATION DRAWINGS FOR ELECTRICAL INSTALLATION

- 1. Prepare Coordination Drawings, to scale. Detail major elements, components and systems of electrical equipment and materials in relation to each other and to other systems, installations, and building components. Indicate locations and space requirements for installation, access and working clearances. Show where sequence and coordination of installations are important to the efficient flow of the Work. Indicate the following:
 - a. Provisions for scheduling, sequencing, moving and positioning large equipment in or on the site or buildings during construction.
 - b. Plans, elevations and details including the following:
 - i) Clearances to meet safety requirements and for servicing and maintaining equipment, including space for equipment disassembly required for periodic maintenance.
 - ii) Equipment support details.



- iii) Exterior wall, roof and foundation penetrations of cable and raceway; and their relation to other penetrations and installations.
- iv) Sizes and locations of required concrete pads and bases.
- v) Grounding system details.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Protection: Use all means necessary to protect the materials of this Section before, during, and after installation and to protect the work and materials of all trades.
- B. Delivery and Storage: Deliver all materials to the job site in their original containers with all labels intact and legible at time of use. Store in strict accordance with approved manufacturers' recommendations. All deliveries are to be made to the Provider's job trailer or approved storage location. Under no circumstances shall Purchaser be responsible for accepting deliveries.
- C. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Purchaser and at no additional cost to the Purchaser.
- D. Provider shall personally, or through an authorized representative, check all materials upon receipt at jobsite for conformance with approved shop drawings and/or plans and specifications.

1.08 SCHEDULING/SEQUENCING

- A. Provider shall coordinate all schedules and sequencing of electrical work with Purchaser.
- B. Place orders for all equipment in time to prevent any delay in construction schedule or completion of project. If any materials or equipment are not ordered in time, additional charges made by equipment manufacturers to complete their equipment in time to meet the construction schedule, together with any special handling charges, shall be borne by the Provider.
 - 1. Provider shall coordinate production and delivery schedule for all Purchaser-supplied equipment with the equipment suppliers to ensure that all Purchaser-supplied equipment is delivered to site in coordination with the construction schedule and in such a manner as to cause no delays in completion of the Contract as scheduled.

1.09 WIND LOADING AND SEISMIC DESIGN

- A. Comply with all applicable codes and standards and provide wind load restraints for all equipment installed under this contract that requires restraint. The electrical equipment wind loading restraint shall be designed as required by the Authorities Having Jurisdiction (AHJs).
- B. The electrical system shall be designed to meet all seismic design requirements of the AHJs. Where applicable, the electrical equipment shall be designed to accommodate lateral displacement in the event of an earthquake based on a nonlinear response-history seismic analysis for the appropriate seismic zone.

1.10 PERMITS AND INSPECTIONS

A. Provider shall obtain all required permits and arrange for all required inspections, including utility company requirements, inspections, and sign-offs.



B. Do not allow or cause any of the work to be covered or enclosed until it has been tested and/or inspected.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Materials of the same type or classification, used for the same purpose, shall be the product of the same manufacturer, or equal.

2.02 POSTED OPERATING INSTRUCTIONS

A. Furnish approved operating instructions for systems and equipment where indicated in the technical sections for use by operation and maintenance personnel. The operating instructions shall include wiring diagrams, control diagrams, and control sequence for each principal system and equipment. Print or engrave operating instructions and frame under glass or in approved laminated plastic. Post instructions as directed. Attach or post operating instructions adjacent to each principal system and equipment including startup, proper adjustment, operating, lubrication, shutdown, safety precautions, procedure in the event of equipment failure, and other items of instruction as recommended by the manufacturer of each system or equipment. Provide weather-resistant materials or weatherproof enclosures for operating instruction exposed to the weather. Operating instruction shall not fade when exposed to sunlight and shall be secured to prevent easy removal or peeling.

2.03 CATALOGGED PRODUCTS / SERVICE AVAILABILITY

A. Materials and equipment shall be current products by manufacturers regularly engaged in the production of such products. Specified product models shall have been in satisfactory commercial or industrial use for a minimum of 2 years prior to design. The 2-year period shall include applications of equipment and materials under similar circumstances and of similar size. The 2-year period shall be satisfactorily completed by a product for sale on the commercial market through advertisements, manufacturers' catalogs, or brochures. Products having less than a 2-year field service record will be acceptable if a certified record of satisfactory field operation for not less than 6,000 hours, exclusive of the manufacturers' factory or laboratory tests, is furnished. The equipment items shall be supported by service organizations which are reasonable convenient to the equipment installation in order to render satisfactory service to the equipment on a regular and emergency basis during the warranty period of the contract.

2.04 ACCEPTABLE MANUFACTURERS

- A. Materials shall be of make mentioned elsewhere in this specification, or equal. All materials shall be new and approved by the Underwriters' Laboratories or an NRTL approved by Purchaser.
- 2.05 BASIC ELECTRICAL EQUIPMENT AND MATERIALS
 - A. Inverters and PV Modules See Specification 26 60 00.
 - B. AC Panelboards:



- As manufactured by Cutler-Hammer, Square D, General Electric, Siemens, IEM, or to match existing equipment at each Site, wherever possible. Similar products may be submitted for considerations and formal approval. Equipment shall at a minimum be NEMA 3R outdoors or NEMA 1 for surface mount in unfinished interior locations and flush mounted in finished and occupied spaces. Provide housekeeping pads for all floor or slab mounted equipment.
- 2. Enclosures: code gauge galvanized sheet steel with welded full flange end pieces, stretcherleveled steel trim, back pan and door or painted steel or powder-coated steel. All surface mounted panels to have enclosures painted in gray enamel. All flush mounted panels to have cover painted to match adjacent surface.
- 3. Phase and ground bussing of copper with silver-plated or tin-plated or nickel-plated contact surfaces.
- 4. Trims on surface-mounted cabinets secured with nickel-plated screws with cup washers, bottom of all trims to have lugs for resting on cabinet flange.
- 5. Panels shall be 20 inches minimum in width, provided with approved gutter space, barriers and adjustable supports. Doors mounted with concealed hinges provided with combination spring latch and lock. Doors and trims and surface mounted cabinets primed and finished with one coat baked on gray enamel.
- 6. Each panel shall be equipped with a copper ground bus.
- 7. All panels shall be fully bussed to accept future circuit breakers.
- C. Distribution Low Voltage Dry-Type Transformers (120/208V and 277/480V):
 - 1. Ventilated type, NEMA 3R where used outdoors.
 - Transformer shall be 3-phase, 60 Hertz. Primary winding shall be Delta connected and secondary winding shall be Wye connected. The temperature rise at rated voltage and full load shall not exceed 150 degrees C with a 220 degrees C U.L. Component Recognized Insulation System. The windings shall be Aluminum or Copper.
 - 3. The higher voltage winding shall have quantity (6) 2.5% taps (2) FCAN and (4) FCBN. Set secondary voltage for 120/208V.
 - 4. Transformer terminals shall be front connected for ease of installation and maintenance.
 - 5. Where the transformers are installed outdoors provide weatherproof drip cover, rodent screen and a NEMA 3R rating of the enclosure.
 - 6. Transformers shall be suitable to carry the PV load characteristics and in the direction of power flow required for the PV system power production.
- D. Circuit Breakers:
 - 1. Circuit breakers shall be molded case rated 250 or 480 volt, multiple or single pole with amperage ratings as required for each circuit. All breakers to be bolt on, manually operated with "de-ion" arc chutes. Plug-in breakers are not acceptable.
 - 2. Circuit breakers shall be rated to interrupt the available short circuit current at the point of application.



- E. Raceways and Conduit Bodies: Only the raceways specified below shall be utilized on these projects. Substitutions shall be pre-approved in writing:
 - 1. Rigid Type hot dip galvanized or sherardized steel, to be used at all exterior locations, below grade, or in concrete slab, and to 18 inches on either side of structural expansion joints in floor slabs, with completely watertight, threaded fittings throughout.
 - a. All rigid steel conduit couplings and elbows in soil or concrete or under membrane to be ½ lap wrapped with Scotch #50 tape and threaded ends coated with T&B #S.C.40 rust inhibitor prior to installation of couplings.
 - b. ½ lap wrap all rigid steel conduit stub-ups from slab or grade to 6" above finished grade level with Scotch #50 tape.
 - c. In lieu of rigid steel conduit for power and control raceways and branch circuit conduits in soil or concrete slabs, "Schedule 40" PVC with Schedule 80 PVC conduit elbows and stub-ups may be used with code size (minimum No. 12) ground wire. A "stub-up" is considered to terminate 6" above the finished surface.
 - i) Schedule 80 PVC conduit shall be used in all concrete footings or foundations and to 18" of either side of footings or foundation walls.
 - ii) Schedule 80 PVC conduit shall be used in all concrete masonry unit (CMU) walls or columns.
 - 2. Provide a minimum cover of 36 inches for all conduits in ground outside of buildings, unless otherwise noted.
 - 3. Conduit installed using horizontal directional boring (HDB) shall include tracer tape or traceable conduit. Minimum depth of the conduit shall be per NEC Table 300.5 or per Purchaser Requirements, whichever is more stringent. The Provider is responsible for demonstrating that all conduits installed utilizing horizontal boring meets the minimum depth requirement and is solely responsible for any remediation costs and schedule impacts if the specification is not met. Provider shall provide documentation of final depth and routes of all conduit installed in horizontal bores.
 - 4. Conduit buried underground shall be suitable for the application and compliant with all applicable codes. PVC shall be constructed of a virgin homopolymer PVC compound and be manufactured according to NEMA and UL specifications. All PVC conduit feeders shall contain an appropriate copper grounding conductor sized per NEC requirements and continuity shall be maintained throughout conduit runs and pull boxes. Minimum conduit size shall be ¾". A metallic tracing/caution tape shall be installed in the trench over all buried conduit. All underground conduits placed in trenches, buried under roadways, or swales shall be encased with red dyed concrete slurry cap.
 - 5. All conduit runs in concrete floor slabs (where allowed) shall be installed to comply with all applicable UBC and structural codes to maintain the structural integrity of the floor slab. Where conflicts occur, alternate routing shall be provided at no additional cost to the Purchaser.
 - 6. Electrical Metallic Tubing (EMT) shall only be exposed in electrical and mechanical rooms and in unfinished spaces and in concealed and furred spaces, made up with steel watertight or steel set screw type fittings and couplings. Set screws shall have hardened points. Cast fittings are unacceptable. EMT may be used in exterior installations where allowed by NEC



or AHJ requirements and any other applicable code. All exterior fittings shall be watertight. EMT may not be installed in areas subject to severe physical damage, including in any carport location with potential for vehicle strike or within 8' of grade.

- 7. All exposed conduits on sides of buildings, or in other visible areas, shall be painted to match adjacent finishes, after complete installation.
- 8. Fasten conduits securely to boxes with locknuts and bushings to provide good electrical continuity.
- 9. To facilitate pulling of conductors, install junction boxes as required.
- 10. If any empty conduits are provided as part of the projects, they shall be provided with a minimum of two sufficiently rated pull strings or wires inside conduit for future wire pull.
- 11. If conduits are to pass through structural expansion joints in floor slab, rigid galvanized conduit shall be used 18" on either side of joint, complete with Appleton expansion couplings and bonding jumpers, or equal. All above grade expansion joint crossings shall also utilize expansion joint couplings or flex conduit transitions as required for each particular installation. No solid conduits shall be allowed to cross expansion joints without proper provisions for building and seismic movement. Expansion joints only refer to contiguous structures, not the overhead space between adjacent, separate canopies. Under no circumstance shall conduits/conductors pass overhead between separate canopies.
- 12. Provide thermal expansion fittings or provisions, per NEC 300.7(b), for all raceways subject to high temperatures in direct exposure to sunlight. Provide expansion provisions where more than 0.25" of expansion is calculated.10.
- 13. Provide and install exterior wall conduit seals and cable seals in the locations listed below. Coordinate installation and scheduling with other trades:
 - a. Conduit seals through exterior wall or slab (below grade): O.Z. Gedney series "FSK" in new cast in concrete locations, series "CSM" in cored locations.
 - b. Conduit seals through exterior wall or slab (above grade): O.Z. Gedney series "CSMI."
 - c. Cable seals at first interior conduit termination after entry through exterior wall or slab: O.Z. Gedney series "CSBI." Coordinate quantity of conductors at each location.
- F. Function Boxes / Pull Boxes:
 - 1. One-piece steel knockout type drawn j-boxes, unless otherwise noted, sized as required for conditions at each location.
 - 2. J-boxes for wet locations, cast aluminum FS or FD type with cast aluminum gasketed spring lid cover. Weatherproof "Bell" type boxes are not acceptable.
 - 3. Pull boxes to be NEMA 1 (indoor) or NEMA 3R (outdoor), sized per code, with grey enamel finish, steel construction, and screw-on covers.
 - 4. All connectors from conduit to junction or outlet boxes shall have insulated throats. Connectors shall be manufactured with insulated throats as integral part. Insertable insulated throats are unacceptable.
 - 5. Conduit Bodies: Malleable iron type, with lubricated spring steel clips over edge of conduit body, O-Z/Gedney type EW, or equal.



- G. Site Pull boxes: All site pull boxes shall be flush in-ground concrete, with engraved covers identifying service use (i.e. electrical, communications, etc.). Boxes shall be NEMA 250, Type 6, outside flanged, with recessed cover for flush mounting, by Christy or equal, with required depth to provide box and conduit depths shown or required.
 - 1. Provide concrete covers for all boxes in planted or paved areas (up to available concrete cover size).
 - 2. Provide galvanized steel covers for all larger boxes (when concrete is not available), or in traffic areas. No cast iron covers.
 - 3. Provide bolted covers and slab bottoms (with grouted perimeter) or vault type boxes for all electrical distribution and signal system pull boxes used for site distribution, to prevent rodent entry. No collar type boxes with dirt or gravel bottoms.
 - 4. Provide drain hole at bottom of all vault type boxes, with loose aggregate base below, for proper drainage.
 - 5. All covers to be completely flush with finished adjacent surfaces.
 - 6. Provide galvanized steel water rated covers and installation of box rated for water in all traffic areas.
- H. Wire and Cable:
 - 1. 600 or 1,000-volt class (as required for system design), insulation color coded, minimum No. 12 AWG for DC string circuits or AC circuits.
 - 2. <u>All conductors shall be copper. Any substitution shall require written approval from</u> <u>Purchaser.</u>
 - 3. Insulation type:
 - a. Standard locations: Conductors shall be Type PV or THWN or THWN-2 or RHH, RHW-2, USE-2 for wet and dry locations. All AC wire sizes used shall be based on a 75-degree C insulation rating, unless specifically used with 90-degree rated devices. For wires/cables with 90 deg C insulation, the 90 deg C ampacity ratings shall be used for cable sizing before conditions of use de-rates are applied per NEC. All DC wire sizes shall be based on 90-degree insulation rating, when used with 90-degree rated PV equipment and components.
 - b. All conductors shall be stranded.
 - c. Install all wiring (low voltage and line voltage) in conduit, except PV string wiring at modules, which may be run outside of raceway.
 - d. Do not pull conductors into conduit until raceways and boxes have been thoroughly cleaned and swabbed as necessary to remove water and debris.
 - e. Approximately balance all AC circuits about the neutral conductors in AC collector panels.
 - f. All wire and cable shall bear the Underwriters' Label or equivalent NRTL label, brought to the job in unbroken packages.
 - g. The equipment grounding conductor shall be insulated or bare copper; where it is insulated, the insulation shall be colored green.
 - h. Install all circuits in one continuous section unless splices are approved by Purchaser. Exercise care in pulling to avoid damage or disarrangement of conductors, using



approved grips. No cable shall be bent to smaller radius allowed by NEC code or manufacturer recommendations. Color code feeder cables at terminals. Provide identifying linen tags in each pull box

- I. Fire stopping: as manufactured by 3M Fire Protection Products or equal.
 - 1. Purchaser shall supply all required under-canopy fire suppression.
 - 2. Fire-rated and smoke barrier construction: Maintain barrier and structural ceiling fire and smoke resistance ratings including resistance to cold smoke at all penetrations, connections with other surfaces or types of construction, at separations required to permit building movement and sound vibration absorption, and at other construction gaps.
 - 3. Systems or devices listed in the UL Fire Resistance Directory under categories XHCR and XHEZ may be used, providing that it conforms to the construction type, penetration type, annular space requirements and fire rating involved in each separate instance, and that the system be symmetrical for wall penetrations. Systems or devices must be asbestos free.
 - 4. When these assemblies are penetrated, seal around conduits and equipment with approved firestopping material. Install firestopping material complete as directed by manufacturer's installation instructions.
 - 5. Meet requirements of ASTM E814, Standard Test Method for Fire Tests of Through Penetration Fire Stops.

PART 3 - EXECUTION

- 3.01 INSPECTION
 - A. Examine the areas and conditions under which the work of this Section will be installed. Do not proceed until unsatisfactory conditions have been corrected by Purchaser.
- 3.02 FIELD QUALITY CONTROL
 - A. All workmanship shall be Best in Class and carried out in a manner satisfactory to and approved by the Purchaser.
 - B. This Provider shall personally, or through an authorized and competent representative, constantly supervise the work and, as much as possible, keep the same foreman and workmen on the job throughout.
- 3.03 INSTALLATION/APPLICATION/ERECTION
 - A. All cutting, repairing and structural reinforcing for the installation of this work shall be done by the Provider in conformance with the Purchaser's requirements.
 - B. Floor Mounted Inverter Installation: Provide mounting channels for grouting into floor or slab. Channels shall be properly drilled to receive the equipment placed flush in floor, leveled and secured in place prior to pouring of floor, of length as required for switchboard. Bolt or weld switchboard to channels.
 - C. Furnish and install all disconnect switches as required by code (AC and DC).



3.04 EARTHQUAKE RESISTANT INSTALLATION & FASTENING:

- A. All electrical equipment and raceways shall be designed to conform to all requirements as defined by applicable codes, laws, rules, regulations, and standards of applicable code enforcing authorities, including, but not limited to the Local Electric Utility and Governmental Authorities.
- B. For floor mounted inverters and switchboards / distribution panels, shall be designed to conform to all requirements as defined by applicable codes, laws, rules, regulations, and standards of applicable code enforcing authorities, including, but not limited to the Local Electric Utility and Governmental Authorities.

3.05 ADJUSTING AND CLEANING

- A. All electrical equipment, including existing equipment not "finish painted" under other sections, shall be touched up where finished surface is marred or damaged.
- B. All equipment shall be left in clean condition, with all shipping and otherwise unnecessary labels removed there from.
- C. Throughout work, remove construction debris and surplus materials accumulated during work.
- D. Upon completion of installation, thoroughly clean electrical equipment, removing dirt, debris, dust, temporary labels and traces of foreign substances.

3.06 IDENTIFICATION

- A. Inverters, combiner boxes, pull boxes, switchboards, panel boards, distribution circuit breakers, disconnect switches, and related electrical enclosures shall be properly identified by means of engraved laminated plastic descriptive nameplates mounted on apparatus using stainless steel screws or permanent epoxy adhesive where set screws are not feasible. Standard adhesives alone are not acceptable. Nameplates shall have white letters with black background. Cardholders in any form are not acceptable.
- B. Provide all required safety and identification placards as required by code.

3.07 PAINTING OF EQUIPMENT

- A. Factory Applied: Electrical equipment shall have factory-applied painting systems which shall, as a minimum, meet the requirements of NEMA ICS 6 corrosion-resistance test, except equipment specified to meet requirements of ANSI C37.20 shall have a finish as specified in ANSI C37.20.
- B. Field Applied: Paint electrical equipment as required to match finish or meet safety criteria.

3.08 TESTING

- A. General:
 - 1. All inspections and tests shall be in accordance with the International Electrical Testing Association Acceptance Testing Specifications ATS-2009 (referred to herein as NETA ATS-2009).
 - 2. Final test and inspection may be conducted in presence of Purchaser: Tests shall be conducted at the expense of and by the Provider at a mutually agreed time. Submit written test reports.



- 3. The electrical installation shall be inspected and tested to ensure safety to building occupants, operating personnel, conformity to code authorities, and final Construction Shop Drawings.
- 4. Final Inspection Certificates: Prior to final payment approval, deliver to the Purchaser, with a copy to the Purchaser, signed certificates of final inspection by the appropriate inspection authority.
 - a. Grounding System:
 - All ground connections shall be checked and the entire system shall be checked for continuity. The resistance of the ground system at each site shall be measured using a 3-point fall-of-potential method. The maximum ground resistance shall be three ohms.
 - ii) Ground tests shall meet the requirements of the National Electric Code, Article 250.
 - iii) All PV system grounding shall meet the requirements of NEC Article 690.

END OF SPECIFICATION SECTION 26 00 00

<u>Schedule 11 – Photovoltaic System Specifications</u>



PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. The Contract and any design-build bridging documents.
- B. Section 26 00 00: General Electrical Specifications
- C. Section 05 90 02: Solar PV Canopy Structure Specification
- D. Section 05 90 04: Solar PV Roof-Mount Specification
- E. Other relevant Purchaser Specifications

NOTE: Where this specification and other specifications or bridging-documents are in conflict, the more stringent shall apply. Provider shall identify conflicts and confirm recommended equipment or procedures with the Purchaser.

1.02 CODES & REFERENCES

- A. The design and installation shall conform to all requirements as defined by the applicable codes, laws, rules, regulations and standards of applicable code enforcing authorities (Latest Edition unless otherwise noted). The following are key standards that shall be followed. The Architect/Engineer of Record and Provider shall ensure all applicable codes are followed:
 - 1. ASTM International (ASTM) (www.astm.org), including:
 - a. E3010, Standard Practice for Installation, Commissioning, Operation, and Maintenance Process (ICOMP) of Photovoltaic Arrays
 - 2. American National Standards Institute (ANSI)
 - 3. Americans with Disabilities Act (ADA)
 - 4. California Building Code (CBC), with State of California Amendments
 - 5. California Energy Commission Title 24 Building Energy Efficiency Requirements
 - 6. California Department of Forestry and Fire Protection, Office of the State Fire Marshal Solar Photovoltaic Installation Guidelines
 - 7. California Office of Statewide Health Planning and Development (OSHPD)
 - 8. Code of Federal Regulations (CFR)
 - 9. Factory Mutual (FM)
 - 10. Institute of Electrical and Electronics Engineers (IEEE)
 - 11. International Building Code (IBC)
 - 12. International Electrotechnical Commission (IEC), including:
 - a. 62446-1 Photovoltaic (PV) systems Requirements for testing, documentation and maintenance. Part 1: Grid connected systems Documentation, commissioning tests and inspection
 - 13. National Electrical Testing Association (NETA)
 - 14. Local Fire Permit Requirements
 - 15. National Electrical Manufacturers Association (NEMA)
 - 16. National Fire Protection Association (NFPA),
 - 17. National Electrical Code (NEC)
 - 18. Occupational Safety and Health Administration (OSHA)
 - 19. Purchaser Specifications and Requirements
 - 20. Underwriters Laboratory (UL), including:



- a. UL 2703 Standard for Mounting Systems, Mounting Devices, Clamping/Retention Devices, and Ground Lugs for use with Flat-Plate Photovoltaic Modules.
- 21. Utility company standards and requirements
- 22. All other applicable Codes and Ordinances
- 23. Where code requirements are at variance with Contract Documents, meet code requirements as a minimum requirement and include costs necessary to meet these in Contract. Machinery and equipment are to comply with OSHA requirements, as currently revised and interpreted for equipment manufacturer requirements. Install equipment provided per manufacturer recommendations.
- 24. Whenever this Specification calls for material, workmanship, arrangement or construction of higher quality and/or capacity than that required by governing codes, higher quality and/or capacity take precedence.

1.03 GENERAL

- A. "Purchaser" shall refer to owner of the site where project will be located, regardless of system ownership, and include any representative of the site owner, such as consultants or inspectors.
 "Contract" refers to the design-build or construction contract and any associated design-build bridging documents. "Provider" refers to the entity performing the work, inclusive of Engineer and Architect of Record for design-build contracts.
- B. The project includes the design and construction of complete Photovoltaic Systems (PV), including all AC and DC components. The design and installation shall conform to all requirements as defined by the applicable codes, laws, rules, regulations and standards as specified in the Contract.
- C. The Provider shall include all items and all work reasonable required to complete the System in accordance with the Agreement. If the Provider is in doubt as to the intent of any portion of these specifications, or necessary information is omitted, the Provider shall notify the Purchaser in writing for clarifications or corrections to be provided by addendum.
- D. All design documents, cut sheets, and technical specifications shall be submitted, reviewed and accepted by the Purchaser per the guidelines specified in the Contract and any bridging documents.

1.04 WORK INCLUDED

- A. The work shall include the design, engineering, materials, labor, equipment, installation, testing, services, and incidentals necessary to install complete Photovoltaic (PV) Systems in conformity with applicable codes and professionally recognized standards.
- B. PV systems shall consist of arrays of framed photovoltaic modules, mounting hardware, terminal boxes, combiner boxes, quick-connect electrical connectors, DC wiring, DC disconnects, utility interactive inverters, AC disconnects, AC feeders, AC circuit breakers, AC panel boards / switchgear, and complete data acquisition and monitoring systems.
- C. The PV systems shall be utility grid connected. The Provider shall be responsible for all required utility company coordination, applications, inspections, permits, and final approval for the complete interconnection of the PV systems with the utility company grid, including bidirectional utility meters at each location. Provider shall coordinate with the Local Electric Utility to schedule any power outages required to interconnect the PV System and will establish a



mutually agreed upon date and time for such an outage with the Purchaser before scheduling. Provider shall be responsible for any Local Electric Utility fees associated with the planned outage but shall not be responsible for other costs incurred by the Purchaser as part of coordinating this outage.

- D. The Provider shall ensure adequate clearance and equipment space within the allotted areas and existing building and site conditions. All equipment and sizes / clearances shall be coordinated with the Purchaser prior to rough-in.
- 1.05 QUALITY ASSURANCE
 - A. All equipment shall be listed to Underwriters' Laboratories (UL) standards as applicable.
 - B. Installer Qualifications The installing Provider shall be familiar with the equipment to be installed and have the necessary training to install in the equipment.
- 1.06 MATERIALS, DELIVERY, STORAGE, AND HANDLING
 - A. All materials shall be delivered new, undamaged and without defects.
 - B. All equipment and panels shall be handled with care so as not to damage the delivered products. All equipment shall be installed in new and neat condition.
 - C. Appropriate protective clothing shall be worn when handling the equipment.

PART 2 - PRODUCTS

- 2.01 ACCEPTABLE MANUFACTURERS
 - A. Acceptable system manufacturers/vendors shall be as specified in other sections of this document. Manufacturers shall provide their latest line of equipment, meeting all current industry standards and all performance criteria set forth in this document. The Purchaser seeks equipment from proven, industry leading manufacturers in solid financial standing, producing tier-one equipment.
 - B. Provider proprietary products shall have an International Code Council (ICC) report or a testing report stamped and signed by a licensed California engineer.

2.02 EQUIPMENT AND MATERIALS

- A. PV MODULES SHALL MEET THE FOLLOWING:
 - 1. Module manufacturer that has produced no less than 250MW of modules in the prior year.
 - 2. Modules are from a field-tested product line that has been commercially available for no less than three years.
 - 3. Module manufacturer shall provide a 25-year warranty on the solar modules with at least 80 percent power output guaranteed at 25 years.
 - 4. Have a minimum 25-year design life, designed for normal, unattended operation.
 - 5. UL 1703 listed.



- 6. UL listed for the specified voltage (typically 1000 V-DC).
- 7. Meet IEC 61215 (crystalline silicon PV modules) or IEC 61646 (thin film PV modules) standards.
- 8. Meet California SB1 Guidelines for Eligibility.
- B. INVERTERS SHALL MEET THE FOLLOWING:
 - 1. String-type inverters.
 - 2. Integrated AC and DC disconnects
 - 3. Include a 10-year warranty.
 - 4. Manufacturer produced no less than 250 MW of inverters in the prior fiscal year.
 - 5. Field-tested product line that is commercially available for no less than 2 fiscal years.
 - 6. Comply with the following:
 - a. UL 1741 listed, inclusive of UL 1741-SB requirements.
 - b. IEEE 1547, including testing to IEEE 1547.1 and IEEE C62.45.
 - c. IEEE C62.41.2 and CSA107.1-01.1.
 - d. California Rule 21, CEC approved and utility line interactive type.
 - 7. Incorporate disconnect switch for main DC power disconnect in compliance with applicable codes and utility requirements.
 - 8. Sized as required to support the PV module production load within the rating of the equipment, together with all other components. <u>Sizing shall not exceed 1.35 DC:AC ratio</u> without approval by Purchaser.
 - 9. Meet the following requirements:
 - a. Nominal AC Voltage (Three-phase, + 10%): 208, 240, or 480 VAC (as required per site)
 - b. Nominal AC Frequency (+ 0.5 Hz): 60 Hz
 - c. Line Power Factor (Above 20% rated power): >0.99
 - d. AC Current Distortion (At rated power): <5% THD
 - e. Maximum Open Circuit Voltage DC: 1,000 VDC
 - f. Maximum Ripple Current (% of rated current): <5%
 - g. Minimum Inverter Efficiency: >96%
 - h. Temperature Range Ambient: -4º F to 122º F (-20º C to 50º C)
 - i. Enclosure Environmental Rating (minimum): NEMA 3R
 - j. Relative Humidity (non-condensing): 0-95%
 - k. Sound level: <85 dBa
 - I. Capable of producing reactive power to operate between a power factor of 0.9 lagging to 0.9 leading (as adjusted on the inverter equipment).
 - m. Protective Functions: Standard wakeup voltage, wakeup time delay, shutdown power, shutdown time delay, AC over / under voltage and time delays, AC over / under frequency and time delays, ground over current, over-temperature, AC and DC over current, DC over voltage
 - n. User Display: Standard-LCD with on/off capability where possible
 - o. DC Disconnect: 1,000 VDC load break rated



- p. Isolation Transformer (if applicable): High-efficiency type, supplied by the manufacturer of the Inverter Systems, mounted within same enclosure or directly adjacent, with factory-designated wiring provisions.
- q. Zone 4 Seismic Rating (free standing) or wall mounted
- r. Internal combiner panel option to allow connections of sub-arrays at the Inverter without the use of additional equipment.
- C. All equipment costs shall include all known and future duties, tariffs, export tariffs, customs, demurrage, and shipping costs.
- D. No substitution for contracted equipment shall be made without the written consent of Purchaser. Such consent will not to be unreasonably conditioned, delayed, or withheld.
- E. Upon connection of the new PV systems, provide a placard on the respective Main Switchboard to identify the two sources of power feeding the equipment.
- F. Combiner boxes (where used) shall be NEMA 3R rated (minimum) and shall include fuses for string inputs and a bus bar to combine the strings into sub-arrays, for input into the Inverter system. Minimum combiner box output bus ampacity shall be 156% of the rated short circuit current available to be carried on the bus (the sum from all strings to the bus).]
- G. All AC interconnecting feeders shall be sized to NEC Table 310.16 (75 degree column) based on associated disconnect amperage. Conduit fill to 40% max. Include temperature derating as required for the ambient temperatures and roof conditions per NEC. Provide equipment grounding conductor in each conduit.
- H. All roof and exterior mounted raceways shall be designed and installed to accommodate expansion and contraction due to heating affects, including adequate cable length and listed expansion couplings. All expansion couplings or installations shall include grounding bonding jumpers as required by code.
- I. All AC circuits to be 3-wire or 4-wire + ground. All grounding per NEC 690, Part V.
- J. All DC circuits and feeders sized to NEC table 310.16 (90-degree column) based on associated disconnect amperage. Minimum ampacity shall be 156% of the rated short circuit current available to be carried on the specific conductor. Conduit fill to 40% max. Include temperature derating as required for the ambient temperatures and roof conditions per NEC. Provide equipment grounding conductor in each conduit.
- K. All DC circuits to be 2-wire + ground.
- L. All AC and DC wiring in conduit to be RHW-2, PVWIRE, THWN-2, or XHHW-2 (90 degree C) wet rated for use with 90 degree C listed terminals on PV equipment.
- M. All exposed DC wiring to be USE-2, PVWIRE, or SE (90 degree C) wet rated and sunlight resistant or PV Wire.
- N. Above ground exposed conduit shall be rigid galvanized steel with threaded fittings except where other applicable codes specifically allow for the use of EMT conduit. All conduit shall meet NEC Code and any applicable standards. Exterior installations shall have watertight fittings. All conduit shall be rated for exposed installation and a minimum design life equivalent to the solar panels. Paint all visible exposed raceways and boxes to match adjacent surface finish after



installation. Colors to be selected and approved by the Purchaser, such approval not to be unreasonably conditioned, delayed, or withheld.

- O. Purchaser will furnish and install:
 - (3) 4" PVC PV conduit for the site PV interconnection to the MSB click on the link here for location of these conduits <u>https://drive.google.com/file/d/1wMqaXz6nWvVVauPDOiH6UhyKqB8xXLGv/view?usp=dri</u> <u>ve_link</u>
 - (2) 2" PVC PV Canopy lighting conduits -click on the link here for the location of these conduits
 <u>https://drive.google.com/file/d/1wMqaXz6nWvVVauPDOiH6UhyKqB8xXLGv/view?usp=drive_link</u>
 - 3. (2) 4" EMT conduits from the admin building roof top to MSB. These conduits are for or the Link Building interconnection to the MSB. Click on the link here for the location of these conduits

https://drive.google.com/file/d/1wMqaXz6nWvVVauPDOiH6UhyKqB8xXLGv/view?usp=drive_link

These conduits are to be installed in accordance with the Instruction Bulletin 024 and shall conform to all requirements as defined by the applicable codes, laws, rules, regulations, and standards of applicable code enforcing authorities, including but not limited to the Local Electric Utility and Governmental Authorities.

P. All interior conduit to be EMT with steel set-screw fittings (no cast fittings).

2.03 WIRE MANAGEMENT

- A. All inter-array wiring methods must meet or exceed current industry standards for wire management, strain relief and fastening.
- B. All inter-array wire management shall use stainless steel or galvanized steel cable clips, Heyco or similar. UV rated cable ties shall be used minimally and only in locations where the use of cable clips is impossible.
- C. Where exposed, wires, cables and conductors shall be managed in a neat and orderly manner. Where exposed to environmental conditions (e.g., sunlight, rain, wind, etc.) and visible from below, wires shall be fastened in a uniform and discrete fashion.
- D. All conductors and conduits between separate arrays shall be routed underground. Wiring shall be routed down columns, encased in piers/caissons, routed underground between arrays or carports, and up the nearest column on the adjacent array. Under no circumstance shall circuits, conduits, or chaseways be mounted overhead between separate structures, including seismic gaps.
- E. Strain relief and drip loops shall be utilized at all entrances to and from conduit bodies, junction boxes, weather heads, switchgear, inverters and panelboards etc. Conductors shall be strapped with strain relief as not to stress panel leads, home runs or mechanically crimped connections within the array.

2.04 MISC. SYSTEM REQUIREMENTS

A. All exterior equipment to be sunlight and UV resistant as well as rated for elevated



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temperatures at which they are expected to operate (on roofs in hot sunlight).

- B. No dissimilar metals are allowed to contact each other (use plastic or rubber washers) with the exception of anodized aluminum module frames in contact with galvanized carport purlins. Best practices shall be used to avoid corrosion.
- C. No aluminum in contact with concrete or masonry materials.
- D. Bolted connections shall be non-corrosive and include locking devices designed to prevent twisting over the design life of the PV system.
- E. Environmental impact of system equipment containing hazardous materials shall be disclosed, as well as maintenance and disposal instructions for equipment at the end of its useful life.



2.05 SYSTEM ELECTRICAL

- A. The modules shall be interconnected using cable assemblies. The pigtails shall be quick-connect electrical wiring connections rated for the application (90 degree C rated).
- B. Raceway system shall be installed in a manner that prevents water from draining into electrical equipment.
- C. Full specifications of the inverter shall be supplied as part of the system submittal.
- D. All major components of the systems and the installation procedures shall meet National Electrical Code requirements, including Article 690.
- E. The PV system shall be designed to automatically drop offline when normal utility power is lost to avoid unintentional islanding effects as required by the local utility. Exceptions may be made by Purchaser where PV system is part of an emergency power/battery backup allowed by Utility and AHJ.
- F. All electrical system equipment shall be properly rated to withstand and interrupt (in the case of over current protection devices) the available fault current at the point of use.
- G. All required overcurrent protection and electrical bussing sizes per NEC 690.
- H. Means of system grounding to be approved by professional Electrical Engineer of record and GFCI protection shall be in accordance with latest NEC requirements.
- 2.06 MONITORING
 - A. DAS A Data Acquisition and Monitoring System (DAS) shall be provided for all points of interconnect. The system shall include, but not be limited to, the measurement, calculation, display, and reporting of the following items:
 - 1. PV production in 15-min reporting intervals.
 - 2. Energy consumption in 15-min reporting intervals.
 - 3. Weather data in 15-min reporting intervals
 - 4. System electrical functions (instantaneous and accumulated power output (kW and kWh), AC and DC system voltage and amperage, and peak value tracking with associated time stamps).
 - 5. Pounds of CO₂ emissions avoided from the generation of PV energy at the site (per NREL calculations).
 - 6. DAS shall be capable of outputting data in the Western Renewable Energy Generation Information System (WREGIS) format sufficient for registering Renewable Energy Credits (RECs) from each system.
 - 7. Lifetime logging and access to data reported by DAS.
 - 8. DAS shall provide Purchaser access to all data through an open data exchange protocol (File Transfer Protocol (FTP) Push or Application Programming Interface (API)) <u>at no additional cost to Purchaser or Purchaser's third-party designee</u>. This data shall, at a minimum, include PV production data, energy consumption data, inverter production data, inverter AC power data, inverter current data, inverter voltage data, weather station and/or satellite data, and



alarm status readings. All data shall be available over multiple timescales, ranging from 15min intervals to annual intervals and shall include both real-time and historic data.

- B. Cellular data shall be used for communications with the DAS and metering systems. In the absence of cellular service availability, the Purchaser may, at its own discretion, provide internet connections on a site-by-site basis.
- C. A separate consumption meter shall be provided for the utility account that the PV system is interconnected with. Consumption meters shall include a web-enabled interface and 15-min reporting intervals to be synced with PV meter production intervals. Consumption meter standard assumption is 480V Point of Interconnection (POI), assumption for anything above 480V POI without a storage component will be monitored at additional cost.
- D. Provider shall load software (as applicable) on Purchaser provided computers and train Purchaser in operation and maintenance of software or cloud-based systems and related monitoring functions.
- E. WEATHER STATION
 - 1. A weather station shall be provided at one site out of five (with a minimum of one) in the Purchaser's portfolio of Systems, located geographically to best provide coverage for the portfolio of sites being considered. The station shall provide at a minimum: solar irradiation (coplanar and horizontal), ambient temperature, wind speed and any other data relevant to weather correction of solar PV system performance.
 - 2. Alternatively, satellite weather may be utilized in lieu of on-site weather stations. If utilized in place of a weather station, satellite weather information shall be made available on the same interval as PV production at no additional cost to Purchaser per Item A above.

PART 3 - EXECUTION

3.01 REQUIRED PLACARDS

- A. All placards shall be machine generated phenolic type with red background and white lettering, affixed to equipment with stainless steel screws or with permanent adhesive where set screws are not feasible. Minimum lettering size to be 1/4" unless otherwise noted or required for legibility.
- B. Provide a placard clearly visible at each main service panel to identify both sources of power, with the following wording in 1/4" high lettering per NEC 690.64(B)(4): "Warning This Service Is Fed by Two Sources Of Power The Utility Service Main Disconnect And The PV System Main Disconnect Both Services Must Be Disconnected To Remove Power From The Switchboard".
- C. Provide a placard on each PV system input circuit breaker (where used) at the main panel with the following wording in 1/4" high lettering per NEC 690.64(B)(7): "Warning Inverter Output Connection Do Not Relocate This Overcurrent Device".
- Provide a placard on all disconnects with the following wording in 1/4" high lettering per NEC 690.17: "Warning Electric Shock Hazard Do Not Touch Terminals Terminals On Both The Line and Load Sides May Be Energized In The Open Position".



- E. Provide a placard on the Main PV System Disconnect (adjacent to each main service panel) with the following information in 1/4" high lettering per NEC 690.53: "Photovoltaic Power Source Disconnect Operating Current: X Amps; Operating voltage: XX VAC; Maximum System Voltage: XX VAC; Short-Circuit Current: XXX Amps", where X is the operating current, XX is the system voltage, and XXX is the maximum short circuit current contribution of the generating facility at the point of interconnection with the utility system.
- F. Provide a placard at each Main Switchboard with the following information in 1/4" High lettering per NEC 690.54: "Caution - Possible Backfeed From Photovoltaic Power System – X VAC, XX Amps", where X is the system voltage and XX is the maximum AC amperes of the installed system.
- G. Provide a placard on each PV System Inverter with the following information in 1/4" high lettering: "Photovoltaic Power Source Inverter Rating Operating Current: XX Amps; Operating voltage: XXX VDC; Maximum System Voltage: 1,000 VDC; Short-Circuit Current: XXXX Amps", where XX is the maximum DC amperes of the installed system, XXX is the operating voltage DC, and XXXX is the short circuit current that the Inverter can provide (from all strings in parallel).
- H. Provide utility-required System Directory placard and utility safety switch Identification placard as required by local utility company, to identify all system components.
- I. Provide a placard for all Combiner Boxes to read: "DC Combiner Box [XXX]– [*System Voltage*] VDC Maximum".

3.02 UTILITY INTERCONNECTION

- A. The Provider shall complete the submissions for the utility interconnection agreement with the Purchaser's approval. The Provider shall submit the required authorization form with the utility to act on behalf of the Purchaser. In the event that the Purchaser has already submitted interconnection applications, the Provider shall take all responsibility for the interconnect process upon contract execution.
- B. The PV system at each Site shall not be interconnected with the Utility's distribution facilities until written authorization from the Utility Company has been obtained. Unauthorized interconnections may result in injury to persons and damage to equipment or property for which the installing Provider may be liable.

3.03 INSTALLATION STANDARDS

- A. System Installation shall conform to the equipment manufacturers Installation Manual(s) and requirements or guidelines.
- B. All Local, State, and NEC codes shall be observed, including all industry standards related to the installation, operation, and maintenance of photovoltaic power systems.

3.04 TESTING

- A. Photovoltaic modules shall be tested in the factory for design performance and results shall be included in the Operation and Maintenance manuals.
- B. Inverters shall be factory tested for performance and the results shall be included in the Operation and Maintenance manuals.



- C. System testing of the installed photovoltaic array shall be performed on all system strings and recorded in commissioning documentation and the Operation and Maintenance manuals.
- D. Commissioning of PV Systems shall adhere to IEC 62446-1 requirements and shall include the following at a minimum:
 - 1. CONDUCTORS
 - a. AC & DC conductor inspection / megger testing
 - b. Wire management check
 - c. DC string Voc & Isc testing and recording when possible
 - d. Confirm all conduits & junction boxes are installed properly/watertight
 - 2. Inspection of DC fusing and disconnects
 - 3. Inspection of AC components: AC Disconnect, Main Switch Board, AC Combiner Panel Boards, Breakers, Fuses, Terminations, Phasing, OCPD operation, etc.
 - 4. Grounding & bonding system inspection and continuity testing
 - 5. INVERTERS
 - a. Inverter inspections and tests per manufacturer instructions
 - b. Inverter start-up and confirm proper inverter settings
 - c. Inverter output tests Confirm PV system AC output as expected based on design, insolation and inverter readings
 - 6. IV Curve Trace, Performance testing and recording when possible
 - 7. THERMAL IMAGING
 - a. Check all electrical components while systems are energized
 - b. Spot check, Modules, Inverters, Disconnects, AC system, etc.
 - 8. Torque spot check on mechanical and electrical terminations
 - 9. Inspection of corrosion control measures
 - 10. Confirm signage and placards meet plans
 - 11. Workmanship evaluation
 - 12. Inspection of DAS / CT metering and monitoring equipment
 - 13. Weather station component inspection and performance audit
 - 14. Confirm web-based monitoring interface operations
 - 15. LIGHTING CONTROLS.
 - a. Provider is connecting canopy lighting to Purchaser-provided circuitry.
 - b. Lighting fixtures shall include local dimming and photocell controls.
 - c. Confirm canopy lighting levels match the photometric design provided by Purchaser.
 - d. Verify component installations
 - e. Confirm lighting controls function as specified
 - 16. Commissioning of any other major electrical infrastructure installed on the project by Provider per manufacturer requirements.
 - 17. Medium voltage equipment tested to ANSI/NETA requirements



- E. Testing to be performed per CPUC Electric Rule 21 testing procedures and requirements. All testing to be done on "no-cloud" days to avoid system fluctuation by passing clouds. Provider to provide all testing and certification / commissioning.
- F. System start-up procedure shall be as outlined by the Manufacturer's Installation Manual(s).

3.05 DOCUMENTATION

- A. All commissioning and testing reports shall be provided to the Purchaser within 15 days of completion of testing.
- B. The Provider shall submit to the Purchaser <u>a comprehensive Operations and Maintenance</u> (O&M) Manual with details for each system. O&M Manuals shall be compiled as a single, bookmarked portable document format (PDF) file. The document shall be a well-organized, comprehensive and custom document created with details for each site. The document shall include at a minimum the following:
 - 1. System description and overview
 - 2. Simplified site plan that shows array naming convention, inverter locations, and disconnects
 - 3. Safety Details, including shut down procedures
 - 4. Contact information for the system installer and maintenance personnel
 - 5. Monitoring system login and operation details
 - 6. Standard procedures for both Purchaser and O&M personnel
 - 7. Maintenance information, including schedules and responsibilities for ongoing maintenance.
 - 8. Troubleshooting and repair, including responses to typical issues and responsible parties.
 - 9. Summary of Performance Guarantee on a site-by-site basis, inclusive of COD for each site, reporting dates and true-up dates.
 - 10. Summary table with the following details for each site: Site, System Size, Permission-to-Operate (PTO), Commercial Operation Date (COD), Final Completion Date, AHJ Closeout Date
 - 11. Any other information that may be required for the Purchaser to easily and safely interact with, confirm performance, troubleshoot, maintain and/or service the materials and equipment installed under this Contract.
 - 12. O&M Attachments shall include:
 - a. Permission-to-Operate (PTO) notice and any other pertinent Utility documentation
 - b. As-built Record Drawings in both AutoCAD and PDF (single compiled file for each site), provided as separate files from the fully compiled O&M Manual PDF. The updated asbuilt drawings shall also include the following details:
 - i) DC string maps with corresponding inverter nomenclature (ID), locations, serial numbers, azimuth, and tilt.
 - ii) Data logger make, model and serial number
 - iii) Include all horizontal/directional boring logs and column footing depths
 - c. Performance Guarantee (PeGu) with as-built details.



- d. Performance Data, Modeled As-built, including expected production over time. Electronic 8760 production and insolation data shall also be provided in spreadsheet format.
- e. Material List Complete material list of all items furnished and installed, including but not limited to the following: PV Modules, inverters, wiring, combiner boxes, panelboards, switch gear, optimizers, disconnects, boxes, metering and DAS equipment, etc. PV System operation details
- f. All warranties, cut sheets and manuals for major equipment
- g. System testing and commissioning documentation

END OF SPECIFICATION SECTION 26 60 00



Schedule 12 – Solar Photovoltaic Roof Mount Specifications

PART 1 - GENERAL

- 1.01 RELATED DOCUMENTS
 - A. The Contract and any design-build bridging documents
 - B. Section 26 00 00: General Electrical Specifications
 - C. Section 26 60 00: Photovoltaic System Specifications
 - D. Section 05 09 02: Solar Photovoltaic Canopy Structures
 - E. Other relevant Purchaser Specifications

NOTE: Where this specification and other specifications or bridging documents are in conflict, the more stringent shall apply. Provider shall identify conflicts and confirm recommended equipment or procedures with the Purchaser.

1.02 CODES & REFERENCES

- A. The design and installation shall conform to all requirements as defined by the applicable codes, laws, rules, regulations and standards of applicable code enforcing authorities (Latest Edition unless otherwise noted). The following are key standards that shall be followed. The Provider shall ensure all applicable codes are followed:
 - 1. Aluminum Association (AA) (www.aluminum.org) Aluminum Standards and Data, 2003 Edition.
 - 2. ASTM International (ASTM) (www.astm.org):
 - a. A484/A484M-16 Standard Specifications for General Requirements for Stainless Steel Bars, Billets, and Forgings.
 - A554-16 Standard Specification for Welded Stainless Steel Mechanical Tubing.
 - c. A555/A555M-16 Standard Specification for General Requirements for Stainless Steel Wire and Wire Rods.
 - d. B85-03 Standard Specification for Aluminum-Alloy Die Castings.
 - e. E2766-13 Standard Practice for Installation of Roof Mounted Photovoltaic Arrays on Steep-Slope Roofs
 - f. E3010-15 Standard Practice for Installation, Commissioning, Operation, and Maintenance Process (ICOMP) of Photovoltaic Arrays
 - g. F836M-02 (2015) Standard Specification for Style 1 Stainless Steel Metric Nuts (Metric).
 - h. F880-12 Standard Specification for Stainless Steel Socket, Square Head, and Slotted Headless-Set Screws.
 - 3. American National Standards Institute (ANSI)
 - 4. American Society of Civil Engineers (ASCE), Minimum Design Loads and Associated Criteria For Buildings And Other Structures (7-16)



- 5. California Building Code (CBC), with State of California Amendments
- 6. California Energy Commission Title 24 Building Energy Efficiency Requirements
- 7. California Department of Forestry and Fire Protection, Office of the State Fire Marshal Solar Photovoltaic Installation Guidelines
- 8. California Office of Statewide Health Planning and Development (OSHPD)
- 9. Local and State Fire Code
- 10. Purchaser Specifications and Requirements
- 11. Factory Mutual (FM)
- 12. Institute of Electrical and Electronics Engineers (IEEE)
- 13. National Electrical Manufacturers Association (NEMA)
- 14. National Fire Protection Association (NFPA), National/CA Electrical Code
- 15. Occupational Safety and Health Administration (CAL_OSHA)
- 16. Underwriters Laboratory (UL), including:
 - a. UL 2703 Standard for Mounting Systems, Mounting Devices, Clamping/Retention Devices, and Ground Lugs for use with Flat-Plate Photovoltaic Modules.
- 17. Utility company standards and requirements
- 18. All other applicable Codes and Ordinances
- 1.03 GENERAL
 - A. "Purchaser" shall refer to owner of the site where project will be located, regardless of system ownership, and include any representative of the site owner, such as consultants or inspectors. "Contract" refers to the design-build or construction contract and any associated design-build bridging documents.
 "Provider" refers to the entity performing the work, inclusive of Engineer and Architect of Record for design-build contracts.
 - A. This section describes requirements for solar photovoltaic system mounting on roofs, including design requirements.
 - B. The Provider shall include all work reasonable inferred by these specifications and the design-build bridging documents, to comply with applicable codes, and to provide complete PV mounting systems acceptable to Authorities Having Jurisdiction (AHJs).
 - C. The Provider shall coordinate with the respective utility company for the installation of each PV system and incorporate all related utility requirements into the design of the system.
 - D. The Provider shall prepare complete drawings and specifications and all final approvals necessary to commence the work. Provide all engineering design services and complete coordination with other disciplines, trades, utility companies, labor, materials, apparatus, tools, equipment, transportation, temporary construction and power and special or occasional services as required to provide complete PV mounting systems at each location.
 - E. The structural mounting designs shall be fully developed at 90% CDs and fully coordinated with the purchaser AOR. Locate, layout and identify means of attachment for all equipment. The site, plans, elevations, schedules and detail



drawings must be sufficiently developed to reflect the overall system design. Provide arrangement of equipment, including attachment details and structural calculations for all roof mounted PV modules, inverters and any other balance-of-system items mounted on the roof, and conduit/conductor routing.

- F. EXCLUSIONS AND SUBSTITUTIONS
 - 1. The Provider shall be allowed freedom to pursue a Fire and any other AHJ approved design toward the Purchaser's benefit with respect to cost and performance.
 - 2. Base design shall be based on the general systems described herein and in any bridging documents. The Provider may offer alternatives, substitutions, or exclusions in any area of the work, provided that each case is clearly described with the benefits noted and that all other applicable Purchaser specifications are met. This applies to systems, methods, equipment and material for which such alternatives or substitutions would, in the Provider's opinion, be beneficial to the projects and the Purchaser, so far as safety, health, and comfort of occupants are satisfied and the requirements of Codes are met.
 - 3. Burden of proof of equality of any substitution for a specified product is the responsibility of the Provider.

1.04 WORK INCLUDED

- A. The scope of work shall include the design of the roof mounted PV system, means of attachment, materials, equipment, fabrication, installation and tests in conformity with applicable codes, professionally recognized standards and authorities having jurisdiction.
- B. Provide all required construction documents and compliance documentation.
- C. Provide all materials, labor, equipment, services, power, lighting, and incidentals necessary to install the PV mounting systems as shown on the drawings and as specified hereinafter.
- D. Coordinate with Client, Client's agent, and roofer for any required blocking prior to roof decking installation. Additional blocking installation will not be allowed after roof is installed. If Provider will not be installing the blocking, the Provider shall provide detailed designs, drawings, and engineering for the blocking installation.
- E. Provide coordination with roofer/roof warranty holder. Provide waterproofing details to Client and roofer and ensure all work maintains roof warranty, inclusive of having roof warranty holder provide waterproofing where required by the warranty.
- F. Include all required incidental work, such as pull tests, blocking, lashing, sealing, fire stopping, waterproofing, roof repair, commissioning, and testing.
- G. Include any other electrical, roof attachment or PV support structure work as might reasonably be implied as required, even though not specifically mentioned herein or shown on the drawings.

1.05 DESIGN PROCEDURE & REQUIREMENTS

A. Engineering calculations, drawings and specifications shall be prepared and signed by a Structural Engineer, registered in the State of California and regularly



employed in the design of photovoltaic electrical systems on roofs for California projects. Structural Engineer shall be the Engineer of Record as required by codeenforcing authorities. The Engineer of Record shall provide required statements and certifications.

- B. Structural design shall be complete and comply with all requirements specified, including materials, workmanship and performance. System shall be designed such that it does not negatively affect the structural integrity of the roof given dead loads, wind loads, and seismic loads.
- C. The design and installation of solar systems on roofs shall adhere to the California State Fire Marshal Solar Photovoltaic Installation Guideline.
- D. Design of racking structures and the subsequent installation of the PV system and all ancillary equipment shall provide adequate room for access to and inspection/maintenance of existing equipment on the building roofs. A minimum of three feet of clearance will be provided between PV equipment and existing mechanical equipment and other equipment mounted on the roof or as required by code. A minimum of four feet of clearance shall be provided between PV equipment and the edge of the roof or as designated by the local AHJ. Clearance guidelines of the AHJs shall be followed. In the event of conflicting requirements, the greater clearance requirement shall be used.
- E. ROOF PENETRATIONS OR ATTACHMENTS
 - 1. Penetrations should be minimized within code requirements. All penetrations shall be waterproofed. Work shall be performed by an experienced and licensed roofer, who regularly engaged in the waterproofing of roof penetrations for the type of roof and is subject to approval by the Purchaser. Provider shall perform all work so that existing roof warranties shall not be voided, reduced, or otherwise negatively impacted.
 - Detail(s) for the sealing of any roof penetrations shall be approved in writing by the Purchaser/Purchaser's Representative, as well as the manufacturer of the existing roofing system, as part of system design review and approval – prior to Design-Builder proceeding with work.
 - 3. Details for any required blocking and/or roof penetrations shall be coordinated with projects AOR and SEOR and approved in writing by the Purchaser/Purchaser's Representative, additionally the details should not compromise the roofing warranty in any way shape or form. Provider shall work with pre-approved roofing Provider for installation of any roof penetrations. Design-Builder shall coordinate with the Provider for the roof and/or building to ensure the blocking details, including location, materials and construction, are known prior to roof construction. Details will be provided to the Purchaser for coordination with the 90% drawings. Rework resulting from failure to provide said details to the parties listed above will result in payment rework by the PV Provider. All roof penetration shall be installed at the time of steel erections.
- F. The PV equipment shall not be installed in a way that obstructs air flow into or out of building systems or equipment.
- G. No work shall compromise roof drainage, cause damming or standing water or cause excessive soil build-up.



- H. All materials and/or sealants must be chemically compatible. Special attention shall be paid to avoiding dissimilar metal contact and minimizing corrosion.
- I. Designs shall account for thermal movement and any thermal/seismic joints on buildings. Thermal movement that causes scuffing to the roof must be mitigated as part of the mounting solution.
- J. Flat and low slope roofs
 - 1. Shall have a minimum of a 6-inch standoff. Purchaser may consider ballasted or hybrid ballasted/attached racking systems.
 - 2. Design shall minimize interrow shading
 - 3. Panel tilt shall be a minimum of 10 degrees
- K. The installation of PV modules, inverters and other equipment on building roofs will be designed to minimize visibility of the equipment from the ground as feasible.
- L. Coordinate design with Drawings and other design engineers and disciplines to ensure completely coordinated construction documents. Lay out equipment in a manner to provide code compliant and manufacturer recommended access for servicing, maintenance, inspection, and testing of PV system and for other equipment, vents, etc. in the vicinity of the system
- M. Conditions at Site: Provider is responsible for familiarizing themselves with all discernible site conditions and no extra payment will be allowed for work required because of these conditions, whether specifically mentioned or not. All dimensions, partitions, etc. are to be verified at site by the Provider. Before ordering any material or closing in any work, Provider is responsible for verifying all measurements at each project site. Any differences found between dimensions on the drawings and actual measurements shall be brought to the Purchaser's attention for consideration before proceeding.
- N. DEAD LOAD, WIND LOADING AND SEISMIC DESIGN
 - 1. Roof-mounted arrays, inclusive of inverters and other electrical equipment may not exceed 5 lbs. per square foot.
 - Systems shall not exceed the ability of the existing structure to support the entire solar system and withstand increased wind uplift and seismic loads. The capability of the existing structure to support proposed solar systems shall be verified by a licensed structural engineer prior to design approval.
 - 3. Comply with all applicable codes and standards and provide wind load restraints for all equipment installed under this contract that requires restraint. The photovoltaic array wind loading restraint shall be designed as required by wind tunnel data and other AHJ requirements.
 - 4. The photovoltaic array shall be designed to accommodate lateral displacement in the event of an earthquake based on a nonlinear response-history seismic analysis for the appropriate seismic zone.
- O. PERMITS AND INSPECTIONS
 - 1. The Provider shall obtain all required permits and arrange for all required inspections including utility requirements, inspections, and sign-offs.



2. Provider shall not allow or cause any of the work to be covered or enclosed until it has been tested and/or inspected.

1.06 SUBMITTALS

- A. Submit each item in this Article according to the Conditions of the Contract.
- B. Design Drawings: For design-build projects, prepare working drawings that shall include but not be limited to the following:
 - 1. Complete racking and module layout designs, inclusive of roof plans showing locations of photovoltaic attachment devices on roof with attachment details and spacing.
 - 2. Equipment mounting details
 - 3. Inverter and any other balance of system mounting details and layout, inclusive of conduit/conductor routing.
 - 4. Equipment space layouts and clearances
 - 5. Details of waterproofing for any penetrations
- C. Roofing Warranty: Signed certificates from the roofing manufacturer/warranty holder stating:
 - 1. Roofing Provider is certified installer of Complete Roofing System.
 - 2. Manufacturer's Technical Representative is qualified and authorized to approve project.
 - 3. Project plans and specs meet the requirements of the warranty of the Complete Roofing System for the specified period.
 - 4. Existing warranty incorporates the new roofing work and flashing work.
- D. Shop Drawings: Submit shop drawings indicating profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners accessories. Include erection drawings, elevation and details where applicable.
- E. PRODUCT DATA
 - 1. Complete material list of all items proposed to be furnished and installed under this Section, including but not limited to the following items: stanchions or attachments, stanchion or attachment hardware including; means of structural attachment to building framing and racking systems, flashing, PV rails, PV module attachment hardware, WEEBS, etc.
 - 2. Manufacturers' specifications and other data required to demonstrate compliance with the specified requirements.
 - 3. Manufacturers' recommended installation procedures which, when approved by the Purchaser, shall become the basis for inspecting and accepting or rejecting actual installation procedures used on the work.
 - 4. Samples of all attachment hardware
- F. Test Results: In-situ pull-test or other testing results where required by AHJ.
- G. AS-BUILTS
 - 1. Maintain "as-built" records at all times, showing the exact location of racking system, including concealed conduits and feeders installed under this contract.
 - 2. Upon completion of work and before acceptance can be considered, the Provider must forward to the Purchaser, a corrected set of plans to show the mounting system work as installed in both PDF and CAD format.
 - 3. Comply with additional "As-built" requirements in other sections of the Specifications.



PART 2 - PRODUCTS

- 2.01 MANUFACTURER QUALIFICATIONS:
 - A. All equipment shall be from a manufacturer specializing in production of roof attachment products and racking materials of the type specified with a minimum of 5 years documented experience.
 - B. Supply all new equipment and accessories free from defects and listed by Underwriter's Laboratories, Inc., or bearing its label or label of a Nationally Recognized Testing Laboratory (NRTL).
 - C. All items of a given type shall be the products of the same manufacturer.
- 2.02 All racking and attachment materials shall be aluminum or stainless steel, with suitable corrosion resistance. Where no alternative to aluminum and steel are available, product can be composite and non-metallic.

2.03 CUSTOM FABRICATION

- A. MATERIALS
 - 1. Steel Sections: ASTM A36.
 - 2. Steel Pipe: ASTM A53, Type E or S, Grade. B.
 - 3. Steel Bolts, Nuts, and Washers: ASTM A307.
 - 4. Welding Materials: AWS D1.1; type required for materials being welded.
 - 5. Galvanizing: Hot-dip process ASTM A123 typical and ASTM A153 for threaded fasteners performed after fabrication into largest practical section. Weight of coating not less than 2 oz. per sq. ft. of surface. Where damaged, repair surface with one coat of hot process galvanizing repair compound, "Galvalloy," Galvweldalloy," or approved equal.
 - 6. Primer: Tnemec Company "Series V10 Red Primer," Sherwin-Williams "Steel Spec Universal Primer," or approved equal.
 - 7. Dissimilar Materials: Separate dissimilar surfaces in contact with or in close proximity to non-compatible metals, concrete masonry, or plaster with neoprene gasket; or other approved means.

B. FABRICATION

- 1. Verify dimensions on site prior to shop fabrication.
- 2. Fabricate items with joints tightly fitted and secured.
- 3. Fit and shop assemble in largest practical sections, for delivery to jobsite.
- 4. Grind exposed welds flush and smooth adjacent finished surfaces. Ease exposed edges to small uniform radius.
- 5. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of structure, except where specifically noted otherwise.
- 6. Make exposed joints butt tight, flush and hairline.
- 7. Supply components required for anchorage of metal fabrications. Fabricate anchorage and related components of same material and finish as metal fabrication, except where specifically noted otherwise.
- C. FINISH
 - 1. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.



- 2. Do not prime surfaces in direct contact bond with concrete or where field welding is required.
- 3. Prime paint interior items with one coat unless scheduled to be galvanized.
- 4. Galvanize exterior items and scheduled interior items to minimum 2.00 oz/sq ft zinc coating.

PART 3 - EXECUTION

3.01 ROOFING

- A. Provider shall perform all work such that existing roof warranties shall not be voided, reduced, or otherwise negatively impacted.
- B. Provider is responsible for providing equipment for roof access.
- C. Waterproofing shall be performed by the entity holding the roof warranty or approved by that entity. Provider shall coordinate and ensure adherence to this requirement.
- D. Provider shall document condition of roofing with roofing representative and Purchaser prior to beginning work.
- E. Any damage to roofing material during installation of solar systems shall be remedied by Provider and approved by roof warranty holder and Purchaser.

3.02 INSTALLER QUALIFICATIONS:

- A. Installer to be certified in solar PV roof attachment products and racking installation with a minimum of 5 years documented experience.
- B. Where manufacturer certifies installers, installer shall possess certification from the manufacturer's products being installed.

3.03 STANDING SEAM ATTACHMENT

- A. Examination: Prior to beginning installation, verify that:
 - 1. Panel seaming or fastening is complete.
 - 2. Roof panel attachment is sufficient to withstand loads applied by the photovoltaic attachment system, photovoltaic system and associated components.
 - 3. Where required, ensure pull tests have been completed and pass requirements.
 - 4. Installation will not impede roof drainage.
- B. PREPARATION
 - 1. Clean areas to receive attachments; remove loose and foreign matter that could interfere with installation or performance.
- C. INSTALLATION
 - 1. Install system in accordance with manufacturer's instructions and approved Shop Drawings.
 - 2. Place clamps as required by PV layout and in-service loads.
 - 3. Install with careful consideration of aesthetics to ensure alignment of modules and fasteners. Place clamps in straight, aligned rows.
 - 4. Tighten set screws to manufacturer's recommended torque. Verify set screw torque using calibrated torque wrench.
SPECIFICATION SECTION 05 90 04: SOLAR PHOTOVOLTAIC ROOF MOUNTING



3.04 PENETRATING ATTACHMENT

A. PREPARATION

- 1. Prior to beginning installation, verify that installation will not impede roof drainage.
- 2. Locate mount placements per design over rafter, blocking or designated attachment points.
- 3. Clean areas to receive attachments; remove loose and foreign matter that could interfere with installation or performance.
- 4. Utilize certified roofer approved by roof warranty holder to expose attachment points.

B. INSTALLATION

- 1. Using the base as a template, mark the penetration points.
- 2. Drill pilot holes perpendicular and centered on rafter or designated attachment with appropriate size bit. Fill pilot holes with a sealant compatible with roofing materials.
- 3. Attach base to roof with specified lag bolts or other approved fastening method.
- 4. Attach any hardware to the top of the post/attachment. Seal top of post/attachment from weather exposure
- 5. After inspection of attachment, install appropriate waterproofing in accordance with roof warranty requirements. Utilize certified roofer approved by roof warranty holder.

3.05 CUSTOM FABRICATED PENETRATING ATTACHMENTS

- A. PREPARATION
 - 1. Follow preparation requirements per Penetrating Attachment listed above.
 - 2. Obtain Purchaser's Representative approval prior to site cutting or making adjustments not scheduled.
 - 3. Clean and strip primed steel items to bare metal where site welding is scheduled.
 - 4. Make provision for erection loads with temporary bracing. Keep work in alignment.
 - 5. Supply items required to be cast into concrete with setting templates, for installation under appropriate Sections.
- B. INSTALLATION
 - 1. Install items plumb and level, accurately fitted, free from distortion or defects.
 - 2. After installation, touch-up field welds, scratched or damaged surfaces with primer, except repair exposed galvanized work (not to be painted) with hot process field galvanizing, in accord with manufacturer's published directions.
 - 3. After inspection of attachment, install appropriate waterproofing in accordance with roof warranty requirements. Utilize certified roofer approved by roof warranty holder.

3.06 RACKING

- A. Follow manufacturer instructions for installation. Utilize a calibrated torque wrench and verify torque of fasteners to manufacturers requirements.
- B. Perform and obtain approval for all required field testing of attachment devices and racking as required by manufacturer, AHJ and building codes.

END OF SPECIFICATION SECTION 05 90 04



Schedule 13 – Solar Photovoltaic Canopy Structure Specifications



PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. The Contract and any design-build bridging documents
- B. Section 26 00 00: General Electrical Specifications
- C. Section 26 60 00: Photovoltaic System Specifications
- D. Section 05 09 04: Solar Photovoltaic Roof Mounting
- E. Other relevant Purchaser Specifications

NOTE: Where this specification and other specifications or bridging-documents are in conflict, the more stringent shall apply. Provider shall identify conflicts and confirm recommended equipment or procedures with the Purchaser.

1.02 CODES & REFERENCES

- A. The design and installation shall conform to all requirements as defined by the applicable codes, laws, rules, regulations and standards of applicable code enforcing authorities (Latest Edition unless otherwise noted). The following are key standards that shall be followed. The Architect/Engineer of Record and Provider shall ensure all applicable codes are followed:
 - 1. Aluminum Association (AA) (<u>www.aluminum.org</u>) Aluminum Standards and Data, 2003 Edition.
 - 2. ASTM International (ASTM) (<u>www.astm.org</u>), including:
 - a. A6, Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling
 - b. A36, Standard Specification for Carbon Structural Steel
 - c. A123, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
 - d. A653, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
 - e. E3010, Standard Practice for Installation, Commissioning, Operation, and Maintenance Process (ICOMP) of Photovoltaic Arrays
 - 3. AISC Manual of Steel Construction
 - 4. AISI Specifications for the Design of Cold Formed Steel Members
 - 5. American National Standards Institute (ANSI)
 - 6. American Society of Civil Engineers (ASCE), Minimum Design Loads and Associated Criteria for Buildings And Other Structures (7-16)
 - 7. California Building Code (CBC), with State of California Amendments
 - 8. California Energy Commission Title 24 Building Energy Efficiency Requirements
 - 9. California Department of Forestry and Fire Protection, Office of the State Fire Marshal Solar Photovoltaic Installation Guidelines
 - 10. California Office of Statewide Health Planning and Development (OSHPD)
 - 11. Local and State Fire Code
 - 12. Purchaser Specifications and Requirements

- 13. Institute of Electrical and Electronics Engineers (IEEE)
- 14. National Electrical Manufacturers Association (NEMA)
- 15. National Fire Protection Association (NFPA), National/CA Electrical Code
- 16. Occupational Safety and Health Administration (CAL_OSHA)
- 17. Research Council on Structural Connections (RCSC)
- 18. Underwriters Laboratory (UL), including:
 - UL 2703 Standard for Mounting Systems, Mounting Devices, Clamping/Retention Devices, and Ground Lugs for use with Flat-Plate Photovoltaic Modules.
- 19. Utility company standards and requirements
- 20. All other applicable Codes and Ordinances
- 1.03 GENERAL
 - A. "Purchaser" shall refer to owner of the site where project will be located, regardless of system ownership, and include any representative of the site owner, such as consultants or inspectors. "Contract" refers to the design-build or construction contract and any associated design-build bridging documents.
 "Provider" refers to the entity performing the work, inclusive of Engineer and Architect of Record for design-build contracts.
 - B. The Provider shall include all items and all work reasonable inferred by these specifications and the Contract for compliance with all applicable structural codes. If the Provider is in doubt as to the intent of any portion of these specifications and the Contract, or necessary information is omitted, the Provider shall notify the Purchaser in writing for clarifications or corrections to be provided by addendum.
 - C. All design documents, cut sheets, and technical specifications shall be submitted, reviewed and accepted by the Purchaser per the guidelines specified in the Contract.
 - D. General Specifications as described in Section 26 00 00: General Electrical Specifications, are referred to herein and shall apply to this specification. Section 26 00 00 shall be deemed to supersede this specification in the case of conflicts.

1.04 WORK INCLUDED

- A. The work shall include the design and construction of the structural systems for solar PV canopies, in conformity with applicable codes and professionally recognized standards.
- B. The structural design shall be fully developed, including descriptions and calculations for all structural components. The site, plans, elevations, schedules and detail drawings must be sufficiently developed to reflect the overall design per the Contract and as described in Section 26 60 00, Photovoltaic System Specifications. Clear-height of canopy above grade shall be clearly noted on the drawings for the low side of canopies at corners and at the minimum clear location between corners.
- C. Provider shall provide all materials, labor, equipment, services, and incidentals necessary to install the structures at each Site as shown on the design drawings and as specified hereinafter.





- D. Provider shall provide temporary power and lighting as required for construction.
- E. Provider responsible for location of all underground utilities and infrastructure with the use of Ground Penetrating Radar (GPR) or equivalent technology.
- F. Provider shall be responsible for prompt removal and disposal of spoils from all related construction activities.

1.05 DESIGN PROCEDURE & REQUIREMENTS

- A. Engineering calculations, drawings and specifications shall be prepared and signed by a Structural Engineer, registered in the State of California and regularly employed in the design of solar canopy projects. Structural Engineer shall be the Engineer of Record as required by code-enforcing authorities. The Engineer of Record shall provide required statements and certifications.
- B. All structural system components shall be designed and constructed to withstand the environmental conditions of the site to which they will be exposed. The mounting systems shall be designed and installed to resist dead load, live load, corrosion UV degradation, wind loads, and seismic loads appropriate to the geographic area over the expected life of the PV system, a minimum 25-years.
- C. Purchaser, not Provider, shall be responsible for ADA compliance.
- D. GEOTECHNICAL STUDY AND ANALYSIS
 - A geotechnical analysis performed by a licensed geotechnical engineering firm shall be used. The results of the analysis shall be used when designing the foundations for the structures on the Site.
 - 2. At a minimum, the following should be included in the analysis:
 - a. Review available geotechnical information. This may include past geotechnical reports, soils and geologic maps/literature, photographs, groundwater reports, water well data, etc.
 - b. Coordination and mobilization of the geotechnical services team for subsurface exploration of the site. This shall include coordinating local utilities to mark any existing underground utilities.
 - c. Study the site to determine the presence of faults, ground fissures, and other potential geologic hazards that could affect the structural design and construction of the facility.
 - d. Drilling or digging of exploratory borings and pits. The amount and depth shall be determined by the Engineer of Record.
 - e. Performance of cone penetration tests. The amount and depth shall be determined by the Provider.
 - f. Laboratory testing of collected soil samples from the borings and test pits. An evaluation of the in-place moisture content and dry density, gradation, plasticity, consolidation characteristics, collapse potential, expansivity, shear strength, resistivity, chloride content, sodium sulfate content, and solubility potential (total salts) should be conducted.
 - g. Analyze the corrosivity of the soil upon determination of a professional engineer. Include a recommendation for the type of cement to be used in concrete foundations. Also include recommendations for corrosion



protection for underground steel, including rigid metal conduit (such as the need for polyvinyl chloride [PVC] coating).

h. A detailed report shall be provided outlining the tasks performed and the results of the testing. Included in the report should be any recommendations for the foundation designs, structural support designs, corrosion protection, pile drive frequency, minimum pile size, and any geologic conditions that may prevent the development of the project. For ground mount systems, an opinion on the viability of driven piles as the PV racking supports should be provided.

1.06 PERMITS AND INSPECTIONS

- A. Provider shall obtain all required permits and arrange for all required inspections, including utility company requirements, inspections, and sign-offs.
- B. Do not allow or cause any of the work to be covered or enclosed until it has been tested and/or inspected.

PART 2 - PRODUCTS

2.01 SOLAR CANOPY STRUCTURES

- A. The PV Canopies shall consist of interconnected structural steel columns and beams, purlins attached to cross beams and solar modules mechanically fastened to the purlins.
- B. For mounting of Bi-facial PV modules, design of racking, fastening and structural support should adhere to specific means consistent and effective in supporting that type of module. Mounting should be structurally sound, taking into consideration all wind and seismic requirements. Array and racking design should allow maximum irradiance to the array.

C. COATINGS AND CORROSION CONTROL

- Each canopy system and associated components must be designed and selected to withstand the environmental conditions of the site (e.g., temperatures, winds, rain, flooding, etc.) to which they will be exposed. The design life shall be a minimum of 25-years.
- 2. All structural members and racking installed outdoors shall be hot dipped galvanized steel.
 - a. All galvanized structural components shall be hot-dipped galvanized in compliance with ASTM 123.
 - All purlin framing members shall meet ASTM A653, minimum G90. If structure is in close proximity to a marine environment (within 1 mile), G120 or higher shall be installed per Engineer/Architect of Record's specification.
 - c. Field cuts of galvanized materials shall be kept to a minimum. All galvanized materials cut during construction shall be field coated with a long-lasting rust inhibiting coating, color matched and intended for coating hot-dipped galvanized metal in outdoor settings.
- 3. All canopy bolts, nuts and washers, unless otherwise noted, shall be hot dip galvanized or stainless steel.



- 4. Particular attention shall be given to the prevention of corrosion at the connections between dissimilar metals.
- D. All materials shall conform to the requirements, tolerances, etc. of the latest editions of the AISC Manual of Steel Construction, AISI Specifications, ASTM Standard Specifications.
- E. All framing material shall be drained or have provisions to prevent water pooling on or within the framing member (weep holes).
- F. FOUNDATIONS AND COLUMNS
 - 1. In parking areas, concrete column foundations shall extend a minimum height of 30 inches above grade for protection of structural steel from vehicle strikes.
 - 2. For canopies outside of parking areas, such as hardscape play areas or interior campus areas, foundations shall be flush to grade, with no concrete above-grade. Columns shall be painted yellow (on top of hot-dipped galvanizing) from grade up to 6-feet above grade and topped with a 3" wide band of outdoor rated reflective tape along the top edge of the paint.
 - 3. All column anchor bolts shall be torqued per Engineer of Record requirements and marked once torqued. Nuts shall then be double nutted or 'staked' (threading irreversibly altered) to protect from structural compromise and vandalism.
 - 4. All structural connections at the flanged base of columns shall be outfitted with metal pole skirts coated to match columns. Pole skirts shall have rounded corners. Alternatively, flange bases may be grouted at the approval of the Purchaser.
 - 5. Provider's scope assumes no required hard rock drilling, no shoring or de-watering for trenches or columns, an estimated required pier depth of 14' and diameter of 30", and that water mitigation such as casings or backfill will not be required. If soil conditions prove to be more adverse, requiring deeper or wider foundations, water mitigations, hard rock drilling, Provider shall not be responsible for such additional expenses. Provider shall demonstrate to Purchaser the added cost for such scope Such additional costs shall be handled in accordance with Schedule 2.
- G. CANOPY
 - 1. All canopies shall have a minimum clear height above grade of 12-feet at the lowest point of any structure or shall meet or exceed parking structure minimum clearance heights at the entrance of the structure. Provider is responsible for determining grade elevations under canopies and ensuring clear-heights are achieved. Clear heights shall be identified on drawings, including at all low side corners and at the point of minimum clearance on the low side.
 - 2. All canopies to be co-planar and in alignment horizontally and vertically with adjacent arrays. Installations with slopes on the long axis or stair-stepping between adjacent arrays shall only be approved in writing by Purchaser. Top of column heights shall be shown in design drawings.
 - Canopies shall have a minimum tilt of two degrees (2°) and maximum tilt of ten degrees (10°).
 - 4. Canopies placed in parking lots shall be clearly labeled with max clearance for vehicles at the low points. Labels shall be rated for long-term UV exposure with lifetime to match warranties specified for PV panels in Section 26 60 00. Minimum labeling along the long axis of the low-side of the carport shall be every 50 feet of canopy or 3 labels, whichever is



greater. Labeling shall also include the exterior corner of each canopy within a parking lot. Label should be easily visible from a vehicle.

- H. ELECTRICAL CONDUITS
 - 1. Electrical conduits extending from the canopy to grade are to be encased in the foundations, not mounted on the outside of finished piers.
 - 2. All electrical connections between separate structures shall be underground. Overhead "jumpers" between structures shall not be permitted. Structures are considered separate wherever a gap exists between structural crossmembers that is not spanned by purlins.
 - 3. Provider shall terminate the security camera conduits at a backbox in the PV canopy above the column where the conduits transition from underground. Provide spare conduits, backboxes, and underground pull boxes as noted in Schedule 6 *Security Camera Schematic sketch* for security cameras with conduits terminating at the following locations:
 - a. Canopy Array A: 1 x 1" conduit;
 - b. Canopy Array B: 1 x 1" conduit;
 - c. Canopy Array D: 1 x 1" conduit;
 - d. Canopy Array F: 1 x 1" conduit.

2.02 LIGHTING SYSTEMS

- A. Purchaser shall furnish canopy lighting system fixtures for Provider's use when installing the PV System. The fixtures shall conform to all requirements as defined by the applicable codes, laws, rules, regulations, and standards of applicable code enforcing authorities, including but not limited to the Local Electric Utility and Governmental Authorities.
- B. Lighting design and fixtures shall be approved by Purchaser and consistent with the lighting products and photometric requirements used at this site.
- C. Provided lights and fixtures shall be guaranteed to not leak for a period of no less than 5 years and have at minimum 5-yr life for LED bulbs and a minimum 5-year product warranty.
- D. Canopy lighting systems shall be designed to meet the Illuminating Engineering Society of North America (IESNA) requirements for parking lot areas, to meet or exceed minimum values and maximum uniformity ratios as listed in the IESNA criteria.
- E. Lighting shall meet all Title 24 requirements for installations in California.
- F. All lighting sources shall be LED type.
- G. Lighting control system shall be connected to the existing lighting controls in each area.
- H. Modify other existing lighting to coordinate with the new work and design, including reconnection of any existing downstream circuiting and controls to remain.
- I. Provider shall provide wiring for power and lighting control to pullbox locations.
- J. All lighting shall be 208V power.

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K. Design shall cover all areas of the parking lots (in the area of the work) to leave no dark spots and meet IESNA and requirements for all areas

PART 3 - EXECUTION

- 3.01 SITE PREPARATION AND INSPECTION
 - A. Provider shall direct, oversee and inspect all site work related to photovoltaic structural installation. Site preparation shall be in accordance with final drawings and specifications provided by manufacturer.

3.02 INSTALLATION

- A. Erect/stand structural steel with proper equipment and qualified installers.
- B. Actively cooperate with other trades and provide incidental welding, connections, etc. for securement of work of others to structural steel framing.
- C. Erect/stand temporary flooring, planking, and scaffolding necessary in connection with erection of structural steel or support of erection machinery. Use of temporary floors shall be as required by municipal or state laws and governing safety regulations. Hoist metal deck onto structural frame.
- D. After erection, clean connections and abrasions to shop coat and spot paint with same primer used in shop.
- E. Installation of the structural system and all components shall be in strict accordance with manufacturer's recommendations.
- F. Post installation, Provider shall provide the materials and labor to grout the base of the column to produce a finished joint.

3.03 ERECTION TOLERANCES

- A. Erection tolerances for structural steel work shall be in accordance with latest AISC "Code of Standard Practice for Steel Buildings and Bridges".
- 3.04 BOLTING
 - A. High strength steel bolts shall be used where indicated. Fabrication and erection shall be in strict accordance with the latest edition of "Specifications for Assembly of Structural Joints Using High-Strength Steel Bolts", as approved by the Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation. Load indicator washer shall be used. Use beveled washers on sloping surfaces.
- 3.05 WELDING
 - A. Welding and welded joints shall be in accordance with AWS standards. Work shall be performed by operators who have been qualified by test in accordance with AWS D1.1, "Structural Welding Code Steel", to perform type of work required for this project.
 - B. All methods, sequence, qualifications and procedures, including preheating, post heating, etc. shall be detailed in writing and submitted for review by the testing laboratory and results provided to Purchaser. Provisions shall be made in detailing



of lengths of members for dimensional changes as a result of shrinkage stresses so as to provide specified finished dimensions.

C. Remove all runoff tabs, and bottom backing bars. Top backup bars to be removed or have continuous fillet weld to column.

END OF SPECIFICATION SECTION 05 90 02

Schedule 14 50% Designs

SAN MATEO COUNTY MEDICAL CENTER 222 W 39TH AVENUE SAN MATEO, CA 94403



GOVERNING CODES:

CALIFORNIA CODE OF REGULATIONS:

(PART 1, TITLE 24, CCR) 2022 CALIFORNIA ADMINISTRATIVE CODE (CAC) 2022 CALIFORNIA BUILDING CODE (CBC), VOLUMES 1, AND 2 (PART 2, TITLE 24, CCR)

(2021 EDITION INTERNATIONAL BUILDING CODE WITH 2022 CALIFORNIA AMENDMENTS)

2022 CALIFORNIA ELECTRICAL CODE (PART 3, TITLE 24, CCR) (2020 EDITION NATIONAL ELECTRICAL CODE WITH 2022 CALIFORNIA AMENDMENTS)

2022 CALIFORNIA MECHANICAL CODE (CMC) (PART 4, TITLE 24, CCR)

(2021 EDITION IAPMO UNIFORM MECHANICAL CODE WITH 2022 CALIFORNIA AMENDMENTS) 2022 CALIFORNIA PLUMBING CODE (CPC) (PART 5, TITLE 24, CCR)

(2021 EDITION IAPMO UNIFORM PLUMBING CODE WITH 2022 CALIFORNIA AMENDMENTS)

(PART 6, TITLE 24, CCR) 2022 CALIFORNIA ENERGY CODE (2021 EDITION CALIFORNIA ENERGY COMMISSION BUILDING ENERGY EFFICIENCY STANDARDS) 2022 CALIFORNIA FIRE CODE (CFC) . . (PART 9, TITLE 24, CCR)

(2021 EDITION OF INTERNATIONAL FIRE CODE WITH 2022 CALIFORNIA AMENDMENTS) 2022 CALIFORNIA GREEN CODE ... (PART 11, TITLE 24, CCR) NFPA 13 - 2022 NFPA 72 - 2022

REFERENCE CODE SECTIONS FOR APPLICABLE STANDARDS: 2022 CBC, CHAPTER 35

2022 CFC, CHAPTER 80 **INSPECTIONS:**

SAFETY DURING CONSTRUCTION TO COMPLY WITH 2022 CFC CHAPTER 33

NOTES:

1) NOTICE TO THE APPLICANT/OWNER/OWNER'S AGENT/ARCHITECT OR ENGINEER OF RECORD: BY USING THIS PERMITTED CONSTRUCTION DRAWINGS FOR CONSTRUCTION.INSTALLATION OF THE WORK SPECIFIED HEREIN, YOU AGREE TO COMPL WITH THE REQUIREMENTS OF THE COUNTY OF LOS ANGELES FOR SPECIAL INSPECTIONS, STRUCTURAL OBSERVATIONS, CONSTRUCTION MATERIAL TESTING AND OFF-SITE FABRICATION OF BUILDING COMPONENTS, CONTAINED IN THE STATEMI OF SPECIAL INSPECTIONS AND AS, REQUIRED BY THE CALIFORNIA CONSTRUCTION CODES.

2) LOCATIONS AND CLASSIFICATIONS OF EXTINGUISHERS SHALL BE IN ACCORDANCE WITH CFC 906 AND CALIFORNIA CODE REGULATIONS (CCR), TITLE 19.

3) DURING CONSTRUCTION, AT LEAST ONE EXTINGUISHER SHALL BE PROVIDED ON EACH FLOOR LEVEL AT EACH STAIRWA ALL STORAGE AND CONSTRUCTION SHEDS, IN LOCATIONS WHERE FLAMMABLE OR COMBUSTIBLE LIQUIDS ARE STORED OF USED, AND WHERE OTHER SPECIAL HAZARDS ARE PRESENT PER CFC SECTION 3315.1.

4) BUILDINGS UNDERGOING CONSTRUCTION, ALTERATION, OR DEMOLITION SHALL CONFORM TO CFC CHAPTER 33. WELDIN CUTTING, AND OTHER HOT WORK SHALL BE IN CONFORMANCE WITH CFC CHAPTER 35.

5) ADDRESS IDENTIFICATION SHALL BE PROVIDED FOR ALL NEW AND EXISTING BUILDINGS IN A LOCATION THAT IS PLAINLY VISIBLE AND LEGIBLE FROM THE STREET OR ROAD FRONTING THE PROPERTY. WHERE ACCESS IS BY WAY OF A PRIVATE ROAD AND THE BUILDING ADDRESS CANNOT BE VIEWED FROM THE PUBLIC WAY, AN APPROVED SIGN OR MEANS SHALL BE USED TO IDENTIFY THE STRUCTURE. PREMISES IDENTIFICATION SHALL CONFORM TO CBC SECTION 501.2.

6) DUMPSTERS AND TRASH CONTAINERS EXCEEDING 1.5 CUBIC YARDS SHALL NOT BE STORED IN BUILDINGS OR PLACED WITHIN 5 FEET OF COMBUSTIBLE WALLS, OPENINGS OR COMBUSTIBLE ROOF EAVE LINES UNLESS PROTECTED BY AND APPROVED SPRINKLER SYSTEM OR LOCATED IN A TYPE I OR TYPE IIA STRUCTURE SEPARATED BY 10 FEET FROM OTHER STRUCTURES. CONTAINERS LARGER THAN 1 CUBIC YARD SHALL BE OF NON-LIMITED COMBUSTIBLE MATERIALS OR SIMILA PROTECTED OR SEPARATED. CFC 304.3.

7) EXITS, EXIT SIGNS, FIRE ALARM PANELS, HOSE CABINETS, FIRE EXTINGUISHER LOCATIONS, AND STANDPIPE CONNECTION SHALL NOT BE CONCEALED BY CURTAINS, MIRRORS, OR OTHER DECORATIVE MATERIAL.

8) THE EGRESS PATH SHALL REMAIN FREE AND CLEAR OF ALL OBSTRUCTIONS AT ALL TIMES. NO STORAGE IS PERMITTED ANY EGRESS PATHS.

PROJECT DIRECTORY

SYSTEM HOST: SAN MATEO COU 555 COUNTY CEN REDWOOD CITY, 801.623.8234 **DESIGALLEGOS**

ARCHITECT & DE PROFESSIONAL MMPV DESIGN, 718 W ARBOR DF SAN DIEGO, CA 9 619.632.2883 AOR: MARIANA MONCADA

SCOPE OF WORK

WORK CONSISTS OF INSTALLING 7 PHOTOVOLTAIC (PV) SOLAR POWER ARRAYS OVER AN EXISTING PARKING LOT AND 2 SOLAR POWER SYSTEMS ON AN EXISTING ROOF. SOLAR POWER SYSTEM CONSISTS OF EQUIPMENT, LIGHTING, PV MONITORING AND METERING COMMUNICATIONS AND POWER INTERCONNECT TO THE UTILITY GRID.

TOTAL MODULE COUNT: 1401 KILOWATTS DC: 637.5 kW **TOTAL PARKING ARRAYS: 7** ROOF TOP: 2

NEW PHOTOVOLTAIC ARRAY CODE ANALYSIS

SYSTEM DESCRIPTION: Module Type LONGI LR4-72HPH-455M (2094MM X 1038MM X 35MM) 23.5 kg

	Array Name	Array				
	Α	5	X			
	В	5	x	1		
	С	5	X			
	D	5	X			
	E	5	X			
	F	5	X	1		
	G	3	X			
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	DEVELOPER
JNTY	FOREFRONTPOWER
TER FL. 2	100 MONTGOMERY ST #725
CA 94063	SAN FRANCISCO, CA 94104
	530.961.2721
	BRENDAN MORAN
SIGN	STRUCTURAL ENGINEER:
IN CHARGE:	TEICHERT
NC.	10620 TREENA ST, SUITE 140
२	SAN DIEGO, CA 92131
92103	562.283.2970
	ANDREAS KARLSSON

ELECTRICAL ENGINEER: HARDIN-DAVIDSON 356 POLLASKY AVE STE 200 CLOVIS, CA 93612 559.323.4995 LOREN HARDIN

GEOTECHNICAL ENGINEER: **CRAWFORD & ASSOC. INC.** 1100 CORPORATE WAY STE. 230 SACRAMENTO, CA 95831 916.455.4225 CHRISTOPHER D. TRUMBULL

GENERAL CONTRACTOR **COLLINS ELECTRICAL** COMPANY, INC 1902 CHANNEL DR 916.567.1100 MALY HER

WEST SACRAMENTO, CA 95691

CALL 811 DIG ALERT PRIOR TO EXCAVATING:

ANY EXCAVATION TAKING PLACE

DRAWING INDEX

SHEET #	SHEET TITLE
ARCHIT	ECTURAL DRAV
MC-A0.0	TITLE SHEET
MC-A1.0	SITE PLAN & FIRE ACC
MC-A1.1	ARRAY LAYOUTS & SE
MC-A1.2	ENLARGED SITE PLAN
4 SHEETS	

ELECTRICAL DRAWINGS

E1.0	ELECTRICAL SITE PLAN
E1.1	ENLARGED ELECTRICA
E2.0	ELECTRICAL SINGLE LI
E2.1	ELECTRICAL SINGLE LI
E2.2	ELECTRICAL FEEDER S
E3.0	TYPICAL ELECTRICAL
E4.0	ELECTRICAL DETAILS
E5.0	TYPICAL ELECTRICAL
E5.1	TYPICAL ELECTRICAL
E6.0	ELECTRICAL SOLAR EC
E6.1	ELECTRICAL SOLAR EC
E6.2	LIGHTING FIXTURE CU
E7.0	OUTDOOR LIGHTING T
E8.0	PV ARRAY ELECTRICA
E8.1	PV ARRAY ELECTRICA
E8.2	PV ARRAY ELECTRICA
E8.3	PV ARRAY ELECTRICA
E8.4	PV ARRAY ELECTRICA

18 SHEETS

STRUCTURAL DRAWINGS

7 SHEL	ETS
S500	STEEL DETAILS
S400	FOUNDATION & ANCH
S310	SECTION - 3X
S300	SECTION - 5X
S210	FRAMING PLAN & SCH
S200	FRAMING PLAN & SCH
S100	GENERAL STRUCTUR

ROOF STRUCTURAL DRAWINGS

10 SHEETS	
PC-10	MECHANICAL ATTACHMENT DE
PC-9	BALLAST LAYOUT - 1.2
PC-8	BALLAST LAYOUT - 1.1
PC-7	BALLAST LEGEND
PC-6	RACKING COMPONENTS
PC-5	ASSEMLIES
PC-4	TYPICAL ARRAY DIMENSIONS
PC-3	ARRAY SITE MAP
PC-2	PROJECT SUMMARY
PC-1	COVER SHEET

TOTAL: 39 SHEETS

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ıy	Total Modules	kW DC	No. of Cols	Minimum Clear Height	Azimuth	Tilt	Occupancy	Const. Type	Area	Allowable Area
33	165	75.08	4	12'-0"	153 °	7 °	S-2 NS	II-B	2,373 SF	-
						Т	OTAL AREA A	RRAY'A':	2,373 SF	UNLIMITED
37	185	84.18	4	12'-0"	153 °	7 °	S-2 NS	II-B	2,373 SF	-
						Т	OTAL AREA A	RRAY'B':	2,373 SF	UNLIMITED
36	180	81.90	4	12'-0"	153 °	7 °	S-2 NS	II-B	2,373 SF	-
						RRAY'C':	2,373 SF	UNLIMITED		
35	175	79.63	4	12'-0"	153 °	7 °	S-2 NS	II-B	2,373 SF	-
						RRAY 'D':	2,373 SF	UNLIMITED		
35	175	79.63	4	12'-0"	153 °	7 °	S-2 NS	II-B	2,373 SF	-
						T	OTAL AREA A	RRAY'E':	2,373 SF	UNLIMITED
30	150	68.25	3	12'-0"	153 °	7 °	S-2 NS	II-B	2,373 SF	-
						Т	OTAL AREA A	RRAY 'F':	2,373 SF	UNLIMITED
30	90	40.95	3	12'-0"	153 °	7 °	S-2 NS	II-B	2,373 SF	-
						Т	OTAL AREA A	RRAY 'G':	2,373 SF	UNLIMITED
ALS:	1120	509.6	26		ТС	OTAL PAF	RKING PROJE	CT AREA:	16,611 SF	-
	152	<mark>69.16</mark>	ſ	-	153 °	10 °	-	II-B	3,496 SF	-
	129	58.70	-	-	153 °	10 °	-	II-B	2,967 SF	-
ALS:	281	127.9	-		TO	TAL ROO	F TOP PROJE	CT AREA:	6,463 SF	-
ALS:	1401	637.5	26			Т	OTAL PROJE	CT AREA:	23,074 SF	-
5 AF		IEIGHT IN	CREASE	S: OPEN PAR	KING GAR	AGES OF	TYPE II CONS	STRUCTIO	N, WITH AL	L SIDES
									75'	

ATION:

DRESS: 222 W 39TH AVENUE SAN MATEO, CA 94403

042-130-040

N: SAN MATEO COUNTY

									2,37335	
7	185	84.18	4	12'-0"	153 °	7 °	S-2 NS	II-B	2,373 SF	-
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						RRAY 'C':	2,373 SF	UNLIMITED		
5	175	79.63	4	12'-0"	153 °	7 °	S-2 NS	II-B	2,373 SF	-
						Т	OTAL AREA A	RRAY 'D':	2,373 SF	UNLIMITED
5	175	79.63	4	12'-0"	153 °	7 °	S-2 NS	II-B	2,373 SF	-
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0	150	68.25	3	12'-0"	153 °	7 °	S-2 NS	II-B	2,373 SF	-
						RRAY 'F':	2,373 SF	UNLIMITED		
0	90	40.95	3	12'-0"	153 °	7 °	S-2 NS	II-B	2,373 SF	-
						Т	OTAL AREA A	RRAY 'G':	2,373 SF	UNLIMITED
S:	1120	509.6	26		Т	OTAL PAP	RKING PROJE	CT AREA:	16,611 SF	-
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	129	58.70	-	-	153 °	10 °	-	II-B	2,967 SF	-
S:	281	127.9	-		TO	TAL ROO	F TOP PROJE	CT AREA:	6,463 SF	-
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COMPLIANCE WITH GOVERNMENT CODE 4216 IS TO BE FOLLOWED PRIOR TO

WINGS

CESS PLAN ECTIONS

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AL NOTES HEDULE HEDULE

IORAGE DETAILS

IMENT DETAIL

SYSTEM HOST
OF SAN APPE
800 North Humboldt Street San Mateo, CA 94401
SYSTEM DEVELOPER
100 Montgomery Street, Suite 725 San Francisco, CA 94104
ELECTRICAL COMPANY INC.
1902 Channel Drive West Sacramento, CA 95691 916-567-1100
ELECTRICAL ENGINEER
HARDIN-DAVIDSON
HARDIN-DAVIDSON
356 Pollasky Avenue, Ste. 200 Clovis, CA 93612 559.323.4995
TEICHERT
SOLAR 10620 Treena Street, Suite 140, San Diego, CA 92131
ARCHITECT OF RECORD
MMPV design
Mariana Moncada, Architect 718 West Arbor Drive San Diego, CA 92103 619.632.2883
ARCHITECT / ENGINEER OF RECORD
SED ARCHINE
MARIANA MONCADA NO. C37182 REN. 9/30/23
FR OF CALLEOR
PROJECT:
SAN MATEO COUNTY MEDICAL CENTER
222 W 39TH AVENUE
SAN MATEO, CA 94403
NO. REVISION DATE
DATE: XX.XX.23
SHEET TITLE:
SHEET NO.:
MC-A0_0



AY CODE ANALYSIS											
уре	LONGI LR4	-72HPH-	455M	(2094MM X	1038MM	X 35MM)	23.5 kg				
No. of Cols	Minimum Clear Height	Azimuth	Tilt	Occupancy	Const. Type	Area	Allowable Area				
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			RRAY 'A':	2,373 SF	UNLIMITED						
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	TOTAL AREA ARRAY 'B': 2,373 SF UNLIMITED										
4	12'-0"	153 °	7 °	S-2 NS	II-B	2,373 SF	-				
	TOTAL AREA ARRAY 'C': 2,373 SF UNLIMITE										
4	12'-0"	153 °	7 °	S-2 NS	II-B	2,373 SF	-				
			T	OTAL AREA A	RRAY 'D':	2,373 SF	UNLIMITED				
4	12'-0"	153 °	7 °	S-2 NS	II-B	2,373 SF	-				
			Т	OTAL AREA A	RRAY 'E':	2,373 SF	UNLIMITED				
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			Т	OTAL AREA A	RRAY 'F':	2,373 SF	UNLIMITED				
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-	-	153 °	10 °	-	II-B	2,967 SF	-				
-		TO	TAL ROO	TOP PROJE	CT AREA:	6,463 SF	-				
26			Т	OTAL PROJE	CT AREA:	23,074 SF	-				
REASES: OPEN PARKING GARAGES OF TYPE II CONSTRUCTION, WITH ALL SIDES											
RGED S	ITE PLAN										
DR POC	INFORMATION	AND LOC	ATION								

SYSTEM HOST 800 North Humboldt Street San Mateo, CA 94401 SYSTEM DEVELOPER FOREFRONT POWER 100 Montgomery Street, Suite 725 San Francisco, CA 94104 GENERAL CONTRACTOR 1902 Channel Drive West Sacramento, CA 95691 916-567-1100 ELECTRICAL ENGINEER Ħ HARDIN-DAVIDSON engineering HARDIN-DAVIDSON 356 Pollasky Avenue, Ste. 200 Clovis, CA 93612 559.323.4995 STRUCTURAL ENGINEERING AND STEEL CONSTRUCT TEICHERT SOLAR 10620 Treena Street, Suite 140, San Diego, CA 92131 ARCHITECT OF RECORD MM**PV**design Mariana Moncada, Architect 718 West Arbor Drive San Diego, CA 92103 619.632.2883 ARCHITECT / ENGINEER OF RECORD PROJECT: SAN MATEO COUNTY MEDICAL CENTER 222 W 39TH AVENUE SAN MATEO, CA 94403 REVISION NO. DATE: XX.XX.23 SHEET TITLE: SITE PLAN & FIRE ACCESS PLAN SHEET NO .: MC-A1.0

SYSTE	MD
Array Name	A
Α	5
В	5
С	5
D	5
E	5
F	5
G	3
	то
RT 1	
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PROJEC	T TO
PER CBC	2406 HALI
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2	



E ELECTRICAL SITE PLAN FOR POC INFORMATION AND LOCATION 3. ARROWS ON PLAN POINT TO LOW SIDE OF CANOPY















		~ 7											
NEW	PH	01	0	/OLTA	IC ARE	RAY CO	ODE ANA	LYSIS					
SYSTE	MD	ES	CR	IPTION:	Module	Туре	LONGI LR4	-72HPH-	455M	(2094MM X	1038MM	X 35MM)	23.5 kg
Array Name	Array Name Array		Total Modules	kW DC	No. of Cols	Minimum Clear Height	Azimuth	Tilt	Occupancy	Const. Type	Area	Allowable Area	
Α	5	X	33	165	75.08	4	12'-0"	153 °	7 °	S-2 NS	II-B	2,373 SF	-
									Т	OTAL AREA A	RRAY 'A':	2,373 SF	UNLIMITED
В	5	X	37	185	<mark>84.18</mark>	4	12'-0"	153 °	7 °	S-2 NS	II-B	2,373 SF	-
									T	OTAL AREA A	RRAY 'B':	2,373 SF	UNLIMITED
С	5	X	36	180	81.90	4	12'-0"	153 °	7 °	S-2 NS	II-B	2,373 SF	-
									Т	OTAL AREA A	RRAY 'C':	2,373 SF	UNLIMITED
D	5	X	35	175	79.63	4	12'-0"	153 °	7 °	S-2 NS	II-B	2,373 SF	-
			-						Т	OTAL AREA A	RRAY 'D':	2,373 SF	UNLIMITED
E	5	X	35	175	79.63	4	12'-0"	153 °	7 °	S-2 NS	II-B	2,373 SF	-
									T	OTAL AREA A	RRAY 'E':	2,373 SF	UNLIMITED
F	5	X	30	150	68.25	3	12'-0"	153 °	7 °	S-2 NS	II-B	2,373 SF	-
			. <u> </u>						1	TOTAL AREA A	RRAY 'F':	2,373 SF	UNLIMITED
G	3	X	30	90	40.95	3	12'-0"	153 °	7 °	S-2 NS	II-B	2,373 SF	-
									Т	OTAL AREA A	RRAY 'G':	2,373 SF	UNLIMITED
	Т	DTA	LS:	1120	509.6	26		тс	OTAL PAR	RKING PROJE	CT AREA:	16,611 SF	-
RT 1				152	69.16	-	-	<mark>153</mark> °	10 °	-	II-B	3,496 SF	-
RT 2				129	58.70	-	, - 1	153 °	10 °	-	II-B	2,967 SF	-
	Т	ЭТА	LS:	281	127.9	-		TO	TAL ROO	F TOP PROJE	CT AREA:	6,463 SF	-
PROJEC	TT	ЭТА	LS:	1401	637.5	26				TOTAL PROJE	CT AREA:	23,074 SF	- 1
PER CBC OPEN, SI	340 HAL	6.5.8 L B	5 AR E UI	EA AND H	IEIGHT IN	CREASE	S: OPEN PAR REA WHERE T	KING GAR	AGES OF	F TYPE II CONS GHT DOES NO	STRUCTIO T EXCEED	N, WITH AL 75'.	LSIDES
SHEE	TN	10	TE	S									
1.	SE	E SI	HEE	T MC-A1.2	FOR ENL	ARGED S	ITE PLAN						
2.	SE	ΕEL	_EC	TRICAL SI	TE PLAN F	OR POC	INFORMATION	AND LOC	ATION				

3. ARROWS ON PLAN POINT TO LOW SIDE OF CANOPY

DADIZINO ANALVEIC

PARKING ANALYSIS									
ſ		ΤΟΤΔΙ	REO'D		COVERED	RATIO.	REQ'D	PROVIDED	
	LOT						COVERED	COVERED	
	LUI	SID	ACCESSIBLE	ACCESSIBLE	STANDARD	COVERED TO	ACCESSIBLE	ACCESSIBLE	
		STALLS	STALLS	STALLS	STALLS	UNCOVERED	STALLS	STALLS	
	1	144	5	26	143	99%	5	7	





7 ARRAY LAYOUT **C** Scale: 1/16" = 1'-0" (FOR 24X36 SHEETS)

8 16 32





1 (E) ACCESSIBLE PARKING SIGN

2 (E) WHEELSTOP 3 (E) TYPICAL ACCESSIBLE PARKING STRIPING AND ISA

4 (E) TYPICAL ACCESS AISLE STRIPING

5 (E) TRUNCATED DOMES

(N) STEEL COLUMN FOR SOLAR



STSTEN	10001
	I OF_SAM
	800 North Humboldt Street
	San Mateo, CA 94401
SYSTEN	
	EOPEEPONT
	POWER
	100 Montgomery Street, Suite 725 San Francisco, CA 94104
GENERA	AL CONTRACTOR
	ELECTRICAL COMPANY INC.
	1902 Channel Drive
	916-567-1100
ELECTR	
	HARDIN-DAVIDSON Engineering
	HARDIN-DAVIDSON 356 Pollasky Avenue, Ste. 200
	559.323.4995
STRUCT	URAL ENGINEERING AND STEEL CONSTRUCT
	TEICHERT
	SOLAR 10620 Treena Street, Suite 140,
	San Diego, CA 92131
ARCHITE	ECT OF RECORD
M	M PV design
Marian	a Moncada, Architect
718 We San Di	est Arbor Drive ego, CA 92103
619.63	2.2883
ARCHITE	ECT / ENGINEER OF RECORD
	CED ARCI
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PROJEC SA MI 222 SAI	W 39TH AVENUE NATEO, CA 94403
PROJEC SA MI	AN MARIANA MONEADA NO. C37182 REN. 9/30/23 OF CALIFOR TO AN MATEO COUNTY EDICAL CENTER AN MATEO, CA 94403 REVISION DATE
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PROJEC SA MI 2222 SAI NO. DATE SHEE	Image: Wight of the second state of
PROJEC SA MI 222 SAI NO. DATE SHEE	Imarinal Molecada NO. C37182 PERIOR REN. 9/30/23 PE CALEDE ST: AN MATEO COUNTY EDICAL CENTER ST: AN MATEO COUNTY EDICAL CENTER ST: AN MATEO, CA 94403 REVISION DATE
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PROJEC SA MI 222 SAI NO.	W 39TH AVENUE NMATEO, CA 94403 REVISION DATE XX.XX.23 T TITLE: ENLARGED SITE PLAN
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PROJEC SA MI 2222 SAI NO. DATE SHEE	TITE W 39TH AVENUE MARTEO, CA 94403 REVISION DATE XX.XX.23 T TITLE: ENLARGED SITE PLAN
PROJEC SA MI 222 SAI NO. DATE SHEE	TTILE: TTILE:





TYPE	MANUFACTURER	MODEL NO.	SOURCE WATTS		VOLT	MOUNTING
A	ILP	WTZ4-4L-U-50-RAFL-CORDW/6FT-BD50 (OR EQUAL)	LED	29	120-277	SURFACE, CARPORT STEEL





DC STRING OCPD CALCULATION PV MODULE OUTPUT: lsc: $11.66 \times 1.56 = 18.19A$ 20A FUSE ALLOWABLE (PER CEC 690.9(B))

DC STRING WIRE SIZE CALCULATION CANOPY PV MODULE OUTPUT: CEC 690.8(B)(1) #10 AWG = $40\dot{A}$ (90°C)(PER TABLE CEC 310.15(B)(16)) CEC 690.8(B)(2)

lsc: $11.66 \times 1.56 = 18.19A$ 40.0A > 18.19A #10 AWG CONDUCTOR IS ALLOWABLE PER CEC 110.14(C)(1)(a)(3)

CEC 690.8(B)(2) $\#10 \text{ AWG} = 40\text{ A} (90^{\circ}\text{C})(\text{PER TABLE CEC } 310.15(\text{B})(16))$

88°F AMBIENT TEMP. = 0.96 DE-RATING

21–30 CURRENT CARRYING CONDUCTORS IN A RACEWAY (SHARED CONDUIT) (PER TABLE CEC 310.15(B)(3)(a) = 0.45 DE-RATING

lsc: $(11.66A \times 1.25) / (0.96 \times 0.45) = 33.74A$ 40A > 33.74A #10 AWG CONDUCTOR IS ALLOWABLE PER CEC 110.14(C)(1)(a)(3)

ROOF PV MODULE TO OPTIMIZER: CEC 690.8(B)(1) $\#12 \text{ AWG} = 30 \text{ A} (90^{\circ}\text{C})(\text{PER TABLE CEC } 310.15(\text{B})(16))$

lsc: $11.66 \times 1.56 = 18.19A$ 30.0A > 18.19A #12 AWG CONDUCTOR IS ALLOWABLE PER CEC 110.14(C)(1)(a)(3)

CEC 690.8(B)(2) #12 AWG = $30\dot{A}$ (90°C)(PER TABLE CEC 310.15(B)(16)) 115°F AMBIENT TEMP. = 0.82 DE-RATING

lsc: $(11.66A \times 1.25) / (0.82) = 17.77A$ 30A > 17.77A

#12 AWG CONDUCTOR IS ALLOWABLE PER CEC 110.14(C)(1)(a)(3)

OPTIMIZER TO OPTIMIZER: CEC 690.8(B)(1) #10 AWG = 40A (90°C)(PER TABLE CEC 310.15(B)(16)) (PER TABLE CEC 310.16) (CU)

lsc: $18.00 \times 1.56 = 28.08A$ 40.0A > 28.08A #10 AWG CONDUCTOR IS ALLOWABLE PER CEC

110.14(C)(1)(a)(3) CEC 690.8(B)(2) #10 AWG = 40A (90°C)(PER TABLE CEC 310.15(B)(16)) 65A x 1.0 = 65A = 65A TEMP. ADJUSTED

115°F AMBIENT TEMP. = 0.82 DE-RATING

lsc: $(18.00A \times 1.25) / (0.82) = 27.44A$ 40A > 27.44A #10 AWG CONDUCTOR IS ALLOWABLE PER CEC 110.14(C)(1)(a)(3)

OPTIMIZER TO INVERTER HOME RUN: CEC 690.8(B)(1)

 $\#8 \text{ AWG} = 55\text{ A} (90^{\circ}\text{C})(\text{PER TABLE CEC 310.15(B)(16)})$

lsc: $18.00 \times 1.56 = 28.08A$ 55.0A > 28.08A #8 AWG CONDUCTOR IS ALLOWABLE PER CEC 110.14(C)(1)(a)(3)

 $\#8 \text{ AWG} = 55\text{ A} (90^{\circ}\text{C})(\text{PER TABLE CEC 310.15(B})(16))$ 115°F AMBIENT TEMP. = 0.82 DE-RATING

7–9 CURRENT CARRYING CONDUCTORS IN A RACEWAY (SHARED CONDUIT)

(PER TABLE CEC 310.15(B)(3)(a) = 0.70 DE-RATINGIsc: $(18.00A \times 1.25) / (0.82 \times 0.70) = 39.20A$

55A > 39.20A #8 AWG CONDUCTOR IS ALLOWABLE PER CEC 110.14(C)(1)(a)(3)

60 KW INVERTER AC Wire & OCPD CALCULATION: INVERTER: AC Output Power: 72.2A AC Output Current Max $72.2A \times 1.25 = 90.25A$ 100 AMP OCPD PER 60kW INVERTER OUTPUT

#2 AWG THWN-2 = 115A (75°C) (PER TABLE CEC 310.16) (CU)

TEMP. CONDITIONS: OUTDOOR WIRE RUN -AMBIENT TEMP. = $38^{\circ}C$ (3) CURRENT CARRYING CONDUCTORS IN A RACEWAY (SHARED CONDUIT) (PER TABLE CEC 310.15(B)(3)(a) = 1.0

 $115A \times 1.0 = 115A = 115A$ TEMP. ADJUSTED #2 CURRENT = 115A @ 75°C PER CEC 110.14(C) #2 AWG CONDUCTOR IS MINIMUM ALLOWABLE (CU)

36 KW INVERTER AC Wire & OCPD CALCULATION: INVERTER: AC Output Power: 43.5A AC Output Current Max $43.5A \times 1.25 = 54.38A$ 60 AMP OCPD PER 36kW INVERTER OUTPUT

 $\#6 \text{ AWG THWN} - 2 = 65A (75^{\circ}C)$

TEMP. CONDITIONS: OUTDOOR WIRE RUN -AMBIENT TEMP. = $38^{\circ}C$ (3) CURRENT CARRYING CONDUCTORS IN A RACEWAY (SHARED CONDUIT) (PER TABLE CEC 310.15(B)(3)(a) = 1.0

#6 CURRENT = 65A @ 75°C PER CEC 110.14(C) #6 AWG CONDUCTOR IS MINIMUM ALLOWABLE (CU)

40 KW INVERTER AC Wire & OCPD CALCULAT INVERTER: AC Output Power: 48.25A AC Output Current $48.25A \times 1.25 = 60.31A$ 70 AMP OCPD PER 40kW INVERTER OUTPUT

 $\#6 \text{ AWG THWN} - 2 = 65A (75^{\circ}C)$ (PER TABLE CEC 310.16) (CU)

TEMP. CONDITIONS: OUTDOOR WIRE RUN -AMBIENT TEMP. = $38^{\circ}C$ (3) CURRENT CARRYING CONDUCTORS IN A RACEWAY (SHARED CONDUIT) (PER TABLE CEC 310.15(B)(3)(a) = 1.0

 $65A \times 1.0 = 65A = 65A$ TEMP. ADJUSTED #6 CURRENT = 65A @ 75°C PER CEC 110.14 #6 AWG CONDUCTOR IS MINIMUM ALLOWABLE

CEC AC kW CALCULATION							
Inverter Model Number	PV Module Model Number	PV Module Count	PV Module PTC (Watts)	Inverter Effeciency (%)	CEC AC kW Rating		
CPS SCA60KTL-DO/US-480 [480V] [SI1-JUN20]	LR4-72HPH-455M	1030	426.3	98.5	432.503		
CPS SCA36KTL-DO/US-480 [480V] [SI1-JUN20]	LR4-72HPH-455M	90	426.3	97.5	37.408		
SE40KUS [480V]	LR4-72HPH-455M	113	426.3	98.5	47.449		
SE30KUS [480V]	LR4-72HPH-455M	168	426.3	98.5	70.544		
	Total	1401		Total	587.904		

600V HEAVY DUT **DISCONNECT SC** (WITH CLASS 'L' CURRENT

(
DESIGNATION	DISCONNECT SIZE (VERIFIABLE)	MANUFACTURER'S CAT NO.	AIC RATING
'FD'	800A 3P+SN 600VAC	SQUARE D #H367NR	200,000 AIC



<u> 10N:</u>	30 KW INVERTER AC Wire & OCPD CALCULATION:	MAX/COLD TEMP PV VOLTAGE CALCULATION:	(E) MAIN SERV
Max	AC Output Power: 36.25A AC Output Current Max 36.25A x 1.25 = 45.31A 50 AMP OCPD PER 30kW INVERTER OUTPUT #8 AWG THWN-2 = 50A (75°C) (PER TABLE CEC 310.16) (CU)	Voc: 49.5V Temp. Coefficient: $-0.270\%V/C$ SAN MATEO CITY: CLIMATE ZONE 3C WINTER DB = 31°F = $-0.56°C*$ Low Temp: $-0.56°C$ (25.56°Δ) # Modules in Series: 16, 17, or 18	277/480V 3¢
(C) (CU)	TEMP. CONDITIONS: OUTDOOR WIRE RUN – AMBIENT TEMP. = $38^{\circ}C$ (3) CURRENT CARRYING CONDUCTORS IN A RACEWAY (SHARED CONDUIT) (PER TABLE CEC 310.15(B)(3)(a) = 1.0 50A x 1.0 = 50A = 50A TEMP. ADJUSTED #8 CURRENT = 50A @ 75°C PER CEC 110.14(C) #8 AWG CONDUCTOR IS MINIMUM ALLOWABLE (CU)	<pre>(49.5 V) x (0.0027 V/°C) x (25.56°) = 3.42 VΔ 49.5 Voc + 3.42 VΔ = 52.92 Voc(corr) (52.92 V) x (15) = 793.7 VDC max (this is < 1000 VDC) (52.92 V) x (16) = 846.7 VDC max (this is < 1000 VDC) (53.14 V) x (17) = 899.6 VDC max (this is < 1000 VDC) (52.57 V) x (18) = 952.5 VDC max (this is < 1000 VDC) * = Per ASHRAE table</pre>	(E) INCOMING SECONDARY
		DESIGN TEMPERATURES SAN MATEO CITY: CLIMATE ZONE 3C WINTER DB = $31^{\circ}F = -0.56^{\circ}C$ SUMMER DB = $87.8^{\circ}F = 31^{\circ}C$ $3-1/2^{\circ}$ ABOVE ROOF = 114.8^{\circ}F = 44^{\circ}C	(E) MAIN SYSTEM GROUND BUS 2#3/0 CU/

SYSTEM	с	
MODULE MODEL	LONGI SOLAR LR4-72HPH-455M	800
MODULE STC DC RATING	455W	-
TOTAL MODULE COUNT	1,401	
TOTAL STC DC SYSTEM SIZE	637.455kW	
TOTAL NOMINAL AC SYSTEM SIZE	496.00kW]
TOTAL CEC-AC SYSTEM SIZE	587.904kW	
	(6) CHINT POWER SYSTEMS AMERICA CPS SCA60KTL-DO/US-480 [480V] [SI1-JUN20]	ļ
INVERTER MODELS	(1) CHINT POWER SYSTEMS AMERICA CPS SCA36KTL-DO/US-480 [480V] [SI1-JUN20]	
	(1) SOLAREDGE TECHNOLOGIES LTD. SE40KUS [480V]	GROUND BUS
	(2) SOLAREDGE TECHNOLOGIES LTD. SE30KUS [480V]	
MODULE TILT	7° & 10°	
ARRAY AZIMUTH	153°]
POINT OF SERVICE FAULT CURRENT CONTRIBUTION	638 AMPS]
POINT OF SERVICE RATING	100,000 AIC	

TY AC \	/ERIFIABLE	
HEDUL	_E	
LIMITING	FUSING)	



800A 3P+SN

CURRENT

800A FUSE •

LIMITING

GND ---









	EEDER 3	SCHED	ULE	Ð															
No.	Potential at Origin (Pi) (Volts)	System	Design Current (Amps)	Raceway Type	Sets of Cond.	Conductor Trade Size	Conductor Cross-Sectional Area (CM)	Conductor Material	DC Conductor Material Constant (K)	Q	Distance (ft)	Voltage Drop (VD) (Volts)	Potential at Load (PI) (Volts)	Percent Voltage Drop (%VD)	Total Voltage Drop (%Vd AC)	'Total Voltage Drop (%Vd AC + DC)	Conduit & Conductors No	Feeder Origin	Feeder Destination
F1	480	AC 3-Phase	597.45	Steel	2	600 kCMIL	1200000	CU	12.9	1.1682	70	0.91	479.09	0.19	0.19	n/a	TWO: 4"C-3#600 KCMIL, 1#3/0 NEUT., 1#3/0 GND. (CU) (25.02% FILL) F1	Main Swbd. 'MSB'	Fused Disconnect 'FD'
F2	480	AC 3-Phase	597.45	Steel	3	300 kCMIL	900000	CU	12.9	1.0490	5	0.08	479.92	0.02	0.21	n/a	THREE: 3"C-3#300 KCMIL, 1#1/0 GND. (CU) (21.56% FILL) F2	Fused Disconnect '	-D' Panel 'S1'
F3	480	AC 3-Phase	476.7	PVC	3	400 kCMIL	1200000	CU	12.9	1.0280	535	4.88	475.12	1.02	1.22	n/a	THREE: 4"C-3#400 KCMIL, 1#2/0 GND. (CU) (15.8% FILL) F3	Panel 'S1'	Panel 'S2'
F4	480	AC 3-Phase	72.2	PVC	1	2	66360	CU	12.9	1.0000	100	2.43	477.57	0.51	1.73	2.29	1-1/4"C-3#2, 1#8 GND. (CU) (26.5% FILL) F4	Panel 'S2'	Inverter No. A
F5	480	AC 3-Phase	72.2	PVC	1	2	66360	CU	12.9	1.0000	155	3.77	476.23	0.79	2.01	2.51	1-1/4"C-3#2, 1#8 GND. (CU) (26.5% FILL) F5	Panel 'S2'	Inverter No. B
F6	480	AC 3-Phase	72.2	PVC	1	2	66360	CU	12.9	1.0000	215	5.23	474.77	1.09	2.31	2.82	1-1/4"C-3#2, 1#8 GND. (CU) (26.5% FILL) F6	Panel 'S2'	Inverter No. C
F7	480	AC 3-Phase	72.2	PVC	1	1	83690	CU	12.9	1.0000	270	5.20	474.80	1.08	2.31	2.82	1-1/2"C-3#1, 1#6 GND. (CU) (26.14% FILL) F7	Panel 'S2'	Inverter No. D
F8	480	AC 3-Phase	72.2	PVC	1	1/0	105600	CU	12.9	1.0000	325	4.96	475.04	1.03	2.26	2.77	1-1/2"C-3#1/0, 1#6 GND. (CU) (30.56% FILL) F8	Panel 'S2'	Inverter No. E
F9	480	AC 3-Phase	72.2	PVC	1	2/0	133100	CU	12.9	1.0341	395	4.95	475.05	1.03	2.25	2.67	1-1/2"C-3#1, 1#4 GND. (CU) (26.14% FILL) F9	Panel 'S2'	Inverter No. F
F10	480	AC 3-Phase	43.5	PVC	1	1	83690	CU	12.9	1.0000	450	5.23	474.77	1.09	2.31	2.73	1-1/2"C-3#1, 1#6 GND. (CU) (27.73% FILL) F1	Panel 'S2'	Inverter No. G
F11	480	AC 3-Phase	120.75	Steel	1	4/0	211600	CU	12.9	1.0362	350	4.62	475.38	0.96	1.17	n/a	4"C-3#4/0, 1#4 GND. (CU) (8.4% FILL) F1	Panel 'S1'	Panel 'S3'
F12	480	AC 3-Phase	48.25	Steel	1	6	26240	CU	12.9	1.0000	10	0.41	479.59	0.09	1.25	1.94	1"C-3#6, 1#8 GND. (CU) (21.9% FILL) F1	Panel 'S3'	Inverter No. R1
F13	480	AC 3-Phase	36.25	Steel	1	6	26240	CU	12.9	1.0000	160	4.94	475.06	1.03	2.20	2.70	1"C-3#6, 1#8 GND. (CU) (21.93% FILL) F1	Panel 'S3'	Inverter No. R2
F14	480	AC 3-Phase	36.25	Steel	1	6	26240	CU	12.9	1.0000	160	4.94	475.06	1.03	2.20	2.95	1"C-3#6, 1#8 GND. (CU) (21.93% FILL) F1	Panel 'S3'	Inverter No. R3
A-11	625.5	DC	10.92	n/a-DC	1	10	10380	CU	12.9	n/a	130	3.53	621.97	0.56	n/a	n/a	2#10 (CU) A-	1 Inverter No. A	Worst Case DC String
B-10	750.6	DC	10.92	n/a-DC	1	10	10380	CU	12.9	n/a	140	3.80	746.80	0.51	n/a	n/a	2#10 (CU) B-:	0 Inverter No. B	Worst Case DC String
C-10	750.6	DC	10.92	n/a-DC	1	10	10380	CU	12.9	n/a	140	3.80	746.80	0.51	n/a	n/a	2#10 (CU) C-:	0 Inverter No. C	Worst Case DC String
D-11	708.9	DC	10.92	n/a-DC	1	10	10380	CU	12.9	n/a	135	3.66	705.24	0.52	n/a	n/a	2#10 (CU) D-	1 Inverter No. D	Worst Case DC String
E-11	708.9	DC	10.92	n/a-DC	1	10	10380	CU	12.9	n/a	135	3.66	705.24	0.52	n/a	n/a	2#10 (CU) E-1	1 Inverter No. E	Worst Case DC String
F-9	750.6	DC	10.92	n/a-DC	1	10	10380	CU	12.9	n/a	115	3.12	747.48	0.42	n/a	n/a	2#10 (CU) F-9	Inverter No. F	Worst Case DC String
G-5	750.6	DC	10.92	n/a-DC	1	10	10380	CU	12.9	n/a	115	3.12	747.48	0.42	n/a	n/a	2#10 (CU) G-	Inverter No. G	Worst Case DC String
R1-4	920	DC	18	n/a-DC	1	8	16510	CU	12.9	n/a	225	6.33	913.67	0.69	n/a	n/a	2#8 (CU) R1	4 Inverter No. R1	Worst Case DC String
R2-3	920	DC	18	n/a-DC	1	8	16510	CU	12.9	n/a	165	4.64	915.36	0.50	n/a	n/a	2#8 (CU) R2	3 Inverter No. R2	Worst Case DC String
R3-3	920	DC	18	n/a-DC	1	8	16510	CU	12.9	n/a	245	6.89	913.11	0.75	n/a	n/a	2#8 (CU) R3	3 Inverter No. R3	Worst Case DC String

ROOF DC STRING HOMERUNS									
MAXIMUM	MAXIMUM NUMBER OF CU #8 PV WIRES (PV WIRE + GROUND)								
CONDUIT TRADE SIZE	CONDUIT LENGTH 24" OR LESS (60% FILL)	CONDUIT LENGTH OVER 24" (40% FILL)							
	LFMC	LFMC	EMT	GRC					
3/4"	3	2	2	2					
1"	5	3	3	3					
1-1/4"	10	6	6	6					
1-1/2"	13	9	9	9					
2"	2" 22 9 9 9								
TABLE ASSUMING CU #8 PV WIRE WITH .33" O.D.									





CANOPY DC STRING HOM	

MAXIMUM NUMBER OF CU #10 PV WIRES (PV WIRE + GROUND)							
CONDUIT TRADE SIZE	ONDUIT TRADE CONDUIT LENGTH 24" CONDUIT LENGTH OVER 24" (40% SIZE OR LESS (60% FILL) FILL)						
	LFMC	LFMC	EMT				
3/4"	5	3	3				
1"	9	6	6				
1-1/4"	16	11	10				
1-1/2"	22	14	14				
2"	30	24	24				
2-1/2"	30	30	30				
3" 30 30 30							

TABLE ASSUMING CU #10 PV WIRE WITH .26" O.D.



ELECTRICAL FEEDER SCHEDULE

SHEET NO .:

E2.2



TYPICAL DC LINE DIAGRAM

SCALE: NONE

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								$\left \right\rangle$
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								1

STIL OF SAV 42
CALIFORNIA
800 North Humboldt Street San Mateo, CA 94401 SYSTEM DEVELOPER
100 Montgomery Street, Suite 725 San Francisco, CA 94104 GENERAL CONTRACTOR
ELECTRICAL COMPANY INC.
1902 Channel Drive West Sacramento, CA 95691 916-567-1100
ELECTRICAL ENGINEER
HARDIN-DAVIDSON ENGINEERING
HARDIN-DAVIDSON 356 Pollasky Avenue, Ste. 200 Clovis, CA 93612 559.323.4995
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TEICHERT SOLAR
San Diego, CA 92131
ARCHITECT OF RECORD
Mariana Moncada, Architect 718 West Arbor Drive San Diego, CA 92103 619.632.2883 ARCHITECT / ENGINEER OF RECORD
NO. 9125
SAN MATEO COUNTY MEDICAL CENTER
222 W 39TH AVENUE SAN MATEO, CA 94403
NO. REVISION DATE
DATE: 07.21.23
SHEET TITLE:
TYPICAL ELECTRICAL THREE LINE DIAGRAM
SHEET NO .:

E3.0



9<u>1</u>"

WARNING: SOLAR ELECTRIC SYS

LABEL - 6

SCALE: NONE

LOCATION:	INVERTERS
BACKGROUND	RED
LETTERING	WHITE
NOTES:	

LOCATION:	AC DISCONNECTS & PANELBOARDS
BACKGROUND	RED
LETTERING	WHITE
NOTES:	

LOCATION:	60kW INVERTER W/ 150 MODULES
BACKGROUND	RED
LETTERING	WHITE
NOTES:	

LOCATION:	INVERTERS
BACKGROUND	RED
LETTERING	WHITE
NOTES:	

LOCATION:	AC DISCONNECT 'FD'
BACKGROUND	RED
LETTERING	WHITE
NOTES:	

≁_,	
STEM 3, 4 LOCATION: MAIN SERVICE DISCONNECT BACKGROUND RED	
LETTERING WHITE	SYSTEM HOST
Image: Interning Interning Image: Interning Internin	<text><text><text><text><image/><image/><text><text><text><text><text><text><text><text><text></text></text></text></text></text></text></text></text></text></text></text></text></text>
LOCATION: DISCONNECT BACKGROUND RED LETTERING WHITE	ARCHITECT / ENGINEER OF RECORD
NOTES: 1 SIGN AT (E) SERVICE METER. PLACE ADDITIONAL SIGN AT SOLAR AC SYSTEM DISCONNECT WHERE NOT LOCATED WITHIN 25' & IN VIEW OF (E) SERVICE METER.	NO. 9125
	PROJECT: SAN MATEO COUNTY MEDICAL CENTER
LOCATION: INVERTER DISCONNECTS, AC DISCONNECT, PANEL	222 W 39TH AVENUE SAN MATEO, CA 94403
BACKGROUND WHITE, RED OR YELLOW LETTERING BLACK AND/OR RED	NO. REVISION DATE
NOTES:	
<u>k</u>	DATE: 07.21.23 SHEET TITLE:
C 1 ¹ / ₂ " LOCATION: DC ENCLOSURES, RACEWAYS AND CONDUITS BACKGROUND RED	TYPICAL ELECTRICAL SOLAR WARNING LABELS
LETTERING WHITE NOTES: EXPOSED CONDUIT	
	E5.0

		-	9"
		<u>3</u> "	CAUTION
		۲ ۲	
			OPERATING MAIN SER
		_	DISCONNECT WILL N
LOCATION:	: 36kW INVERTER	-	INTERRUPT THE PHOTOV
	ND RED	-	
NOTES:			DACKFEED
			LABEL - 10
			SCALE: NONE
			<u>−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−</u>
	Γ	1	
LOCATION: BACKGROUN	: 40kW INVERTERS		100 MONTGOMERY STREET, SUITE 725
LETTERING	WHITE	-	SAN FRANCISCO, CA 94104
NOTES:			FOR SERVICE CALL (855) 204-5083
			LABEL - 11
			SCALE: NONE
		_	8 <u>1</u> "
		ج چ* ل	
		° \	INPLIT VALUE AT DC RUS
LOCATION:	: 30kW INVERTERS]	
BACKGROUN	ND RED	╡ ╡	RATED MAXIMUM POWER-POINT CURRENT:
LETTERING NOTES:	G WHITE		MAXIMUM SYSTEM VOLTAGE
		-	SHORT-CIRCUIT CURRENT:
		L	LABEL - 12
			SCALE: NONE
		_	8 <u>1</u> "
BACKGROUND	DISCONNECT	- ° \	INPLIT VALUE AT DO RUS
LETTERING	WHITE	1 \	
NOTES:			RATED MAXIMUM POWER-POINT CURRENT:
			MAYIMUM SYSTEM VOLTAGE.
			SHORT-CIRCUIT CURRENT:
		l	LABEL - 13
			SCALE: NONE
		-	8 <u>1</u> "
		<u>3</u> "	PV SYSTEM DISCONNE
		*	INPUT VALUE AT DC BUS
		<u>1</u> " \	RATED MAYIMIIM DOMER_DOINT OUDDENT.
		4 \	RATED MAXIMUM POWER-POINT VOLTAGE
LOCATION:	PV DIST. PANEL 'S3' & INVERTERS 'R1',		MAXIMUM SYSTEM VOLTAGE:
BACKGROUND	RED		SHORT-CIRCUIT CURRENT:
LETTERING	WHITE		LABEL - 14
NOTES:		J	SCALE: NONE

LOCATION:	MAIN SERVICE DISCONNECT
BACKGROUND	RED
LETTERING	WHITE
NOTES:	

LOCATION:	AC DISCONNECT, PANELS, DAS, & INVERTERS
BACKGROUND	BLUE
LETTERING	WHITE
NOTES:	

LOCATION:	60kW INVERTERS W/ 180 OR 185 MODULES
BACKGROUND	RED
LETTERING	WHITE
NOTES:	

LOCATION:	60kW INVERTERS W/ 175 MODULES
BACKGROUND	RED
LETTERING	WHITE
NOTES:	

LOCATION:	60kW INVERTERS W/ 165 MODULES
BACKGROUND	RED
LETTERING	WHITE
NOTES:	

SYSTEM HOST
STANDE SAN APPROV
800 North Humboldt Street San Mateo, CA 94401
100 Montgomery Street, Suite 725 San Francisco, CA 94104 GENERAL CONTRACTOR
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ARCHITECT OF RECORD
Mariana Moncada, Architect 718 West Arbor Drive San Diego, CA 92103
NO. 9125
PROJECT: SAN MATEO COUNTY MEDICAL CENTER
SAN MATEO, CA 94403
NO. REVISION DATE
DATE: 07.21.23
SHEET TITLE:
TYPICAL ELECTRICAL SOLAR WARNING LABELS
SHEET NO.:
E5.1

NEW 36 kW, 1000 Vdc String Inverters for North America

The new, V2 version of the 36 kW (36 kVA) CPS three-phase string inverter is designed for rooftop and carport applications. The units are high performance, advanced and reliable inverters designed specifically for the North American environment and grid. High efficiency at 98.8% peak and 97.4% CEC, wide operating voltages, broad temperature ranges and a NEMA Type 4X enclosure enable this inverter platform to operate at high performance across many applications.

CPS 36KTL V2 ships with either the Standard wire-box or the Rapid Shutdown wire-box, each fully integrated and separable with touch-safe fusing, monitoring, and AC and DC disconnect switches. The integrated PLC transmitter in the Rapid Shutdown Wire-box enables PVRSS certified module-level rapid shutdown when used with APS RSD-S-PLC/RSD-D products. The CPS FlexOM Gateway enables monitoring, controls and remote product upgrades.

Key Features

- NEC 2017/2020 PVRSS certified for rapid shutdown
- NEC-compliant & UL listed arc-fault circuit protection
- 15-90° mounting orientation for low-profile roof installs Optional FlexOM Gateway enables remote firmware upgrades
- Integrated AC and DC disconnect switches
- Copper- and Aluminum-compatible AC connections
- 3 MPPTs with 5 inputs each for maximum flexibility
- NEMA Type 4X outdoor rated enclosure
- UL 1741-SA certified to CA Rule 21, including SA8-SA18 VW
- UL 1741-SB and IEEE 1547-2018 certified Separable wire-box design for fast service
- Standard 10-year warranty with extensions up to 20 years

36/50/60KTL Standard Wire-box

FC This device complies with part 15 of the FCC Rules

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7) Firmware version 17.0 or later required.

CPS	Technica
lodel Name	CPS SCA36KTL-DO/US-480
CInput	
ax. PV power	90 kW (33 kW per MPPT)
ax. DC input voltage	1000 Vdc
perating DC input voltage range	200-950 Vdc
art-up DC input voltage / power	330 V / 80 W
umber of MPP trackers	3
PPT voltage range @ PF>0.99	400-850 Vdc
lax. PV short-circuit current (lsc x 1.25)	204 A (68 A per MPPT)
umber of DC inputs	15 inputs, 5 per MPPT
C disconnection type	Load-rated DC switch
C surge protection	Type II MOV
C Output	
ated AC output power @ PF>0.99	36 kW
ax. AC apparent power (selectable)	36 kVA
ated output voltage	480 Vac
utput voltage range ¹	422 - 528 Vac
rid connection type	3Φ/ PE/ N (neutral optional)
ax. AC output current @ 480 Vac	43.5 A
ated output frequency	60 Hz
utput frequency range ¹	57 - 63 Hz
ower factor	>0.99 (±0.8 adjustable)
urrent THD @ rated load	<3%
Nax. fault current contribution (1 cycle RMS)	73.2 A (1.68 PU)
Nax. OCPD rating	125 A
C disconnection type	Load-break rated AC switch
C surge protection	Type II MOV
ystem and Performance	
opology	Transformerless
Nax. efficiency	98.8%
EC efficiency	97.4%
tand-by / night consumption	<3 W
nvironment	
nclosure protection degree	NEMA Type 4X
ooling method	Variable speed cooling fans
perating temperature range ²	-22°F to +140°F / - 30°C to +60°C
lon-operating temperature range ³	No low temp minimum to +158°F / +70°C maximum
perating humidity	0 to 100%
Dperating altitude	13123 ft / 4000 m (derating from 9843 ft / 3000 m)
udible noise	<60 dBA @ 1 m and 25°C
isplay and Communication	
Iser interface and display	LCD + LED
verter monitoring	SunSpec, Modbus RS485
ite-level monitoring	CPS FlexOM Gateway (1 per 32 inverters)
1odbus data mapping	CPS
emote diagnostics / firmware upgrade functions	Standard / (with FlexOM Gateway)
lechanical	
imensions (H x W x D)	39.4 x 23.6 x 10.24 in (1000 x 600 x 260 mm)
/eight	Inverter: 123.5 lbs (56 kg); Wire-box: 33 lbs (15 kg)
Acunting / installation angle ⁴	15 to 90 degrees from horizontal (vertical or angled)
C termination	M8 stud type terminal block (wire range: #6 - 3/0 AWG CU/A1: lugs not supplied)
C termination	Screw clamp. neg. husbar (RSD version ⁵) wire range: #14 - #6 AWG CU
used string inputs (5 per MPDT)6	20 A filling novided (file values un to 30 A accentable)
afety	20 A 10303 province (1030 values up to 30 A acceptable)
ertifications and standards	
errinications and standard	IEFE 1547-2014 IEEE 1547-20197 CA Dute 21 ISO NE LIECO
mort arid footuros	ILLE 1347 072014, IEEE 1347 72010, CA NULL 21, ISONE, NEW
nart-grid reatures	voit-kide inru, rreq-kide inru, kamp-kate, specified-PF, Voit-VAK, Freq-Watt, Volt-Watt
rarrancy	10
lanuaru	
xtenaea terms	15 and 20 years
The output voltage and frequency ranges may differ according to the sy Active power derating begins at 45°C when PF=1 and MPPT>Vmin, and See user manual for further requirements regarding non-operating con Shade Cover accessory required for installation angles of 75 degrees or RSD wire-box only includes fuses and fuse holders on the positive polar Fuse values above 20 A have additional spacing requirements or require	pecific grid standard. at 50°C when PF=1 and MPPT≥700 Vdc. ditions. less. ity, compliant with NEC 2017/2020 Section 690.9(C). e the use of the Y-Comb Terminal Block. See the user manual for further details.

CPS SCA36KTL-DO/US-480 V2

36/50/60KTL Rapid Shutdown Wire-box

Chint Power Systems America 1380 Presidential Drive, Suite 100, Richardson, TX 75081 Tel: 855-584-7168 Mail: AmericaSales@chintpower.com Web: www.chintpowersystems.com

50/60kW, 1000Vdc String Inverters for North America

The 50 & 60kW (55 & 66kVA) medium power CPS three phase string inverters are designed for ground mount, large rooftop and carport applications. The units are high performance, advanced and reliable inverters designed specifically for the North American environment and grid. High efficiency at 98.8% peak and 98.5% CEC, wide operating voltages, broad temperature ranges and a NEMA Type 4X enclosure enable this inverter platform to operate at high performance across many applications. The CPS 50/60KTL products ship with either the Standard wirebox or the Rapid Shutdown wire-box, each fully integrated and separable with touch safe fusing, monitoring, and AC and DC disconnect switches. The integrated PLC transmitter in the Rapid Shutdown wire-box enables PVRSS certified module-level rapid shutdown when used with the Tigo TS4-F/TS4-A-F/TS4-A-2F products and APS RSD-S-PLC/RSD-D products. The CPS FlexOM Gateway enables monitoring, controls and remote product upgrades.

Key Features

- NEC 2017/2020 PVRSS Certified Rapid Shutdown
- 55 & 66kVA rating allows max rated Active Power @±0.91PF
- Selectable Max AC Apparent Power of 50/55kVA and 60/66kVA
- NEC 2014/17 compliant & UL listed Arc-Fault circuit protection 15-90° Mounting orientation for low profile roof installs
- Optional FlexOM Gateway enables remote FW upgrades
- Integrated AC & DC disconnect switches
- 3 MPPT's with 5 inputs each for maximum flexibility
- NEMA Type 4X outdoor rated, tough tested enclosure
- UL1741 SA Certified to CA Rule 21, including SA8 through SA18 Separable wire-box design for fast service
- Standard 10 year warranty with extensions to 20 years

50/60KTL Standard Wire-box

This device complies with part 15 of the FCC Rules

4) See user manual for further requirements regarding non-operating conditions

5) Shade Cover accessory required for installation angles of 75 degrees or less.

6) RSD wire-box only includes fuses/fus

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Chint Power Systems America 6800 Koll Center Parkway, Suite 235 Pleasanton, CA 94566 Tel: 855-584-7168 Mail: AmericaSales@chintpower.com Web: www.chintpowersystems.com

APsmart

50/60KTL Rapid Shutdown Wire-box

Tigo

Model Name	- CPS SCA50KTL DO/US 480 - CPS SCA60KTL-DO/US-480
DC Input	
Max. PV Power	90kW (33kW per MPPT)
Max. DC Input Voltage	1000Vdc
Operating DC Input Voltage Range	200-950Vdc
Start-up DC Input Voltage / Power	330V / 80W
Number of MPP Trackers	3
MPPT Voltage Range @ PF>0.99	480-850Vdc 540-850Vdc
Max. PV Short-Circuit Current (Isc x 1.25)	204A (68A per MPPT)
Number of DC Inputs	15 inputs, 5 per MPPT
DC Disconnection Type	Load-rated DC switch
DC Surge Protection	Type II MOV, 2800V _c , 20kA I _{TM} (8/20S)
AC Output	
Rated AC Output Power @ PF>0.99 to ±0.91 ¹	50kW 60kW
Max. AC Apparent Power (Selectable)	50/55kVA 60/66kVA
Rated Output Voltage	480Vac
Output Voltage Range ²	422 - 528Vac
Grid Connection Type	3Φ / PE / N (Neutral optional)
vlax. AC Output Current @480Vac	60.2/66.2A 72.2/79.4A
Rated Output Frequency	60Hz
Output Frequency Range ²	57 - 63Hz
Power Factor	>0.99 (±0.8 adjustable)
Current THD @ Rated Load	<3%
Max. Fault Current Contribution (1 Cycle RMS)	64.1A (1.06/0.88 PU)
Max. OCPD Rating	110A 125A
AC Disconnection Type	Load-break rated AC switch
AC Surge Protection	Type II MOV, 1240Vc, 15kA ITM (8/20S)
System and Performance	C TE PROVINCE STOPPARTY CONTRACTOR AND A CONTRACTOR A
Topology	Transformerless
Max Efficiency	98.8%
CEC Efficiency	98.5%
Stand-by / Night Consumption	<1W
Environment	
Enclosure Protection Degree	NEMA Type 4X
Cooling Method	Variable speed cooling fans
Operating Temperature Pange ³	-22°E to +140°E / - 30°C to +60°C
Non Operating Temperature Range ⁴	No low temp minimum to $\pm 158^{\circ}$ F / $\pm 70^{\circ}$ C maximum
	13 123 /ft / /000m (derating from 98/2 5ft / 3000m)
	<60dRA @ 1m and 25°C
Display and Communication	
Iser Interface and Display	I CD+I ED
nverter Monitoring	SunShar Modhus RS485
Site Level Monitoring	CDS ElevOM Cateway (1 per 22 inverteer)
Modbus Data Mapping	
Romoto Diagnostica / EW/ Ungreda Evention	UFO Standard / (with ElevOM Cataway)
	$30.4 \times 22.6 \times 10.24$ in (1000 $\times 600 \times 260$ mm)
	JJ.4 X ZJ.O X TU.Z4III. (TUUU X OUU X ZOUMIM)
	15 to 00 decrees from horizontal (vertical or analod)
viounting / Installation Angle	15 to 50 degrees from norizontal (Vertical or angled)
	wo Stud Type Terminal Block (wire range: #6 - 3/0AWG CU/AL, Lugs not supplied)
DC Iermination	Screw Clamp, Neg. Busbar (RSD version") Wire range: #14 - #6AWG CU
used String Inputs (5 per MPPT)'	RSD [°] and Standard Wire-box: 20A fuses provided (Fuse values up to 30A acceptable)
Certifications and Standards	UL1741-SA Ed. 2, UL1699B, CSA-C22.2 NO.107.1-01, IEEE1547a-2014; FCC PART1
Selectable Grid Standard	IEEE 1547a-2014, CA Rule 21, ISO-NE
Smart-Grid Features	Volt-RideThru, Freq-RideThru, Ramp-Rate, Specified-PF, Volt-VAr, Freq-Watt, Volt-Wat
Narranty	
Standard	10 years
Extended Terme	15 and 20 years

Temperature Ra **Temperature Coeffi Temperature Coeffi** Temperature Coeff

I-V Curve

Datasheet

acteristics											Test (incertain	ty for Pma	ax: ±3%
	.R4-72H	PH-425M	LR4-72H	PH-430M	LR4-72H	PH-435M	LR4-72H	PH-440M	LR4-72H	PH-445M	LR4-72H	PH-450M	LR4-72H	PH-455
	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOC
Pmax/W)	425	317.4	430	321.1	435	324.9	440	328.6	445	332.3	450	336.1	455	339.
ge (Voc/V)	48.3	45.3	48.5	45.5	48.7	45.7	48.9	45.8	49.1	46.0	49.3	46.2	49.5	46.4
ent (Isc/A)	11.23	9.08	11.31	9.15	11.39	9.21	11.46	9.27	11.53	9.33	11.60	9.38	11.66	9.43
um Power (Vmp/V)	40.5	37.7	40.7	37.9	40.9	38.1	41.1	38.3	#1.3	38.5	41.5	38.6	41.7	38.8
um Power (Imp/A)	10.50	8.42	10.57	8.47	10.64	8.53	10.71	8.59	10.78	8.64	10.85	8.70	10.92	8.75
(%)		.6	19	.8	20	0.0	2	0.2	20	D.5	20		20	1.9
ing Conditions): Irradia	nce 1000W/	/m², Cell	Temperat	ture 25 C	, Spectra	a at AM1.	5							
perating Cell Temperatu	ure): Irradian	nce 800W	//m², Am	bient Ten	nperatur	e 20°C, 5	pectra at	: AM1.5,	Wind at 1	Lm/S				

atings (STC)		Mechanical Loading	
ficient of Isc	+0.048%/°C	Front Side Maximum Static Loading	5400Pa
ficient of Voc	-0.270%/ <i>`</i> C	Rear Side Maximum Static Loading	2400Pa
ficient of Pmax	-0.350%/ °C	Hailstone Test	25mm Hailstone at the speed of 23m/s

Room 801, Tower 3, Lujiazui Financial Plaza, No.826 Century Avenue, Pudong Shanghai, 200120, China Tel: +86-21-80162606 E-mail: module@longi-silicon.com Facebook: www.facebook.com/LONGi Solar

Note: Due to continuous technical innovation, R&D and improvement, technical data above mentioned may be of modification accordingly. LONGi have the sole right to make such modification at anytime without further notice; Demanding party shall request for the latest datasheet for such as contract need, and make it a consisting and binding part of lawful documentation duly signed by both parties.

SVSTEM HOST
V OF SAW
STATE RILLE
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SYSTEM DEVELOPER
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IEICHERI SOLAR
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ARCHITECT OF RECORD
MM PV design
Mariana Moncada, Architect 718 West Arbor Drive San Diego, CA 92103 619.632.2883
ARCHITECT / ENGINEER OF RECORD
NO. 9125
OF CALIFORNIA
PROJECT: SAN MATEO COUNTY MEDICAL CENTER
222 W 39TH AVENUE SAN MATEO, CA 94403
NO. REVISION DATE
DATE: 07.04.00
U1.21.23
ELECTRICAL SOLAR EQUIPMENT CUT SHEETS
SHEET NO.:
E6.0

PV power optimization at the module level

- Specifically designed to work with SolarEdge residential inverters
- Detects abnormal PV connector behavior, preventing potential safety issues
- Module-level voltage shutdown for installer and firefighter safety
- Superior efficiency (99.5%)
- Mitigates all types of module mismatch loss, from manufacturing tolerance to partial shading
- Faster installations with simplified cable management and easy assembly using a single bolt
- Flexible system design for maximum space utilization
- Compatible with bifacial PV modules
- Meets NEC requirements for arc fault protection (AFCI) and Photovoltaic Rapid Shutdown System (PVRSS)

solaredge.com

solaredge

/ Power Optimizer

For North America

/	 	

	S440	S500B	_S650B	
INPUT				
Rated Input DC Power ⁽¹⁾	440	500	650	W
Absolute Maximum Input Voltage (Voc)	60	125	85	Vdc
MPPT Operating Range	8 - 60	12.5 – 105	12.5 – 85	Vdc
Maximum Short Circuit Current (lsc) of Connected PV Module	14.5	15		Adc
Maximum Efficiency		99.5		%
Weighted Efficiency		98.6		%
Overvoltage Category		II		
OUTPUT DURING OPERATION (POWER OPTIM	IZER CONNECTED TO C	PERATING SOLAREDGE IN	IVERTER)	
Maximum Output Current		15		Adc
Maximum Output Voltage	60	80		Vdc
OUTPUT DURING STANDBY (POWER OPTIMIZE	ER DISCONNECTED FRO	M SOLAREDGE INVERTER	OR INVERTER OFF)	
Safety Output Voltage per Power Optimizer		1 ± 0.1		Vdc
STANDARD COMPLIANCE				
Photovoltaic Rapid Shutdown System		NEC 2014, 2017 & 2020		
EMC	FCC	Part 15 Class B, IEC61000-6-2, IEC610	00-6-3	
Safety		IEC62109-1 (class II safety), UL1741		
Material		UL94 V-0, UV Resistant		
RoHS		Yes		
Fire Safety		VDE-AR-E 2100-712:2013-05		
INSTALLATION SPECIFICATIONS				
Maximum Allowed System Voltage		1000		Vdc
Dimensions (W x L x H)	129 x 155 x 30 / 5.07 x 6.10 x 1.18	129 x 165 x 45 / 5.	07 x 6.49 x 1.77	mm/in
Weight	720 / 1.6	790 /	1.74	gr / lb
Input Connector		MC4 ⁽²⁾		
Input Wire Length		0.1/0.32		m / ft
Output Connector		MC4		
Output Wire Length		(+) 2.3, (-) 0.10 / (+) 7.54, (-) 0.32		m / ft
Operating Temperature Range ⁽³⁾		-40 to +85		°C
Protection Rating		IP68 / NEMA6P		
Relative Humidity		0 - 100		%

(1) Rated power of the module at STC will not exceed the power optimizer Rated Input DC Power. Modules with up to +5% power tolerance are allowed. (2) For other connector types please contact SolarEdge. (3) Power de-rating is applied for ambient temperatures above +85°C / +185°F for S440, and for ambient temperatures above +75°C / 167°F for S500B. Refer to the Power

PV System Design Usir Inverter	ng a SolarEdge	SolarEdge Home Wave/Hub - Single Phase	Three Phase for 208V Grid	Three Phase for277/480V Grid	
Minimum String Length	S440	8	10	18	
(Power Optimizers)	S500B, S650B	6	8	14	
Maximum String Length (Po	ower Optimizers)	25		50 ⁽⁴⁾	
Maximum Nominal Power p	per String	5700 (6000 with SE7600-US-SE11400-U)	6000	12750	W
Maximum Allowed Connect	ted Power per String ⁽⁵⁾		One string 7200		
(Permitted only when the difference in connected power between strings is 1,000W or less)		Refer to footnote 5	Two strings or more 7800	15000	W
Parallel Strings of Different	Lengths or Orientations		Yes		
 (4) A string with more than 30 opti (5) If the inverters rated AC power Refer to the <u>Single String Desig</u> (6) It is not allowed to mix S-series 	imizers does not meet NEC rap ≤ maximum nominal power p n Guidelines Application Note and P-series Power Optimizer	id shutdown requirements; safety voltage will be abover er string, then the maximum power per string will be al for more details. s in new installations.	e the 30V requirement. ole to reach up to the inverters maximum	input DC power.	

SolarEdge Technologies, Ine

- Specifically designed to work with power optimizers Quick and easy inverter commissioning directly
- (98.5%) and longer strings Built-in type 2 DC and AC Surge Protection, to better withstand lightning events
- Small, lightest in its class, and easy to install outdoors or indoors on provided bracket

MODEL NUM APPLICABLE OUTPUT Rated AC Power Maximum appare AC Output Line C AC Output Voltag AC Output Voltag AC Frequency Mi Maximum Contir GFDI Threshold Utility Monitoring Total Harmonic [

Power Factor Rai INPUT Maximum DC Pc Transformer-less Maximum Input \ Operating Voltag Maximum Input Maximum Input Reverse-Polarity

CEC Weighted E Night-time Powe ADDITIONA Supported Comr Inverter Commis Arc Fault Protecti Rapid Shutdown

RS485 Surge Prot DC Surge Protect AC Surge Protect DC Fuses (Single Smart Energy Ma

DC SAFETY DC Disconnect STANDARD Safety Grid Connection Emissions INSTALLATI

AC output condu DC input conduit Number of DC in Dimensions with Weight with Safe Cooling Noise Operating Temp Protection Rating

Mounting (1) For 120/208V inve (2) For other regional (3) Where permitted k (4) For power de-ratin

Three Phase Inverters for the 277/480V Grid For North America

SE30KUS / SE40KUS

The best choice for SolarEdge enabled systems

- from a smartphone using the SolarEdge SetApp
- Fixed voltage inverter for superior efficiency
- solaredge.com

Integrated arc fault protection and rapid shutdown for NEC 2014 and 2017, per article 690.11 and 690.12

INVERTERS

- Built-in module-level monitoring with Ethernet, wireless or cellular communication for full system visibility
- Integrated Safety Switch
- UL1741 SA certified, for CPUC Rule 21 grid compliance

solaredge

/ Three Phase Inverters for the 277/480V Grid⁽¹⁾ For North America

SE30KUS / SE40KUS

MODEL NUMBER	SE30KUS SE40KUS	
APPLICABLE TO INVERTERS WITH PART NUMBER	SEXXK-USX8IXXXX	UNITS
OUTPUT		
Rated AC Power Outout	30000 40000	w
Maximum apparent AC output power	30000 40000	VA
AC Output Line Connections	3W + PE, 4W + PE	
AC Output Voltage Minimum-Nominal-Maximum ⁽²⁾ (L-N)	244 - 277 - 305	Vac
AC Output Voltage Minimum-Nominal-Maximum ⁽²⁾ (L-L)	422.5 - 480 - 529	Vac
AC Frequency Min-Nom-Max ⁽²⁾	59.3 - 60 - 60.5	Hz
Maximum Continuous Output Current (per Phase)	36.25 48.25	Aac
GFDI Threshold	1	A
Utility Monitoring, Islanding Protection, Country Configurable Set Points	Yes	
Total Harmonic Distortion	≤ 3	%
Power Factor Range	+/- 0.85 to 1	
INPUT		1
Maximum DC Power (Module STC)	45000 60000	W
	1000	Vde
	840, 1000	Vdc
	26.25 // / / / / / / / / / / / / / / / / /	VUC Ada
Maximum Input Current	50.23 40.25	Add
Maximum input short Circuit Current	55 Vec	AUC
Reverse-Polarity Protection	Yes	
STOUND-Fault Isolation Detection		0/
	90.5	70
	<4	VV
ADDITIONAL FEATURES		
Supported Communication Interfaces	2 x RS485, Ethernet, Cellular (optional)	
nverter Commissioning	With the SetApp mobile application using built-in access point for local connection	
Arc Fault Protection	Integrated, User Configurable (According to UL1699B)	
Rapid Shutdown	NEC2014, NEC2017 and NEC2020 compliant/certified	
RS485 Surge Protection Plug-in	Supplied with the inverter, Built-in	
DC Surge Protection	Type II, field replaceable, Built-in	
AC Surge Protection	Type II, field replaceable, Built-in	
DC Fuses (Single Pole)	25A, Built-in	
Smart Energy Management	Export Limitation	L
DC SAFETY SWITCH		
DC Disconnect	Integrated	
STANDARD COMPLIANCE		
Safety	UL1741, UL1741 SA, UL1699B, CSA C22.2, Canadian AFCI according to T.I.L. M-07	
Grid Connection Standards	IEEE1547, Rule 21, Rule 14 (HI)	
Emissions	FCC Part 15 class A	
NSTALLATION SPECIFICATIONS		
AC output conduit size / AWG range	34" or 1" / 6 - 10 AWG	
DC input conduit size / AWG range	34" or 1" / 6 - 12 AWG	
Number of DC inputs pairs	4	
Dimensions with Safety Switch (H x W x D)	31.8 x 12.5 x 11.8 / 808 x 317 x 300	in / m
Weight with Safety Switch	78.2 / 35.5	lb/k
Coolina	Fans (user replaceable)	
Noise	< 62	dRA
Operating Temperature Range	-40 to +140 / -40 to +60 ⁽⁴⁾	°F / °
	NEMA 3R	17
recession noting		-
Mounting	Bracket provided	

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SYSTEM HOST
THE FORMUT
800 North Humboldt Street San Mateo, CA 94401
SYSTEM DEVELOPER
FOREFRONT
100 Montgomery Street, Suite 725 San Francisco, CA 94104
ELECTRICAL COMPANY INC.
1902 Channel Drive West Sacramento, CA 95691 916-567-1100
ELECTRICAL ENGINEER
HARDIN-DAVIDSON 356 Pollasky Avenue, Ste. 200 Clovis, CA 93612 559.323.4995
SOLAR 10620 Treena Street, Suite 140,
San Diego, CA 92131 ARCHITECT OF RECORD
MM PV design
Mariana Moncada, Architect 718 West Arbor Drive San Diego, CA 92103 619.632.2883 ARCHITECT / ENGINEER OF RECORD
NO. 9125
PROJECT: SAN MATEO COUNTY MEDICAL CENTER 222 W 39TH AVENUE SAN MATEO, CA 94403
NO. REVISION DATE
DATE: 07.21.23
SHEET TITLE:
ELECTRICAL SOLAR EQUIPMENT CUT SHEETS
SHEET NO.:
E6.1

Project Name:					Part Numbe	er:			Type:	А
WTZ									TTD	
NARROW I	LINE	AR V	APOF	R TIGH	HT					
FEATURES						-J				407-478-3759
 Robust & Durable Narrow Body Linear Vapor Tight Industry Leading Max Ambient up to 131F Ambient Range -40°F to 131°F (Select Models) Extremely High Efficacy up to 156 lm/W 2ft, 4ft & 8ft Fixture Lengths Lumen Packages Ranging 2,000-24,000 Surface, Pendant, Wall & Suspended Mounting Options Wireless Createrle Options 					4			3	www.ilp-inc.com	
 Multiple Lens Optio Fiberglass Body Att F1 Weatherability IP65, IP66 & IP6 3000K-5000K CCT >80 Color Renderint Calculated L70 >10 0-10V Dimmable D 5 Year Warranty ETL Listed for Wet DesignLights Consol 	Dons tributes: ty Rating 7, NEMA f ng Index (0,000 Ho river (100 Location Dortium® F A Stemens Comp	& 5VA Fl. 4X, NSF, 8 CRI) Durs D%–10%) Premium (any	ame Rating & 1500 PS Qualified L	g I Hosedow uminaire [®] NIEMA						
Coolers & Freezers	• Food	LONS	age Prepara	ation • G	reenhouse • I	Pharmaceut	tical • Healthca	are • Education • Ir	ndustrial	Parking Garage
ORDERING G	UIDE:		10		DDIVED	CCT		LENC		
SERIES	□ 2L		15 (select of 4	ne)			RAFL Ribbe	d Acrylic Frosted (Std)		Standard
WTZ4 4ft Amazon	☐ 3L ☐ 7L ☐ 12L	4L 8L	☐ 5L ☐ 9L	☐ 6L ☐ 10L		☐ 40 ☐ 35 ☐ 30	SAFL Shallo	w Acrylic Frosted (eta) w Acrylic Clear w Polycarbonate Frosted w Polycarbonate Clear	□ст	-40°F Cold Start
WTZ8 8ft Amazon	☐ 6L ☐ 14L	□ 8L □ 16L	10L 18L	☐ 12L ☐ 24L						
		OPTIC	NS					CONTROLS OPTIONS		J
		Factory In	stalled					Basic		
SD347 ¹⁸ SD480 ¹⁸ DIM1 SS TPS EM7 ⁷ EM7/HE ^{7,10,19}	347V S 480V S 1% Dim Stainles Tamper 7W Fac 7W Fac	tep Down 7 tep Down 7 imming Dri s Steel Late Proof Scre tory Installe tory Installe	Transformer Transformer ver ches ws ed Battery B ed Battery B	ackup ackup		WLOS ^{4,} WLOSP BDxx ^{4,6} BDxx ^{4,6} MWS ^{3,4}	 Wet-Loca Wet-Loca User Sele Preset Bi- Preset Bi- Preset Bi- S.* On/Off M D3.4,5,8,12 User Sele User Sele 	ation Rated On/Off End Mo ation Rated On/Off End Mo ctable Bi-Leveling Dimming -Level Dimming End Mount -Level Dimming End Mount ficrowave Sensor Installed ctable Bi-Level Dimming M	unted Occu unted Occ S g End Mount ed Sensor ed Sensor w Behind Lens icrowave Se	pancy Sensor Gensor w/ Photocell ted Sensor // Photocell Gensor
EM10/HE 7,10,19	10W Factory Installed Battery Backup 10W Factory Installed Battery Backup 10.19 10W Factory Installed Self-Diagnosing Battery Backup					Installed	Deniniu Lens			

	EMITO/HE-20	10vv Factory Installed Self	-Diagnosing battery backup	a second s	Adv
	EM12 7	12W Factory Installed Batt	ery Backup	ES/HB 3,4,11	EasySense High-Bay Se
	GTD *	Factory Installed Generato	r Transfer Device	55/HRW/IL ^{3,4}	Enlighted Ruggedized Ir
	LEDBBCT [®]	Factory Installed Cold Tem	p Battery Backup	55/HRW/CL ^{3,4}	Enlighted Ruggedized C
] SP10	10kA Surge Protector Insta	lled	55/HRW/IOT 3,4	Enlighted Ruggedized Ir
	CORDW/xFT	Wet-location rated cord in	stalled (xFT = Length)	FSP-311B/L2 4.6	Legrand FSP-311 Bluet
	CORD/6FT/5WIRE	6ft 5-wire cord w/ 1 groun	d, 2 power, and 2 dimming leads	FSP-311B/L3 4.6	Legrand FSP-311 Bluet
] 3WMR ⁴	3-wire mini receptacle inst	alled	FSP-311B/L7 4.6	Legrand FSP-311 Bluet
	3WMR/6 4	3-wire mini receptacle inst	alled with 6ft cord		
	EMH1 13	1/2" HUB installed in one	end of housing for power entry		
	EMH2 14	1/2" HUB installed in both	ends of housing for power entry		
		Mounting Options	5		Ship With
	HB-xxx-LOOP	Aircraft cables (xx= inches)	1	ES/PCD ²	EasySense Pre-Program
	HUB 3/4 15,17	Conduit Hub 3/4" for Pend	lant Mounting	ES/IR 2,9	EasySense Commission
	FMB 16,17	Fixture Mounting Box for F	Pendant Mounting	ES/WWS/DR	EasySense Dual Rocker
	AB45DEG	45 Degree Stainless Steel A	Angled Mounting Bracket Set	MW/RC ²	Programming Tool for N
Ref	ference Ambient Temperature I	Range Table for more detail (pg. 4)	⁶ Does not qualify for NSF Listed	¹¹ Must be used w/ ES/PCD	& ES/IR for commissioning
²On	e needed per project		⁷ Operating temp down to 32°F	12 Must be used with MW/R	C option for commissioning
³ IP6	5 Rated		⁸ Operating temp down to -4 ^o F	13 Cannot be used with com	bination of
IP6	66 Rated		⁹ Must be used with ES/PCD	End Mounted sensor & po	ower cord
⁵ IP6	57 Rated		¹⁰ CEC Title 20 Compliant	¹⁴ Cannot be used w/ End M	ounted sensor or power cord
NТ	ZSPEC0321				

WTZ

NARROW LINEAR VAPOR TIGHT

MOUNTING OPTIONS

HB-XXX-LOOP Includes 2 adjustable cable hangers. Available in 60", 120", 180" & 240"

WTZSPEC0321

FMB Fixture Mounting Box utlized when pendant mounting. Must be used with HUB 3/4. One needed per 4ft section.

Individual Lighting (IL) Sensor w/ Control Unit Connected Lighting (CL) Sensor w/ Control Unit Internet of Things (IOT) Sensor w/ Control Unit etooth Programming sensor–8' mounting height etooth Programming sensor–20' mounting height etooth Programming sensor–40' mounting height

n Accessories mmed Control Device oning IR Blaster er Wireless Wall Switch

MWUSBD sensor ¹⁵ Must use with FMB for pendant mounting ¹⁶Must use with HUB 3/4 for pendant mounting ¹⁷One required per 4ft section ¹⁸Reference DLC website for current listing ¹⁹Not available on WTZ2

HUB 3/4 HUB 3/4 - 3/4" Conduit Hub for Single Pendant Mounting. Requires use of FMB

WTZ

NARROW LINEAR VAPOR TIGHT AMBIENT TEMPERATURE RANGE

Doub Musellance	Suspended (18 in.)	Surface Mount		
Part Numbers	Standard ¹	Standard ¹		
WTZ2-2L-U-XX-RAFL	-4°F to 127°F	-4°F to 126°F		
WTZ2-3L-U-XX-RAFL	-4°F to 122°F	-4°F to 112°F		
WTZ2-4L-U-XX-RAFL	-4°F to 115°F	-4°F to 103°F		
WTZ2-6L-U-XX-RAFL	-4°F to 110°F	-4°F to 96°F		
WTZ4-3L-U-XX-RAFL	-4°F to 132°F	-4°F to 130°F		
WTZ4-4L-U-XX-RAFL	-4°F to 129°F	-4°F to 122°F		
WTZ4-5L-U-XX-RAFL	-4°F to 127°F	-4°F to 115°F		
WTZ4-6L-U-XX-RAFL	-4°F to 126°F	-4°F to 113°F		
WTZ4-7L-U-XX-RAFL	-4°F to 125°F	-4°F to 111°F		
WTZ4-8L-U-XX-RAFL	-40°F to 124°F	-40°F to 108°F		
WTZ4-9L-U-XX-RAFL	-4°F to 122°F	-4°F to 104°F		
WTZ4-10L-U-XX-RAFL	-40°F to 130°F	-40°F to 119°F		
WTZ4-12L-U-XX-RAFL	-40°F to 129°F	-40°F to 118°F		
WTZ8-6L-U-XX-RAFL	-4°F to 122°F	-4°F to 117°F		
WTZ8-8L-U-XX-RAFL	-40°F to 129°F	-40°F to 115°F		
WTZ8-10L-U-XX-RAFL	-4°F to 127°F	-4°F to 115°F		
WTZ8-12L-U-XX-RAFL	-40°F to 124°F	-40°F to 120°F		
WTZ8-14L-U-XX-RAFL	-4°F to 125°F	-4°F to 111°F		
WTZ8-16L-U-XX-RAFL	-40°F to 122°F	-40°F to 110°F		
WTZ8-18L-U-XX-RAFL	-40°F to 145°F	-40°F to 133°F		
WTZ8-24L-U-XX-RAFL	-40°F to 122°F	-40°F to 107°F		
¹ CT Cold Temp Start Driver (-40°F) Available for (-4°F) standard products				

SPECIFICATIONS CONSTRUCTION

Injection molded one piece 5VA rated fiberglass body with chemical resistant finish for rigidity, durability and prolonged life in rough environments. F1 weatherability rated housing. Toolless removable gear tray for quick and easy access to electrical. Captive latches fastened to housing to safely secure lens to housing. Designed to achieve maximum performance and improved aesthetics.

ELECTRICAL

Class 2 LED light engine for high efficacy and long life. Calculated L70 > 100,000hrs. LED Lumen Maintenance Estimates based on TM-21 projections for the light source at 25C ambient. Power Factor > 0.90. Standard 120-277 Vac 0-10V dimmable (10% - 100%) with optional 347V - 480Vac step down transformer. Optional emergency battery backups and generator transfer device available to meet critical life safety lighting requirements. Fixture max ambient reduced for emergency battery backup and step down options.

INSTALLATION

Designed for a variety of mounting applications including surface, pendant, 45 degree wall mount and suspended. Pre-drilled holes on each side of fixture for electrical access and wiring. Hole plugged from factory with rubbed IP rated seal. 1/2" HUBs available for threaded power entry from both ends. Toolless hinged removable gear tray for quick and easy access to electrical.

WARRANTY

5 Year Warranty (Terms and Conditions apply)

NARROW LINEAR VAPOR TIGHT

WTZSPEC0321

WTZ

WTZ4

LENS TYPE

WTZSPEC0321

RAFL

durability and LED glare reduction. Standard Ribbed Acrylic Frosted (RAFL), with optional Shallow Acrylic Frosted (SAFL), Shallow Acrylic Clear (SACL), Shallow Polycarbonate Frosted (SPFL) and Shallow Polycarbonate Clear (SPCL) lens options. Field removeable lens for easy access to LED boards, drivers and maintenance.

Robust injection molded and impact resistant PMMA lens options for

THERMAL

OPTICS

Ambient temperature range -40°F up to 131°F (-40°C to 55°C) on select models with cold start ambient temperature options. Fixture to be mounted at a minimum plenum height of 18" for suspended mounting. Reduced maximum ambient for surface mounting. Reference Ambient Temperature Ratings by lumen package in the Ambient Temperature Range table for more detail.

CONTROLS

Factory installed Advanced & Basic integral occupancy sensor options available. Fully control light levels for both occupied and unoccupied areas with user selectable bi-level dimming options to meet critical life safety lighting requirements. Advanced controls available for grouping capabilities and BAS operation. See controls pg for more detail (pg. 5).

CERTIFICATIONS

ETL Listed to US and Canadian safety standards. Suitable for Wet Locations. American Recovery and Reinvestment Act Funding Compliant. BAA Compliant. IP65, IP66, IP67 Rated. NSF Listed. 1500 PSI Hosedown Rated. DLC (DesignLights Consortium) Premium Qualified. Please refer to the DLC Qualified Products List at www. Designlights.org/QPL to confirm specific product qualifications.

WTZ

PHOTOMETRIC DATA

LINE DRAV	VINGS			PHOTOMET				
				LUMINAIRE DATA		ZONAL LUM	EN SUMMARY	
WTZ2:				Part Number	WTZ2-4L-U-50-RAFL	Zone	Lumens (Im)	% Fixtur
Top View		End View		Description	2ft Amazon Vapor Tight, 4,000 Lumens, Ribbed Frosted Acrylic Lens	0° - 40°	1,744	42%
°				Fixture Lumens (Im)	4,172 lm	0° - 60°	3,043	73%
\square \bigcirc	\bigcirc \bigcirc \bigcirc \bigcirc		4.2	Wattage (W)	80 W	0° - 90°	4.010	96%
	<u> </u>			Efficacy (Im/W)	164 lm/W			
		LENS TYPE:	LENS TYPE:	Mounting	Suspended	90° - 180°	162	4%
	27.7	RAFL	SAFL	Spacing Criteria	0° = 1.30, 90° = 1.29	0° - 180°	4,172	100%
Side View			SPFL SPCL					

WTZ8

JMINAIRE DATA Part Number Description Fixture Lumens (Im) 16,371 Im 80 W Wattage (W) Efficacy (Im/W) 159 Im/W Mounting

WTZSPEC0321

WTZ

BASIC WLOS

WLOSPC

of fixture.

USBD

BDxx

mounted off end of fixture.

ADVANCED

Philips ES/HB

Legrand FSP-311B

WTZSPEC0321

Spacing Criteria

LENS TYPE: SAFL SACL SPFL

SPCL

NARROW LINEAR VAPOR TIGHT **CONTROLS OPTIONS**

Standard on/off wet location rated PIR occupancy sensor. Comes with 360 degree lens. Sensor mounted off end of fixture.

Standard on/off wet location rated PIR occupancy sensor with photocell control. When installed, fixture will not activate unless 1. motion is detected and 2. light levels are below the preset level. When activated, fixture will turn on to 100% light output and will only shut off when one of the two levels listed above are met. If no motion is detected and light levels fall below preset level the fixture remains off. Sensor mounted off end

User Selectable Bi-Level Dimming wet location rated PIR occupancy sensor. Allows the end user to manually select the unoccupied dimming level. Once motion is detected, the fixture will return to 100% light output. Sensor mounted off end of fixture.

Factory set Bi-Level Dimming wet location rated PIR occupancy sensor. Sensor is set to dim level, as indicated in the "xx" portion of the part number, when the area is unoccupied. Example: BD20 sets the fixture to dim down to 20% lumen output when the area is unoccupied. Once motion is detected, the fixture will return to 100% light output. Sensor

EasySense wet location rated PIR occupancy sensor combines occupancy sensing, daylight harvesting and institutional tuning in one solution. Each device allows you to turn on/off occupancy and/or daylight harvesting functions as well as set the full light output, background light level, occupancy prolong time, occupancy grace fading time and occupancy time out/hold time. Requires use of EasySense Pre-Programmed Control Device (ES/PCD) and Commissioning IR Blaster (ES/IR); one of each needed per project. Sensor mounted off end of fixture.

FSP-311 wet location rated PIR occupancy sensor offers fully adjustable high and low dimmed light levels with optional photocell. Hold off setpoint with automatic calibration option. Adjustable time delay and cut off delay. Sensor adjustable programming via iOS or Android 'Sensor Configuration' App. Sensor mounted off end of fixture.

BDxxPC

Factory set Bi-Level Dimming wet location rated PIR occupancy sensor with photocell. Sensor is set to dim level as indicated in the "xx" portion of the part number, when the area is unoccupied and will not return to 100% light output unless 1. motion is detected and 2. the light level is below the preset level. Example: BD20PC sets the fixture to dim down to 20% lumen output when the area is unoccupied and will not return to 100% light output unless the above conditions are met for both motion light level readings. Sensor mounted off end of fixture.

MWS

Standard on/off wet location rated microwave occupancy sensor. Sensor installed on LED gear tray behind lens.

MWUSBD

User Selectable Bi-Level Dimming wet location rated microwave occupancy sensor. Allows the end used to manually select the unoccupied dimming level. Once motion is detected, the fixture will return to 100% light output. Requires use of MW/RC programming tool; one needed per project. Sensor installed on LED gear tray behind

Enlighted 5S/HRW/IL

Enlighted wet location rated PIR occupancy sensor bundled system with 5E sensor (SU-5S-HRW-IL), Control Unit (CU-4E-FM) and Cable (CBL-5E-CU4-30N). Fixtures are controlled based on occupancy and ambient light. Includes ability to group fixtures together and connect to a wireless wall switch to zone fixtures for group operation. Provided factory installed components only. Inquire for Enlighted system. Inquire with factory for customer supplied factory installed components. Contact factory for more information. Sensor mounted off end of fixture.

Enlighted 5S/HRW/CL

Enlighted wet location rated PIR occupancy sensor bundled system with 5E sensor (SU-5S-HRW-CL), Control Unit (CU-4E-FM) and Cable (CBL-5E-CU4-30N). Fixtures are controlled based on occupancy and ambient light. Includes individual lighting attributes plus conection to Enlighted Energy Manager. The Energy Manager provides data analysis for all data collected by the Enlighted Smart Sensors for energy, occupancy and environment. Inquire for Enlighted system. Inquire with factory for customer supplied factory installed components. Contact factory for more information. Sensor mounted off end of fixture.

Enlighted 5S/HRW/IOT

Enlighted wet location rated PIR occupancy sensor bundled system with 5E sensor (SU-5S-HRW-IOT), Control Unit (CU-4E-FM) and Cable (CBL-5E-CU4-30N). Fixtures are controlled based on occupancy and ambient light. Includes individual lighting attributes plus conection to Enlighted Energy Manager. The Energy Manager provides data analysis for all data collected by the Enlighted Smart Sensors for energy, occupancy and environment. Additionally, the IOT functionality takes the data acess and function beyond just lighting to a wide range of applications beyond the standard connected lighting controls. Inquire for Enlighted system. Inquire with factory for customer supplied factory installed components. Contact factory for more information. Sensor mounted off end of fixture.

NARROW LINEAR VAPOR TIGHT

TZ4-8L-U-50-RAFL
Amazon Vapor Tight, 8,000 Lumens, obed Frosted Acrylic Lens
673 lm
W
2 lm/W
spended
= 1.29, 90° = 0.77

Zone	Lumens (Im)	% Fixture
0° - 40°	3,626	42%
0° - 60°	6,327	73%
0° - 90°	8,338	96%
90° - 180°	336	4%
0° - 180°	8,673	100%

	ZONAL LUME	ZONAL LUMEN SUMMARY					
000	Zone	Lumens (Im)	% Fixture				
s	0° - 40°	6,845	42%				
	0° - 60°	11,944	73%				
	0° - 90°	15,737	96%				
	90° - 180°	634	4%				
	0° - 180°	16,371	100%				

YSTEM HOST
OF SAN APPRO
800 North Humboldt Street San Mateo, CA 94401
YSTEM DEVELOPER
100 Montgomery Street, Suite 725 San Francisco, CA 94104
ENERAL CONTRACTOR
COLLINS ELECTRICAL COMPANY INC.
1902 Channel Drive West Sacramento, CA 95691 916-567-1100
LECTRICAL ENGINEER
HARDIN-DAVIDSON 356 Pollasky Avenue, Ste. 200 Clovis, CA 93612 559.323.4995
TRUCTURAL ENGINEERING AND STEEL CONSTRUCT
MM PV design
Mariana Moncada, Architect 18 West Arbor Drive San Diego, CA 92103 19.632.2883
RCHITECT / ENGINEER OF RECORD
NO. 9125
ROJECT: SAN MATEO COUNTY MEDICAL CENTER
222 W 39TH AVENUE SAN MATEO, CA 94403

NO.	REVISION	DATE	
DATE:	07.2	1.23	
SHEET	TITLE:		
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state of california Outdoor Lighting	
CERTIFICATE OF COMPLIANCE	NRCC-LTC
This document is used to demonstrate compliance with requirements in 110.9, 130.0, 130.	2, 140.7, and 141.0(b)2L for outdoor lighting scopes using the prescriptive path for
nonresidential and hotel/motel occupancies. It is also used to document compliance with r	equirements in 160.5, 170.2(e)6, 180.1(a) and 180.2(b)4Bv for outdoor lighting scopes using
the prescriptive path for multifamily and mixed-use occupancies. Multifamily includes dorr	nitory and senior living facilities.

Proje	ect Name:		San Mateo County - Medical Center	r Report Page: (Page 1 c						
Proje	ect Address:		222 W 39th Avenue	nue Date Prepared: 6/9/2						
A. 6	ENERAL INFORMATION									
01	Project Location (city)	San I	Mateo	04	Total Illuminated Hardsonna Area (ft ²)	26659				
02	Climate Zone	3		1 04	Total numinated Hardscape Area (ft ⁻)	20035				
03	Outdoor Lighting Zone per Title 24 Part :	1 10.1	14 or as designated by Authority Having	Juriso	diction (AHJ):					
	LZ-0: Very Low - Undeveloped Parkland		LZ-2: Moderate - Urban Clusters		LZ-4: High - Must be reviewed by CA End	ergy Commission for Approval				
	LZ-1: Low - Rural Areas		LZ-3: Moderately High - Urban Areas							
05	Occupancy Types within Project		•							
• Al	l Other Occupancies									

B. PROJECT SCOPE

Altered Lighting System

This tab 170.2(e,	le includes outdoor lighting systems that are within tl)6 or 141.0(b)2L / 180.2(b)4Bv for alterations.	he scope of the permit application and are demonstrating compliance using the prescriptive path outlined in 140.7 /								
My Proj	ly Project Consists of:									
	01 02									
\boxtimes	New Lighting System	Must Comply with Allowances from 140.7 / 170.2(e)6								

Is your alteration increasing the connected lighting load (Watts)?

03 04 05 % of Existing Luminaires Being Altered¹ Sum Total of Luminaires Being Added or Altered Calculation Method □ < 10% □ >= 10% and < 50% □ >= 50% Please proceed to Table F. Outdoor Lighting Fixture Schedule to define the project's luminaires.

¹ FOOTNOTES: % of Existing Luminaires Being Altered = (Sum Total of Luminaires Being Added or Altered / Existing Luminaires within the Scope of the Permit Application) x 100.

Registration Number:	Generated Date/Time:	Documentation Software: EnergyPro
CA Building Energy Efficiency Standards - 2022 Nonresidential Compliance	Report Version: 2022.0.000 Schema Version: rev 20220101	Compliance ID: EnergyPro-7514-0623-0142 Report Generated: 2023-06-09 11:08:16
state of california Outdoor Lighting		CALIFORNIA ENERGY COMMISSIO
		NRCC-LTO-
Project Name: San Mateo County -	- Medical Center Report Page:	(Page 4 of 7
Project Address: 222	W 39th Avenue Date Prepared:	6/9/202

H. OUTDOOR LIGHTING CONTROLS

Registration Number:

This table demonstrates compliance with controls requirements for all new or altered luminaires installed as part of the permit application. For alteration projects, luminaires which are existing to remain (ie untouched) and luminaires which are removed and reinstalled (wiring only) do not need to be included in this table even if they are within the spaces covered by the permit application. Outdoor lighting for nonresidential buildings, parking garages and common service areas in multifamily buildings must be documented separately from outdoor lighting attached to multifamily buildings and controlled from the inside of a dwelling unit Mandatory Controls for Nonresidential Occupancies, Parking Garages & Common Areas in Multifamily Buildings 03 01 02 04 05

Area Description	Shut-Off 130.2(c)1 / 160.5(c)	Auto-Schedule 130.2(c)2 / 160.5(c)	Motion Sensor 130.2(c)3 / 160.5(c)	Field In	spector
				Pass	Fail
Exterior Lights	Astronomical Timer	Provided	Provided		
¹ FOOTNOTE: Text has been abbr	eviated, please refer to Table 160.5-A to c	onfirm compliance with the specific	: light source technologies listed.		

²Authority having jurisdiction may ask for cutsheets or other documentation to confirm compliance of light source.

³Recessed luminaires marked for use in fire-rated installations, and recessed luminaires installed in non-insulated ceilings are excepted from ii and iii.

CA Building Energy Efficiency Standards - 2022 Nonresidential Compliance	Report Version: 2022.0.000 Schema Version: rev 20220101	Compliance ID: EnergyPro-7514-0623-0142 Report Generated: 2023-06-09 11:08:16
STATE OF CALIFORNIA		
		CALIFORNIA ENERGY COMMISSION
CERTIFICATE OF COMPLIANCE		NRCC-LTO-E
Project Name: San Mateo Coun	ty - Medical Center Report Page:	(Page 7 of 7)
Project Address:	222 W 39th Avenue Date Prepared:	6/9/2023

Generated Date/Time:

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT I certify that this Certificate of Compliance documentation is accurate and complete. Documentation Author Name: umentation Author Signature: Richard J. Hardin Company: Signature Date: Hardin-Davidson Engineering 2023-06-09 CEA/ HERS Certification Identification (if applicable): 356 Pollasky Ave E-9125 City/State/Zip: one Clovis CA 93612 559.323.4995 **RESPONSIBLE PERSON'S DECLARATION STATEMENT** I certify the following under penalty of perjury, under the laws of the State of California: 1. The information provided on this Certificate of Compliance is true and correct. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer) The energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations. 4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application. 5. I will ensure that a completed signed copy of this Certificate of Compliance shall be made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a completed signed copy of this Certificate of Compliance is required to be included with the documentation the builder provides to the building owner at occupancy. Responsible Designer Name: sponsible Designer Signature: -----Richard J. Hardin Date Signed: 2023-06-09 Hardin Davidson Engineering License: 356 Pollasky Ave, Suite 200 E9125 City/State/Zip: one: Clovis CA 93612 559.323.4995

Registration Number:	Generated Date/Time:	Documentation Software: EnergyPro
CA Building Energy Efficiency Standards - 2022 Nonresidential Compliance	Report Version: 2022.0.000 Schema Version: rev 20220101	Compliance ID: EnergyPro-7514-0623-0142 Report Generated: 2023-06-09 11:08:16

STATE OF CALIFORNIA Outdoor Lighting

CERTIFICATE OF COMPLIANCE Project Name: Project Address:

Yes 🔵

No

CALIFORNIA ENERGY COMMISSION

6/9/2023

NRCC-LTO-E (Page 2 of 7)

to Table D. Exce	eptio	nal Conditions	for g	idance or see o	applic	able Table refe	rence	ed below.	nouy	n N. Note. ij un	y cen	on this tuble suys	CONT	LILS WITH EXCEption	nui conultions rejer
Calcu	latio	ns of Total Allo	wed	Lighting Power	(Wa	tts) 140.7 / 170).2(e)	6 or 141.0(b)2l	/ 18	0.2(b)4Bv			Co	mpliance Results	
01		02		03		04		05		06		07		08	09
General Hardscape Allowance 140.7(d)1 / 170.2(e)6 (See Table I)	+	Per Application 140.7(d)2 / 170.2(e)6 (See Table J)	+	Sales Frontage 140.7(d)2 (See Table K)	+	Ornamental 140.7(d)2 / 170.2(e)6 (See Table L)	+	Per Specific Area 140.7(d)2 / 170.2(e)6 (See Table M)	OR	Existing Power Allowance 141.0(b)2L / 180.2(b)4Bv (See Table N)	=	Total Allowed (Watts)	≥	Total Actual (Watts)	07 must be >= 08
810	+		+		+		+		OR		=	810	≥	609	COMPLIES
				Sh	ieldi	ng Compliance	(See	Table G for Det	ails)						N/A
				C	ontro	Is Compliance	(See	Table H for Det	ails)						COMPLIES
D. EXCEPTION This table is au	IAL	CONDITIONS lled with unedit	able	comments becc	iuse (of selections ma	ide o	r data entered i	in tab	oles throughout	the f	orm.			
E. ADDITION	AL R	EMARKS													
This table inclu	des i	remarks made l	by the	e permit applica	nt to	the Authority I	lavir	ng Jurisdiction.							

San Mateo County - Medical Center Report Page: 222 W 39th Avenue Date Prepared:

Registration Number:

CA Building Energy Efficiency Standards - 2022 Nonresidential Compliance

Generated Date/Time: Report Version: 2022.0.000

Documentation Software: EnergyPro Compliance ID: EnergyPro-7514-0623-0142 Report Generated: 2023-06-09 11:08:16

STATE OF CALIFORNIA Outdoor Lighting

Outdoor Lighting			CALIFORNIA ENERGY COMMISSION
CERTIFICATE OF COMPLIANCE			NRCC-LTO-E
Project Name:	San Mateo County - Medical Center	Report Page:	(Page 5 of 7)
Project Address:	222 W 39th Avenue	Date Prepared:	6/9/2023

Schema Version: rev 20220101

I. LIGHTING POWER ALLOWANCE	(per 140.7 / 170.2(e))

it or lose i wances and ne of the " owance. om the ins other mult 40.7-A for Area Watta Area Alle	it" are being "Use it or side of a ltifamily or Nonresidentia 04 tage Allowance llowed Density	General Hardscape Allowance Table I (below)	"Use it or lose i Per Application Table J 06 Line	t" Allowance (select	all that apply) (select Ornamental Table L 08	t all that apply) Per Specific Area Table M 09
wances and the "owance. om the insorther mult 40.7-A for Area Watta Area Alle	are being "Use it or uside of a ltifamily or Nonresidentia 04 tage Allowance llowed Density	General Hardscape Allowance Table I (below)	Per Application Table J 06 Line	Sales Frontage Table K 07 ar Wattage Allowand	Ornamental Table L	 Per Specific Area Table M 09
40.7-A for Area Watta Area Allo	04 04 tage Allowance llowed Density	al & Hotel/Motel 05 (AWA)	06 Line	07 ar Wattage Allowand	08	09
Area Watta Area Allo	04 tage Allowance llowed Density	05 (AWA)	06 Line	07 ar Wattage Allowand	08	09
Area Watta Area Allo	tage Allowance llowed Density	e (AWA)	Line	ar Wattage Allowand	(1) (()	
Area All	llowed Density	Area Allowance			ce (LVVA)	Total General
	(W/ft^2)	(Watts)	Perimeter Leng (lf)	th Allowed Density (W/lf)	Linear Allowance (Watts)	AWA + LWA (Watts)
	0.021	559.8	0	0.2	0	560
			Initial Wat	ttage Allowance for	Entire Site (Watts):	250
			Instances o	f Initial Wattage Allo	owance (LZ 0 only) ¹	
			Total	General Hardscape	Allowance (Watts):	810

L. LIGHTING ALLOWANCE: ORNAMENTAL

CA Building Energy Efficiency Standards - 2022 Nonresidential Compliance

This section does not apply to this project.

Registration Number:

Documentation Software: EnergyPro

Generated Date/Time: Report Version: 2022.0.000

Schema Version: rev 20220101

Compliance ID: EnergyPro-7514-0623-0142 Report Generated: 2023-06-09 11:08:16

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Project Name: Project Address:	S:	an Mateo County 222	- Medical Center 2 W 39th Avenue	Report Page: Date Prepared:					(Pag	e 3 of 7) /9/2023		
				j.								
For new or alter the spaces cover nstalled and re Dutdoor lightin ighting is inclu	ared lighting systems demonstrating compliance ered by the permit application are included in the eplacement luminaires being installed as part of a attached to multifamily buildings and contro- ided here.	e with 140.7 / 1 the Table below. of the project sco olled from the in	70.2(e)6 all nev For altered ligh ope are include side of a dwelli	v luminaires bei hting systems us d (ie, existing lur ng unit are inclu	ng installed and ing the Existing minaires remain ided in Table H.	d any existing lu g Power method ning or existing . and are not inc	minaires remain per 141.0(b)2L luminaires bein luded here. All d	ning or being mo only new lumin g moved are no other multifamil	oved wit aires bei t include ly outdo	thin ing ed). or	SYSTEM HOST	
01	age: 02	03	04	05	06	07	08	09 Cutoff Reg. >	1	0	CILIEO R NT	
Name or Item Tag	Complete Luminaire Description	Watts per luminaire ^{1, 2}	How is Wattage determined	Total Number Luminaires ²	Luminaire Status ³	Excluded per 140.7(a) / 170.2(e)6A	Design Watts	6,200 initial lumen output 130.2(b) / 160.5(c)1 ⁴	Fie Inspe Pass	eld ector Fail	800 North Humboldt Stree San Mateo, CA 94401 SYSTEM DEVELOPER	t
A	29W LED 🗌 Linear	29	Mfr. Spec	21	New	Design Watts:	609	NA: < 6200 lumens			•	
NOTES: Selection X: Luminaire is l FOOTNOTES: Aut For linear lumin Select "New" for or existing lumin the project scope. Compliance with	ons with a * require a note in the space below explain lighting a statue; EXCEPTION 2 to 130.2(b) thority Having Jurisdiction may ask for Luminaire cu- paires, wattage should be indicated as W/If instead of r new luminaires in a new outdoor lighting project, aires within the project scope that are not being alt h mandatory shielding requirements is required for	aining how compli ut sheets to confiri of Watts/luminairi or for added lumin tered and are remi luminaires with in	ance is achieved m wattage used j e. Total linear fee naires in an alter aining. Select "Ex itial lumen outpu	for compliance pe It should be indica ation. Select "Alte Sisting Reinstalled It >= 6,200 unless	r 130.0(c) / 160.5 nted in column 05 red" for replacen " for existing lum exempted by 13	5(b) 5 instead of numb ment luminaires ir ninaires which are 0.2(b)/ 160.5(c)	er of luminaires. a an alteration. Se being removed a	elect "Existing to F nd reinstalled as p	Remain" part of		In the formation of the	725
This section do	es not apply to this project.										1902 Channel Drive West Sacramento, CA 9568 916-567-1100	91
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D. DECLARATI	ION OF REQUIRED CERTIFICATES OF INSTA	ALLATION	Form	/Title							M M P V d e s	ign
NRCI-LTO-E - M	lust be submitted for all buildings										Mariana Moncada, Architect	
P. DECLARATIO	ON OF REQUIRED CERTIFICATES OF ACCEI	PTANCE						Systems/Space	ces To Be	e Field	718 West Arbor Drive San Diego, CA 92103 619.632.2883	
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he spaces cove ostalled and re outdoor lightin ghting is inclu	ered by the permit application are included in a placement luminaires being installed as part of g attached to multifamily buildings and contro ded here.	the Table below. of the project sco olled from the in	For altered ligh ppe are included side of a dwelli	nting systems us d (ie, existing lur ng unit are inclu	ing the Existing minaires remain ided in Table H.	g Power method ning or existing . and are not inc	per 141.0(b)2L luminaires bein luded here. All	only new lumin g moved are no other multifami	aires bei t include ly outdoo	ng d). or	STY OF SAN APPA
esigned Watt	age: 02	03	04	05	06	07	08	09	1	0	
lame or Item Tag	Complete Luminaire Description	Watts per Iuminaire ^{1, 2}	How is Wattage determined	Total Number Luminaires ²	Luminaire Status ³	Excluded per 140.7(a) / 170.2(e)6A	Design Watts	Cutoff Req. > 6,200 initial lumen output 130.2(b) /	Fie Inspe Pass	ector Fail	800 North Humboldt Street San Mateo, CA 94401
A	29W LED 🗌 Linear	29	Mfr. Spec	21	New	al Design Watts:	609 609	160.5(c)1 ⁴ NA: < 6200 lumens			SYSTEM DEVELOPER
NOTES: Selectio X: Luminaire is I	ons with a * require a note in the space below explaining a statue; EXCEPTION 2 to 130.2(b)	aining how compli	ance is achieved								FOREFRONT
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i. SHIELDING his section doe	REQUIREMENTS (BUG) es not apply to this project.										ELECTRICAL COMPANY INC.
											1902 Channel Drive West Sacramento, CA 95691 916-567-1100
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I. EXISTING C	CONDITIONS POWER ALLOWANCE (altera	tions only)									SULAR 10620 Treena Street, Suite 140, San Diego, CA 92131
). DECLARATI	ION OF REQUIRED CERTIFICATES OF INSTA	ALLATION									ARCHITECT OF RECORD
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		DTANCE				2	_	_			Mariana Moncada, Architect 718 West Arbor Drive
. DECLARATIO	ON OF REQUIRED CERTIFICATES OF ACCE	Form	/Title					Systems/Space	ces To Be	e Field	San Diego, CA 92103 619.632.2883
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OUTDOOR or new or alte the spaces cove astalled and re Outdoor lightin ghting is inclu	LIGHTING FIXTURE SCHEDULE red lighting systems demonstrating compliance ered by the permit application are included in the eplacement luminaires being installed as part of g attached to multifamily buildings and contro- ded here.	ce with 140.7 / 1 the Table below. of the project sco olled from the in	70.2(e)6 all nev For altered ligh ope are included side of a dwelli	w luminaires bei hting systems us d (ie, existing lui ng unit are inclu	ing installed and ing the Existing minaires remail uded in Table H.	d any existing lu 9 Power method ning or existing . and are not inc	minaires remai per 141.0(b)2L luminaires bein :luded here. All	ning or being m only new lumin g moved are no other multifami	oved wi aires be t include ly outdo	thin ing ed). or	SYSTEM HOST	AN ANTE
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lame or Item Tag	Complete Luminaire Description	Watts per luminaire ^{1, 2}	How is Wattage determined	Total Number Luminaires ²	Luminaire Status ³	Excluded per 140.7(a) / 170.2(e)6A	Design Watts	Cutoff Req. > 6,200 initial lumen output 130.2(b) /	Fi Insp Pass	eld ector Fail	800 North Hur San Mateo,	nboldt Street CA 94401
A	29W LED Linear	29	Mfr. Spec	21	New	al Design Watts:	609 609	NA: < 6200 lumens				
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				1							ARCHITECT OF RECORD	
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IRCI-LTO-E - M	ust be submitted for all buildings										Mariana Moncada, Archite	ct
DECLARATI	ON OF REQUIRED CERTIFICATES OF ACCE	PTANCE						Systems/Space	ces To B	e Field	718 West Arbor Drive San Diego, CA 92103 619.632.2883	
IRCA-LTO-02-A	A - Must be submitted for all outdoor lighting c	Form, controls except f	/Title or alterations w	vhere controls a	re added to <=	20 luminaires.		Exterior Lights	ified ;		ARCHITECT / ENGINEER OF R	ECORD
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PV ARRAY STRING CABLING PLAN

SCALE: 1/8"=1'-0"

		SYSTEM HOST
		STAN OF SAWAPATION
		800 North Humboldt Street San Mateo, CA 94401 SYSTEM DEVELOPER
		FOREFRONT
		POWER 100 Montgomery Street, Suite 725 San Francisco, CA 94104
		GENERAL CONTRACTOR
		1902 Channel Drive West Sacramento, CA 95691 916-567-1100
		ELECTRICAL ENGINEER
		HARDIN-DAVIDSON 356 Pollasky Avenue, Ste. 200 Clovis, CA 93612 559.323.4995
		STRUCTURAL ENGINEERING AND STEEL CONSTRUCT
		TEICHERT SOLAR 10620 Treena Street, Suite 140, San Diego, CA 92131
		ARCHITECT OF RECORD
		Mariana Moncada, Architect 718 West Arbor Drive San Diego, CA 92103 619.632.2883
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		222 W 39TH AVENUE SAN MATEO, CA 94403
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	DE SAN ARE
	800 North Humboldt Street San Mateo, CA 94401
SYSTEM [DEVELOPER
	100 Montgomery Street, Suite 725
GENERAL	San Francisco, CA 94104 CONTRACTOR
	COLLINS ELECTRICAL COMPANY INC.
	1902 Channel Drive West Sacramento, CA 95691 916-567-1100
ELECTRIC	CAL ENGINEER
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	HARDIN-DAVIDSON 356 Pollasky Avenue, Ste. 200
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COLLINS ELECTRICAL COMPANY INC.
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TRUCTURAL ENGINEERING AND STEEL CONSTRUCT
TEICHERT SOLAR 10620 Treena Street, Suite 140, San Diego, CA 92131
RCHITECT OF RECORD
MM PV design
Aariana Moncada, Architect 718 West Arbor Drive San Diego, CA 92103 619.632.2883
RCHITECT / ENGINEER OF RECORD
NO. 9125
ROJECT: SAN MATEO COUNTY MEDICAL CENTER
222 W 39TH AVENUE SAN MATEO, CA 94403

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DATE:	07.2	1.23	

ELECTRICAL STRING CABLING PLAN

DESIGN CRITERIA

BUILDING CODE: 2022 CALIFORNIA BUILDING CODE, REFERRED TO AS "THE CODE" GOVERNING JURISDICTION: CITY OF SAN MATEO, CA OCCUPANCY TYPE: S-2

ROOF LIVE LOADS: DISTRIBUTED = 12 PSF * POINT LOAD = 300 LBS **

* NON-CONCURRENT W/ PV PANEL DEAD LOAD & WIND LOAD ** CONCURRENT W/ PV PANEL DEAD

SNOW LOADS:

 $\frac{\text{WIND ANALYSIS:}}{\text{BASIC WIND SPEED, V = 91 MPH}}$ WIND EXPOSURE = CATEGORY B RISK CATEGORY = II GUST EFFECT FACTOR, G = 0.85 INTERNAL PRESSURE COEFFICIENT, GCpi = ±0

 $\begin{array}{l} \underbrace{\text{SEISMIC CRITERIA:}}\\ \text{SITE CLASSIFICATION = C}\\ \text{RISK CATEGORY = II}\\ \text{SEISMIC DESIGN CATEGORY = D}\\ \text{SEISMIC ANALYSIS: ASCE 7-16, CHAPTER 12}\\ \text{SEISMIC FORCE-RESISTING SYSTEM = STEEL ORDINARY CANTILEVER COLUMN}\\ \text{RESPONSE MODIFICATION COEFFICIENT, R = 1.25}\\ \text{SYSTEM OVERSTRENGTH FACTOR, } \Omega o = 1.25}\\ \text{DEFLECTION AMPLIFICATION FACTOR, Cd = 1.25}\\ \text{SEISMIC IMPORTANCE FACTOR, IE = 1.0}\\ \text{REDUNDANCY FACTOR, } \rho = 1.0\\ \text{Ss= 1.989g, Sds = 0.326g}\\ \text{S1 = 0.935g, Sd1 = 0.810g}\\ \text{SEISMIC BASE SHEAR}.....Cs = 0.2608W \end{array}$

GENERAL

- 1. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS PRIOR TO STARTING CONSTRUCTION. DO NOT SCALE THE DRAWINGS. THE ENGINEER SHALL BE NOTIFIED OF ANY DISCREPANCIES OR INCONSISTENCIES. SUBMIT CLARIFICATION
- REQUEST PRIOR TO PROCEEDING WITH WORK.
 ALL DRAWINGS ARE CONSIDERED TO BE A PART OF THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REVIEW AND COORDINATION OF ALL DRAWINGS PRIOR TO THE START OF CONSTRUCTION. ANY DISCREPANCIES THAT OCCUR SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO START OF CONSTRUCTION SO THAT A CLARIFICATION CAN BE ISSUED. ANY DEVIATION FROM THE APPROVED SET OF CONTRACT DOCUMENTS SHALL ONLY BE MADE AFTER WRITTEN APPROVAL BY THE ENGINEER OF RECORD. ANY WORK PERFORMED IN CONFLICT WITH THE CONTRACT DOCUMENTS OR ANY CODE REQUIREMENTS SHALL BE CORRECTED BY THE CONTRACTOR AT THEIR OWN
- EXPENSE. 3. THE STRUCTURES IN THESE CONTRACT DOCUMENTS ARE PROPRIETARY TO TEICHERT ENERGY & UTILITIES GROUP, INC. DBA TEICHERT SOLAR. THESE
- STRUCTURES MAY NOT GO OUT TO BID AND MUST BE BUILT BY TEICHERT SOLAR.
 NOTES AND DETAILS ON DRAWINGS SHALL TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS. WHERE NO DETAILS ARE GIVEN, CONSTRUCTION SHALL BE AS SHOWN FOR SIMILAR WORK. UNLESS NOTED OTHERWISE, DETAILS IN STRUCTURAL DRAWINGS ARE TYPICAL AS INDICATED BY CUTS, REFERENCES OR TITLES
- 5. ALL WORK SHALL CONFORM TO THE MINIMUM STANDARDS OF THE FOLLOWING LOCAL BUILDING CODE, AND ANY OTHER REGULATING AGENCIES WHICH HAVE AUTHORITY OVER ANY PORTION OF THE WORK AND THOSE CODES AND
- STANDARDS LISTED IN THESE NOTES AND SPECIFICATIONS.
 THE CONTRACT STRUCTURAL DRAWINGS AND SPECIFICATIONS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE ALL MEASURES NECESSARY TO PROTECT THE STRUCTURE DURING CONSTRUCTION. SUCH MEASURES SHALL INCLUDE, BUT NOT BE LIMITED TO, BRACING, SHORING FOR LOADS DUE TO CONSTRUCTION EQUIPMENT, ETC. OBSERVATION VISITS TO THE SITE BY THE STRUCTURAL ENGINEER SHALL NOT INCLUDE INSPECTION OF THE ABOVE ITEMS.
- ALL REFERENCED STANDARDS (i.e. ACI, AISC, ASTM, ETC.) SHOWN IN THESE DOCUMENTS SHALL BE PER THE LATEST ADOPTED EDITION AS LISTED IN CHAPTER 35 OF THE CODE.
- 8. CONTRACTOR TO PROVIDE A LIST OF ALL PROPOSED SUBSTITUTIONS, WITH APPLICABLE MANUFACTURER'S ICC/IAPMO REPORTS, TO ARCHITECT, ENGINEER OF RECORD AND GOVERNING JURISDICTION FOR REVIEW AND APPROVAL BEFORE FABRICATION.

POST-INSTALLED CONCRETE ANCHORS

- 1. POST-INSTALLED ANCHORAGE SHALL BE AS DETAILED ON THE PLANS. SUBSTITUTION OF PRODUCTS SPECIFICALLY DETAILED IN THESE DRAWINGS SHALL NOT BE ALLOWED WITHOUT WRITTEN APPROVAL FROM THE STRUCTURAL ENGINEER OF RECORD.
- SPECIAL INSPECTION IS REQUIRED FOR ALL POST-INSTALLED ANCHORS, U.N.O.
 WHERE ANCHOR TYPE IS NOT NOTED OR AN ALTERNATE BRAND IS PREFERRED, THE FOLLOWING PRODUCTS ARE ACCEPTABLE TO BE SUBMITTED FOR A SUBSTITUTION REQUEST:

EXPANSION ANCHORS

- a. HILTI KWIK BOLT TZ (ICC ESR-1917)
- b. SIMPSON STRONG-BOLT-2 (ICC ESR-3037)c. POWERS POWER-STUD +SD2 (ICC ESR-2502)
- d. ALTERNATE APPROVED BY THE SEOR
- 4. ALL CONCRETE ANCHORS WHICH ARE EXPOSED TO THE WEATHER SHALL BE STAINLESS STEEL OR HOT DIP GALVANIZED.

FOUNDATIONS

- FOUNDATION DESIGN BASED ON THE FOLLOWING GEOTECHNICAL REPORT: COMPANY: CRAWFORD & ASSOCIATES DATE: APRIL 10, 2020 REPORT NUMBER: 20-607.2
- 2. DRILLED PIERS ARE DESIGNED BASED ON THE FOLLOWING INFORMATION: ALLOWABLE LATERAL BEARING PRESSURE = 4,000 PSF* ALLOWABLE SKIN FRICTION = 300 / 500 PSF*

* A 1/3 INCREASE MAY BE APPLIED WHEN SHORT TERM LOADING

- 3. DE-WATERING OF EXCAVATIONS FROM EITHER SURFACE WATER, GROUND WATER,
- OR SEEPAGE SHOULD BE PERFORMED, IF REQUIRED.
 4. FOUNDATIONS SHALL BE PLACED AND ESTIMATED ACCORDING TO DEPTHS SHOWN ON DRAWINGS. SHOULD SOIL ENCOUNTERED AT THESE DEPTHS NOT BE APPROVED BY THE INSPECTOR OR SOILS ENGINEER, FOUNDATION ELEVATIONS WILL BE ALTERED.
- 5. FOOTING BACKFILL AND UTILITY TRENCH BACKFILL SHALL BE MECHANICALLY COMPACTED IN LAYERS IN ACCORDANCE WITH THE SOILS REPORT OR BACKFILLED WITH 2-SACK SAND CEMENT SLURRY AND APPROVED BY THE SPECIAL INSPECTOR. SOILS REPORT SHALL TAKE PRECEDENT WHEN RECOMMENDATION GIVEN.
- CONTRACTOR SHALL INVESTIGATE SITE DURING CLEARING AND EARTHWORK OPERATIONS FOR FILLED EXCAVATIONS OR BURIED STRUCTURES, SUCH AS CESSPOOLS, CISTERNS, FOUNDATIONS, ETC. IF ANY SUCH STRUCTURES ARE FOUND, STRUCTURAL ENGINEER SHALL BE NOTIFIED IMMEDIATELY.
 SOIL REMOVAL AND RECOMPACTION SHALL BE PER THE SOILS REPORT AND
- SOLE REMOVAL AND RECOMPACTION SHALL BE PER THE SOLES REPORT AND APPROVED CONTRACT DOCUMENTS.
 THE DRILLED PIERS MUST BE INSPECTED BY THE SOILS ENGINEER PRIOR TO
- PLACING CONCRETE AND REINFORCING STEEL. ADJUST SHAFT LENGTHS UNDER DIRECTION OF THE SOILS ENGINEER AND THE OWNER'S REPRESENTATIVE BASED ON SOIL CONDITIONS AT TIME OF DRILLING.
 PRECAUTIONS SHOULD BE TAKEN DURING THE INSTALLATION OF PIERS TO
- 9. PRECAUTIONS SHOULD BE TAKEN DURING THE INSTALLATION OF PIERS TO MINIMIZE THE POSSIBILITY OF CAVING. PIERS SPACED CLOSER 3 PIER DIAMETERS SHOULD BE DRILLED AND FILLED ALTERNATELY, ALLOWING THE CONCRETE TO SET AT LEAST EIGHT HOURS BEFORE DRILLING AN ADJACENT HOLE.
- 10. PIER EXCAVATIONS SHOULD BE FILLED WITH CONCRETE WITHIN 72 HOURS OR AS NOTED IN THE SOILS REPORT AFTER DRILLING AND INSPECTION, WHICHEVER IS SOONER.
- KEEP EXCAVATIONS FREE OF WATER BEFORE PLACING CONCRETE UNLESS OTHERWISE APPROVED BY THE SOILS ENGINEER. IF UNABLE TO SEAL OFF WATER FLOW, PER THE APPROVAL OF THE SOILS ENGINEER, ALLOW WATER LEVEL TO ATTAIN ITS NORMAL LEVEL AND PLACE CONCRETE BY THE TREMIE METHOD OR OTHER APPROVED METHOD
- 12. PLACE REINFORCING STEEL IN ONE CONTINUOUS UNIT AND ACCURATELY HOLD SECURELY IN FINAL POSITION USING CHAIRS OR SPACERS DURING CONCRETE PLACEMENT.
- AN UNREINFORCED HEIGHT OF 18 INCHES AT THE BOTTOM OF THE SHAFT IS ACCEPTABLE.
- 14. CONSTRUCTION SHALL COMPLY WITH THE REQUIREMENTS OF ACI 336.3R, LATEST EDITION.

CONCRETE

- 1. ALL CONCRETE CONSTRUCTION SHALL CONFORM WITH THE CODE AND WITH THE PROVISIONS OF ACI 318 AND ACI 301.
- CONCRETE MIXES SHALL BE DESIGNED BY A QUALIFIED TESTING LABORATORY AND APPROVED BY THE STRUCTURAL ENGINEER. a. MIX DESIGN METHODS (TEST HISTORY OR TRIAL BATCH METHOD) PER THE CODE SHALL BE USED TO PROPORTION CONCRETE. SUBMIT MIX DESIGN METHOD DATA
- b. MIX DESIGNS SHALL SATISFY EITHER THE SHRINKAGE CRITERIA OR THE W/C RATIO AND TOTAL WATER CRITERIA.
 SCHEDULE OF STRUCTURAL CONCRETE PERFORMANCE REQUIREMENTS:

SCHEDULE OF STRUCTURAL CONCRETE PERFORMANCE REQUIREMENTS:

ELEMENT	f'c @ 28 DAYS [PSI]	MAX W/C	MAX DENSITY [PCF]					
30" DIAM. PIER FOUNDATIONS	5,000	0.50	150					
24" DIAM. PIER FOUNDATIONS	3,000	0.50	150					
EQUIPMENT PADS & MISC.	3,000	0.50	150					

- PORTLAND CEMENT SHALL CONFORM TO ASTM C-150 TYPE II
 AGGREGATE FOR HARDROCK CONCRETE SHALL CONFORM TO ALL REQUIREMENTS AND TESTS OFASTM C33 AND PROJECT SPECIFICATIONS. EXCEPTIONS MAY BE
- USED ONLY WITH PERMISSION OF THE STRUCTURAL ENGINEER.
 6. CONCRETE MIXING OPERATION, ETC. SHALL CONFORM TO ASTM C94.
 7. PLACEMENT OF CONCRETE SHALL CONFORM TO ACI 301 AND PROJECT
- SPECIFICATIONS. CLEAN AND ROUGHEN TO MIN. \car{L} " AMPLITUDE ALL CONCRETE SURFACES AGAINST WHICH NEW CONCRETE IS TO BE PLACED.
- ALL REINFORCING BARS, ANCHOR BOLTS, AND OTHER CONCRETE INSERTS SHALL BE WELL SECURED IN POSITION PRIOR TO PLACING CONCRETE.
 PIPES OR CONDUITS LARGER THAN 4" DIAMETER SHALL NOT BE EMBEDDED IN
- 9. PIPES OR CONDUITS LARGER THAN 4" DIAMETER SHALL NOT BE EMBEDDED IN STRUCTURAL CONCRETE EXCEPT WHERE SPECIFICALLY PERMITTED OR APPROVED BY STRUCTURAL ENGINEER. PIPES OR CONDUITS SHALL NOT DISPLACE OR INTERRUPT REINFORCING BARS. SPACE THE PIPES OR CONDUITS SUCH THAT PROPER CONCRETE PLACEMENT AND CONSOLIDATION IS ACHIEVED.
 10. PROVIDE MIN. ¼" CHAMFER ON ALL EXPOSED CORNERS.
- THE VIDE MIN. 74 CHAMILER ON ALL EXPOSED CONVERS.
 THE STEEL STRUCTURES MAY BE INSTALLED 48 HOURS AFTER THE FOUNDATIONS HAVE BEEN CAST OR AFTER CONCRETE REACHES A MINIMUM COMPRESSIVE STRENGTH OF 1,500-PSI, WHICHEVER COMES FIRST. BREAK TESTS NOT REQUIRED IF WAITING UNTIL 48 HOURS TO ERECT STEEL.

GENERAL STRUCTURAL NOTES

REINFORCING STEEL

- . REINFORCING BARS SHALL CONFORM TO THE REQUIREMENTS OF CHAPTER 19 OF THE CODE, ASTM A615 (A706 WHERE NOTED ON PLANS), GRADE 60 U.N.O.
- BARS SHALL BE CLEAN OF RUST, GREASE, OR OTHER MATERIALS LIKELY TO
- IMPAIR BOND. ALL REINFORCING BAR BENDS SHALL BE MADE COLD.REINFORCING BAR SPLICES SHALL, IN CONCRETE, CONFORM TO THE PROVISIONS
- OF ACI 318. LAP ALL HORIZONTAL BARS AT CORNERS AND INTERSECTIONS.
- BARS IN SLABS SHALL BE SECURELY SUPPORTED ON WELL-CURED CONCRETE BLOCKS OR APPROVED METAL CHAIRS, PRIOR TO PLACING CONCRETE.
- REINFORCING STEEL SHALL BE DETAILED IN ACCORDANCE WITH ACI 315.
 COMPLETE AND DETAILED REINFORCING PLACEMENT DRAWINGS SHALL BE
- PREPARED AND SUBMITTED FOR REVIEW BY THE STRUCTURAL ENGINEER PRIOR TO FABRICATION IN ACCORDANCE WITH SPECIFICATIONS AND APPLICABLE CODES. THE APPROVED DRAWINGS SHALL BE AVAILABLE ON THE JOB SITE PRIOR TO PLACING OF CONCRETE.
- 7. REBAR SPACINGS GIVEN ARE MAXIMUM ON CENTER WHETHER STATED AS "O.C." OR NOT. UNLESS A SPECIFIED LENGTH IS GIVEN, ALL REBAR IS CONTINUOUS WHETHER STATED AS "CONT." OR NOT.
- 8. MECHANICAL BAR SPLICES (COUPLERS) SHALL BE USED WHERE SPECIFIED ON PLANS. THEY MAY ALSO BE USED AT THE CONTRACTOR'S OPTION IN LIEU OF LAP SPLICES AND WHERE REINFORCING IS SHOWN CONTINUOUS THROUGH CONSTRUCTION JOINTS. UNLESS NOTED OTHERWISE, ALL MECHANICAL BAR SPLICES SHALL BE "TYPE 2" AS DEFINED BY ACI 318.
- 9. COUPLERS SHALL BE AND BE LENTON A2 SERIES MECHANICAL SPLICES (IAPMO ER-0129), OR EQUIVALENT, AND INSTALLED PER THE MANUFACTURER'S RECOMMENDATIONS.
- 9. CONTINUOUS INSPECTION OF CONCRETE SHALL INCLUDE INSPECTION DURING INSTALLATION OF REINFORCING STEEL. INSPECTION SHALL BE SCHEDULED SO THAT PLACEMENT OF REINFORCING STEEL, CONDUIT, SLEEVES, AND EMBEDDED ITEMS, MAY BE CORRECTED PRIOR TO THE SCHEDULED POUR
- 10. CONCRETE PROTECTION FOR REINFORCEMENT:
 a. CAST-IN-PLACE CONCRETE. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCEMENT:

MINIMUM CONCRETE COVER

E	ELEMENT	COVER	TOLERANCE (+/-)
PERMANENT PERMANENTL	LY CAST AGAINST OR Y EXPOSED TO EARTH	3"	3/8"
EXPOSED TO	EARTH OR WEATHER		
a) #6 TH	ROUGH #18 BAR	2"	³ ⁄8"
b) #5 BA	R OR SMALLER	1½"	3⁄8"
NOT EXPOS CAST AC	ED TO WEATHER OR GAINST GROUND	3⁄4"	1⁄4"

SUBMITTALS

4

- THE STRUCTURAL SHOP DRAWING REVIEW IS INTENDED TO HELP THE ENGINEER VERIFY THE DESIGN CONCEPT. IT IS THE CONTRACTOR'S RESPONSIBILITY TO CHECK THEIR OWN SHOP DRAWINGS.
- THE STRUCTURAL SHOP DRAWINGS WILL BE RETURNED FOR RESUBMITTAL IF A CURSORY REVIEW SHOWS MAJOR ERRORS WHICH SHOULD HAVE BEEN FOUND BY THE CONTRACTOR'S CHECKING.
- THE FOLLOWING SHOP DRAWINGS ARE NOT REQUIRED FOR SUBMITTAL FOR STRUCTURAL REVIEW:
 - a. SHORING AND BRACING.b. UNSPLICED REBAR AT SLAB-ON-GRADE AND SPREAD FOOTINGS.
 - c. FORMWORK.
- d. STRUCTURAL STEEL MILL REPORTS. THE FOLLOWING SHOP DRAWINGS (AND CALCULATIONS WHEN APPLICABLE) ARE REQUIRED FOR SUBMITTAL FOR STRUCTURAL REVIEW:
 - a. CONCRETE MIX DESIGNS, INCLUDING STRENGTH TEST RESULTS
 b. REINFORCING STEEL (EXCEPT WHERE NOTED BY NOTE 3 ABOVE)
 a. STRUCTURAL STEEL
 - c. STRUCTURAL STEELd. ANCHOR ROD CUT SHEET WITH DIAMETER, LENGTH, AND MATERIAL
 - STRENGTH e. WELDING PROCEDURE SPECIFICATIONS
- ANY SUBMITTAL OF A DETAIL SHEET WITH ADDED INFORMATION NOT SHOWN ON PLANS SHALL BE ACCOMPANIED BY LOCATION PLAN IDENTIFYING THE MEMBERS INVOLVED AND CLOUDING AROUND ADDED INFORMATION.
- THE SHOP DRAWINGS SHALL REFERENCE THE DATA OF THE DESIGN USED TO
- PRODUCE THE SUBMITTAL. CONTRACTOR/SUBCONTRACTOR TO PROVIDE DIGITAL SET OF SHOP DRAWINGS FOR REVIEW BY THE STRUCTURAL ENGINEER. DIGITAL SET WILL BE RETURNED TO THE CONTRACTOR FOR DISTRIBUTION.

COLD FORMED STEEL

- 1. ALL COLD-FORMED METAL FRAMING CONSTRUCTION SHALL BE IN ACCORDANCE WITH AISI S100 "SPECIFICATIONS FOR DESIGN OF COLD-FORMED STEEL
- STRUCTURAL MEMBERS". ALL COLD-FORMED STEEL SHALL CONFORM TO THE FOLLOWING (U.N.O)
- 43 MIL / 18GA AND LIGHTER ASTM A1003, GR 33 OR ASTM 653, GR 33
- 54 MIL / 16 GA AND HEVIER ASTM A1003, GR 55 OR ASTM 653, GR 55
- WELDING IS NOT PERMITTED UNLESS SPECIFICALLY APPROVED BY THE SEOR.
 ALL APPROVED WELDING SHALL BE PERFORMED BY WELDERS CERTIFIED FOR ALL APPROPRIATE DIRECTIONS COMPLYING WITH AWS D1.3. WELDING RODS SHALL CONFORM TO THE FOLLOWING:

	43 MIL / 18GA AND LIGHTER	E60XX						
	54 MIL / 16 GA AND HEVIER	E70XX OR E6013						
	COLD FORMED TO STRUCTURAL STEEL	E70XX LOW HYDROGEN						

- WIRE TYING OF FRAMING COMPONENTS SHALL NOT BE PERMITTED.
 TEMPORARY BRACING REQUIREMENTS ARE THE RESPONSIBILITY OF THE CONTRACTOR.
- ALL SCREWS SHALL BE FULLY DRIVEN AND PROTRUDE THE LARGER OF 3 THREADS OR 1/4" THROUGH THE LAST MATERIAL JOINED. THERE SHALL BE NO SPACE
- BETWEEN JOINING MEMBERS AT THE SCREW LOCATION.
 9. ALL FIELD CUTTING OF MEMBERS SHALL BE BY SAWING OR SHEARING. TORCH OR PLASMA CUTTING OF MEMBERS SHALL NOT BE PERMITTED.
- ALL FRAMING COMPONENTS SHALL NOT BE PERMITTED.
 ALL FRAMING COMPONENTS SHALL BE CUT SQUARELY FOR ATTACHMENT TO PERPENDICULAR MEMBERS OR AS REQUIRED ON AN ANGULAR FIT AGAINST ABUTTING MEMBERS. MEMBERS SHALL BE HELD POSITIVELY IN PLACE UNTIL PROPERLY FASTENED.
- PROPERLY FASTENED.
 SPLICING OF PURLINS OR OTHER LOAD CARRYING MEMBERS SHALL NOT BE PERMITTED UNLESS SPECIFICALLY APPROVED BY THE ENGINEER OF RECORD.
 WHEN CLIP ANGLES WITH SCREW CONNECTIONS ARE USED TO ATTACH A COMPONENT TO THE PRIMARY STRUCTURE. THE CLIP ANGLE SHALL BE FASTENED
- TO THE PRIMARY STRUCTURE, THE CLIP ANGLE SHALL BE FASTENED TO THE PRIMARY STRUCTURE FIRST; THEN THE COMPONENT SHALL BE BROUGHT TO BEAR ON THE STRUCTURE AND FASTENED TO THE CLIP ANGLE. 13. MEMBERS SHALL BE IDENTIFIED PER SECTION 2202A.1 OF 2022 CBC PART 2, VOL. 2.
- ALL EXTERIOR SCREWS SHALL BE ELCO DRIL-FLEX (ICC ESR-3332) OR ITW BUILDEX TEKS SELECT (ICC ESR-3223) UNLESS APPROVED BY THE SEOR.

STRUCTURAL INSPECTION AND TESTING THE FOLLOWING ELEMENTS OF CONSTRUCTION SHALL REQUIRE SPECIAL INSPECTION PER CHAPTER 17A OF THE CODE. U.N.O.

SPECIAL INSPECTIONS AND TESTING SHALL BE PROVIDED BY AN INSPECTION AGENCY, EMPLOYED BY THE OWNER, AND QUALIFIED BY THE BUILDING OFFICIAL TO INSPECT THE PARTICULAR TYPE OF CONSTRUCTION. TESTS AND INSPECTIONS, AS REQUIRED BY SECTIONS 110.3 & 1705A OF THE 2022 CBC W/ CALIFORNIA AMENDMENTS, SHALL BE PERFORMED DURING CONSTRUCTION ON THE TYPES OF WORK LISTED BELOW:

TESTING AND INSPECTION							
	INSPECTIONS	TESTING					
STEEL CONSTRUCTION	1705A.2	1705A.13					
CONCRETE CONSTRUCTION	1705A.3	1705A.3					
SOILS	1705A.6	1705A.6					
CAST IN-PLACE DEEP FOUNDATIONS	1705A.8	1705A.8					

- 1. THE SPECIAL INSPECTIONS IDENTIFIED ON PLANS ARE, IN ADDITION TO, AND NOT A SUBSTITUTE FOR, THOSE INSPECTIONS REQUIRED TO BE PERFORMED BY THE GOVERNING JURISDICTION. SPECIALLY INSPECTED WORK WHICH IS INSTALLED OR COVERED WITHOUT THE APPROVAL OF AN INSPECTOR FROM THE GOVERNING JURISDICTION IS SUBJECT TO REMOVAL OR EXPOSURE.
- FOR CONTINUOUS INSPECTION, WHEN WORK IN MORE THAN ONE CATEGORY OF WORK REQUIRING SPECIAL INSPECTION IS TO BE PERFORMED SIMULTANEOUSLY, OR THE GEOGRAPHIC LOCATION OF THE WORK IS SUCH THAT IT CANNOT BE CONTINUOUSLY OBSERVED IN ACCORDANCE WITH THE PROVISIONS OF THE CODE, IT IS THE AGENT'S RESPONSIBILITY TO EMPLOY A SUFFICIENT NUMBER OF INSPECTORS TO ASSURE THAT ALL WORK IS INSPECTED IN ACCORDANCE WITH THOSE PROVISIONS
- THOSE PROVISIONS.
 THE SPECIAL INSPECTORS MUST BE CERTIFIED BY THE GOVERNING JURISDICTION IN THE CATEGORY OF WORK REQUIRED TO HAVE SPECIAL INSPECTION.
- EXCEPTIONS: a. SOILS INSPECTIONS BY THE SOILS ENGINEER OF RECORD OR PROJECT INSPECTOR
 - b. WHEN WAIVED BY THE GOVERNING JURISDICTION
- 5. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO INFORM THE OWNER'S REPRESENTATIVE, SPECIAL INSPECTOR OR INSPECTION AGENCY AT LEAST TWO WORKING DAYS PRIOR TO PERFORMING ANY WORK THAT REQUIRES SPECIAL INSPECTION. ALL WORK PERFORMED WITHOUT REQUIRED SPECIAL INSPECTION IS SUBJECT TO REMOVAL.
- 6. PROVIDE SPECIAL INSPECTION FOR CONNECTIONS BOLTED WITH A325 AND A490 BOLTS. INSPECTIONS SHALL BE DONE PER APPROVED NATIONALLY RECOGNIZED STANDARDS AND THE REQUIREMENTS OF THE CODE AND THE GOVERNING JURISDICTION. WHILE THE WORK IS IN PROGRESS, THE SPECIAL INSPECTOR SHALL DETERMINE THE BOLTS, NUTS, WASHERS AND PAINT; BOLTED PARTS; AND
- INSTALLATION AND TIGHTENING MEET THE STANDARDS REQUIREMENTS.
 THE SPECIAL INSPECTOR FOR HIGH STRENGTH BOLTED CONNECTIONS SHALL:
 a. OBSERVE THE CALIBRATION PROCEDURES WHEN SUCH PROCEDURES
- a. Observe the Calibration Proceedones when soon Proceedones
 ARE REQUIRED BY THE PLANS OR SPECIFICATIONS.
 b. MONITOR THE INSTALLATION OF BOLTS TO DETERMINE THAT ALL PLIES
- OF CONNECTED MATERIALS HAVE BEEN DRAWN TOGETHER. c. MONITOR THAT THE SELECTED PROCEDURE IS PROPERLY USED TO
- TIGHTEN ALL BOLTS. 8. IF DEEMED NECESSARY, THE SPECIAL INSPECTOR SHALL PROVIDE PROGRESS
- 8. IF DEEMED NECESSARY, THE SPECIAL INSPECTOR SHALL PROVIDE PROGRESS REPORTS AND A FINAL REPORT TO THE STRUCTURAL ENGINEER.
- THE SPECIAL INSPECTOR SHALL ENSURE THAT ALL DEFICIENCIES NOTED BY THE STRUCTURAL ENGINEER IN STRUCTURAL OBSERVATION REPORTS ARE CORRECTED. SUCH COMPLIANCE SHALL BE REFERENCED IN SPECIAL INSPECTOR REPORT.
- 10. THE CONSTRUCTION MATERIALS TESTING LABORATORY MUST BE APPROVED BY THE GOVERNING JURISDICTION, FOR TESTING OF MATERIALS, SYSTEMS, COMPONENTS AND, EQUIPMENTS.
- 11. PERIODIC INSPECTION SHALL OCCUR FREQUENTLY ENOUGH TO INSPECT ALL OF THE INSTALLED ITEMS AND TO PERIODICALLY WITNESS THE INSTALLATION OF THE ITEMS.

STRUCTURAL STEEL

- 1. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED, AND ERECTED IN
- ACCORDANCE WITH AISC 360 AND AISC 303. . ALL STRUCTURAL STEEL SHALL CONFORM TO THE ASTM DESIGNATION AS INDICATED BELOW (U.N.O.):

MINIMUM MATERIAL PROPERTIES						
ASTM						
A572, GR 50						
A36, GR 36 OR DUAL GRADE						
A992, GR 50						
A500, GR C						
A53, GR B						
F3125 GR A325						
A307						
F1554, GR 105						

- THE STRUCTURAL STEEL FABRICATOR SHALL FURNISH SHOP DRAWINGS OF ALL STEEL FOR STRUCTURAL ENGINEER'S REVIEW BEFORE FABRICATION.
 HOLES IN STEEL SHALL BE 1/16" LARGER DIAMETER THAN NOMINAL SIZE OF BOLT USED, EXCEPT AS NOTED. COLUMN BASE PLATE HOLES MAY BE OVERSIZED PER AISC MANUAL OR AS NOTED.
- ALL STRUCTURAL STEEL SURFACES THAT ARE ENCASED IN CONCRETE, MASONRY, OR SPRAY ON FIREPROOFING, OR ARE ENCASED BY BUILDING FINISH, SHALL BE LEFT UNPAINTED.
- ALL STRUCTURAL STEEL AND MISCELLANEOUS METAL EXPOSED TO THE WEATHER SHALL BE HOT DIP GALVANIZED OR PAINTED AFTER FABRICATION, U.N.O.
- C. GALVANIZING AT FIELD WELDS AND DAMAGE SHALL BE REPAIRED WITH A
- GALVANIZING REPAIR PAINT ACCORDING TO ASTM A780.
- . TIGHTEN HIGH STRENGTH BOLTS TO "SNUG-TIGHT" CONDITION PER AISC SPECIFICATION FOR STRUCTURAL JOINTS, U.N.O.
- . PROVIDE BEVELED WASHERS PER ANSI B18.23.1 AS REQUIRED ON SLOPED SURFACES.
- 21. GROUT OTHER SHALL BE NON-SHRINK, NON-METALLIC GROUT, MEETING ASTM C-1107, MIXED AND INSTALLED PER MANUFACTURER'S SPECIFICATIONS.
 22. TIGHTEN ANCHOR BOLTS TO "SNUG TIGHT" CONDITION PER AISC SPECIFICATIONS,
- U.N.O. 23. WELDING:

24. ALL WELDS SHALL BE IN CONFORMITY WITH THE PROJECT SPECIFICATIONS AND AWS D1.1, SEE SPECIAL INSPECTION SECTION FOR WELDING INSPECTION REQUIREMENTS.

- a. ALL WELDING IS TO BE DONE BY CERTIFIED WELDERS USING E70XX ELECTRODES (U.N.O.).
- b. WELD LENGTHS CALLED FOR ON PLANS ARE THE NET EFFECTIVE LENGTH REQUIRED. WHERE FILLET WELD SYMBOL IS GIVEN WITHOUT INDICATION OF SIZE, USE MINIMUM SIZE WELDS AS SPECIFIED IN AISC 360.
 c. WELDS TERMINATING AT ENDS OR SIDES, WHERE PRACTICAL, SHALL BE
- RETURNED CONTINUOUSLY AROUND CORNERS A DISTANCE 2 TIMES THE NOMINAL SIZE OF THE WELD PER AISC 360 SECTION J2.2B, U.N.O.
- d. ALL FULL-PENETRATION FIELD WELDS SHALL BE ULTRASONICALLY TESTED.
 e. ALL TWO-SIDED FILLET WELDS SHOWN SHALL BE WELDED WITH THE SAME (GIVEN) WELD SIZE ON BOTH SIDES.
- f. ALL UNSIZED GROOVE OR BUTT WELDS SHOWN SHALL BE COMPLETE PENETRATION.
 a. ALL PROVISIONS OF AWS SHALL BE OBSERVED INCLUDING REQUIREMENTS
- g. ALL PROVISIONS OF AWS SHALL BE OBSERVED INCLUDING REQUIREMENTS FOR BACK-UP PLATES AND WELD TRANSITIONS WHETHER OR NOT THEY ARE SPECIFICALLY SHOWN.
 h. A WRITTEN WELDING PROCEDURE SPECIFICATION SHALL BE SUBMITTED TO
- i. A WRITTEN WELDING PROCEDURE SPECIFICATION SHALL BE SUBMITTED TO THE TESTING LABORATORY. IT SHALL INCLUDE ALL WELDING PROCEDURES TO BE USED AS DESCRIBED IN AWS, CHAPTER 4.
 i. WHERE FIELD WELDING IS INDICATED, THE FIELD DESIGNATION IS GIVEN AS
- A RECOMMENDATION ONLY.

	MEMBER & DIMENSIONAL SCHEDULE											
ARRAY	ARRAY SIZE	# OF COLUMNS	COLUMN	BEAM	PURLIN	PANEL LENGTH	PANEL WIDTH	MAX SPAN LENGTH, Lspan	MAX CANT. LENGTH, Lcant	SPLICE LENGTH, Lsplice	MAX. COLUMN LENGTH	MIN. CLEARANCE
A	5x33	4	HSS12x8x ¹ ⁄ ₂	W14X38	12X4X14GA	82.4"	40.9"	34'-6"	8'-7 1/4"	5'-1 ¹³ ⁄ ₁₆ "	18'-0"	12'-0"
В	5x37	4	HSS12x8x ¹ ⁄ ₂	W14X38	12X4X14GA	82.4"	40.9"	34'-6"	12'-0 5/8"	5'-1 ¹³ ⁄ ₁₆ "	18'-0"	12'-0"
С	5x36	4	HSS12x8x ¹ ⁄ ₂	W14X38	12X4X14GA	82.4"	40.9"	34'-6"	12'-0 5/8"	5'-1 ¹³ ⁄ ₁₆ "	16'-0"	12'-0"
D, E	5x35	4	HSS12x8x ¹ ⁄ ₂	W14X38	12X4X14GA	82.4"	40.9"	34'-6"	8'-7 1/4"	5'-1 ¹³ ⁄ ₁₆ "	16'-0"	12'-0"
F	5x30	3	HSS12x8x ¹ ⁄ ₂	W14X38	12X4X14GA	82.4"	40.9"	37'-9"	13'-11 3/4"	6'-10 ⁹ ⁄ ₁₆ "	16'-0"	12'-0"

	Z)
n,max	Lcant,max
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SYSTEM HOST
SYSTEM DEVELOPER FOREFRONT POWER
100 Montgomery Street, Suite 725 San Francisco, CA 94104
GENERAL CONTRACTOR
West Sacramento, CA 95691 916-567-1100
ELECTRICAL ENGINEER FARDIN-DAVIDSON HARDIN-DAVIDSON 356 Pollasky Avenue, Ste. 200 Clovis, CA 93612 559.323.4995
STRUCTURAL ENGINEERING AND STEEL CONSTRUCT
TEICHERT SOLAR 10620 Treena Street, Suite 140, San Diego, CA 92131
ARCHITECT OF RECORD
M M P V d e s i g n Mariana Moncada, Architect 718 West Arbor Drive San Diego, CA 92103 619.632.2883
PROJECT: SAN MATEO COUNTY MEDICAL CENTER
222 W 39TH AVENUE SAN MATEO, CA 94403
NO. REVISION DATE
DATE: 07.21.23 SHEET TITLE:
FRAMING PLAN & SCHEDULE
SHEET NO.:
S200

[MEMB	ER & DIMENSIONAL S	CHEDULE					
	ARRAY	ARRAY SIZE	# OF COLUMNS	COLUMN	BEAM	PURLIN	PANEL LENGTH	PANEL WIDTH	MAX SPAN LENGTH, Lspan	MAX CANT. LENGTH, Lcant	SPLICE LENGTH, Lsplice	MAX. COLUMN LENGTH	MIN. CLEARANCE
	G	3x30	3	HSS12x8x ¹ ⁄ ₂	W14X38	12X4X14GA	82.4"	40.9"	37'-9"	13'-11 3/4"	6'-10 ⁹ ⁄ ₁₆ "	16'-0"	12'-0"

	STANDE SAWARD
<text></text>	CALIFORNIP
	800 North Humboldt Street San Mateo, CA 94401
	SYSTEM DEVELOPER FOREFRONT POWER
	100 Montgomery Street, Suite 725 San Francisco, CA 94104
<image/> PROJECT: Carterior Contraction C	
<text></text>	ELECTRICAL COMPANY INC.
ELECTRICAL ENGINEER	1902 Channel Drive West Sacramento, CA 95691 916-567-1100
PROJECT: PROJEC	ELECTRICAL ENGINEER
STRUCTURAL ENGINEERING AND STEEL CONSTRUCT SOCLAR 10620 Treena Street, Suite 140, San Diego, CA 92131 ARCHITECT OF RECORD M M P V d e s i g n Mariana Moncada, Architect 718 West Arbor Drive San Diego, CA 92103 619 632 2883 ARCHITECT / ENGINEER OF RECORD PROJECT: SAN MATEO COUNTY MEDICAL CENTER 222 W 39TH AVENUE SAN MATEO, CA 94403 NO. REVISION DATE DATE 07.21.23 SHEET ITTLE: SHEET ITTLE: SHEET NO: SHEET NO:	HARDIN-DAVIDSON 356 Pollasky Avenue, Ste. 200 Clovis, CA 93612
PROJECT: ARCHITECT OF RECORD M M P V d e s i g n Mariana Moncada, Architect 718 West Arbor Drive San Diago, CA 92103 619.632.2883 ARCHITECT / ENGINEER OF RECORD PROJECT: SAN MATEO, CA 94403 NO. REVISION DATE DATE DATE: DATE: CT.21.23 SHEET TITLE: SHEET TITLE: SHEET NO: SHEET NO:	STRUCTURAL ENGINEERING AND STEEL CONSTRUCT
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800 North Humboldt Street
San Mateo, CA 94401 SYSTEM DEVELOPER FOREFRONT 100 Montgomery Street, Suite 725 San Francisco, CA 94104
GENERAL CONTRACTOR GENERAL CONTRACTOR GENERAL CONTRACTOR I902 Channel Drive
HARDIN-DAVIDSON 356 Pollasky Avenue, Ste. 200 Clovis, CA 93612
559.323.4995 STRUCTURAL ENGINEERING AND STEEL CONSTRUCT FEICHERT SOLAR 10620 Treena Street, Suite 140, San Diego, CA 92131
ARCHITECT OF RECORD
M M P V d e s i g n
Mariana Moncada, Architect 718 West Arbor Drive
619.632.2883
PROJECT: SAN MATEO COUNTY MEDICAL CENTER 222 W 39TH AVENUE SAN MATEO, CA 94403 NO. REVISION DATE
DATE: 07.21.23 SHEET TITLE:
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800 North Humboldt Street San Mateo, CA 94401
SYSTEM DEVELOPER
FOREFRONT
100 Montgomery Street, Suite 725 San Francisco, CA 94104
ELECTRICAL COMPANY DE
1902 Channel Drive West Sacramento, CA 95691 916-567-1100
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Mariana Moncada, Architect 718 West Arbor Drive San Diego, CA 92103
619.632.2883 ARCHITECT / ENGINEER OF RECORD
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MEDICAL CENTER
222 W 39TH AVENUE SAN MATEO, CA 94403
NO. REVISION DATE
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Roof Live Load (psf)	20(see footnote 1)	
Ground Snow Pg (psf)	0	
Flat Roof Snow Pf (psf)	0	
Snow Importance Factor (Is)	1.1	
Wind Design Data		
Basic Wind Speed (mph)	98	
Risk Category	III	
Wind Exposure	В	
Earthquake Design Data		
Risk Category	III	
Importance Factor (Ie)	1.25	
Component Importance Factor (Ip)	1.0	
Mapped Acceleration Parameter (Ss)	1.936	
Mapped Acceleration Parameter(S1)	0.796	
Seismic Site Class	D	
Design Spectral Acceleration Parameter (Sds)	1.549	
Design Spectral Acceleration Parameter (Sd1)	0.902	
Seismic Design Category (SDC)	E	
Basic seismic-force-resisting system(s)	roof anchors	
Base Design Shear = Fp x W	0.74 W	
Response Modification Factor (R)	2.5	
Analysis Procedure	ASCE 7 sec. 13.3/4	
Design Code (with local amendments)	2022 CBC	
-	ASCE 7 - 16	
ALTERNATE DESIGN METHOD		
-	SEAOC PV2	

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GENERAL NOTES:

- 1. ALL SITE, PROJECT, AND BUILDING DETAILS ARE PROVIDED BY CUSTOMER OR GENERATED VIA SATELLITE IMAGERY FROM INFORMATION PROVIDED BY CUSTOMER. PANELCLAW IS NOT RESPONSIBLE FOR SITE INACCURACIES THAT COULD LEAD TO CHANGES TO THESE DRAWING DETAILS AND ARRAY LAYOUT CONFIGURATIONS. ALL INFORMATION CONTAINED WITHIN THESE DOCUMENTS ARE TO BE FIELD VERIFIED BY CUSTOMER AND INSTALLER. ANY CHANGES OR MODIFICATIONS TO THESE DOCUMENTS, CONTAINED INFORMATION, OR FINAL ARRAY AND MOUNTING SYSTEM INSTALLATIONS MUST BE SUBMITTED TO PANELCLAW AND OTHER PROJECT AUTHORITIES FOR APPROVAL.
- REFER TO AND FOLLOW THE APPROPRIATE PANELCLAW INSTALLATION MANUALS AND PROCEDURES DURING THE INSTALLATION PROCESS. NOT FOLLOWING SUCH PROCEDURES AND METHODS COULD RESULT IN DAMAGE TO THE COMPONENTS OR MAY VOID THE PRODUCT WARRANTY.
- 3. ARRAY SETBACKS: ALL ARRAYS ARE REQUIRED TO BE SETBACK 4-FEET FROM ALL ROOF EDGES UNLESS OTHERWISE SPECIFIED AND CALLED OUT ON THE ARRAY DIAGRAMS ON THIS PAGE OR ON ADDITIONAL ARRAY BALLAST PAGES
- 4. REFER TO THE SPECIFIC ARRAY BALLAST SHEETS FOR BALLASTING REQUIREMENTS BASED ON THE PROVIDED SITE INFORMATION
- 5. SYSTEM PSF INCLUDES ALL PANELCLAW RACKING COMPONENTS, MECHANICAL ATTACHMENTS (IF APPLICABLE), PV MODULE AND BALLAST BLOCKS. FOR MAXIMUM SYSTEM POINT LOAD SUMMARY (PLS), REFER TO CALCULATIONS.
- 6. PANELCLAW AND/OR PANELCLAW CONSULTING ENGINEERS ARE NOT RESPONSIBLE FOR DETERMINING THE ADEQUACY OF THE STRUCTURE TO SUPPORT LOADS IMPOSED BY THE ARRAY AND MOUNTING SYSTEM. SUPPORT STRUCTURE TO BE CHECKED BY OTHERS
- 7. ALWAYS ALLOW 6" CLEARANCE BETWEEN NEIGHBORING SUBARRAYS, 6" BETWEEN SUBARRAYS AND ALL FIXED ROOF OBJECTS AND 4' BETWEEN SUBARRAYS AND ROOF EDGES. REFER TO LOCAL FIRE CODES AND ELECTRICAL CODES FOR ADDITIONAL REQUIREMENTS WHICH MAY GOVERN DESIGN. SUBARRAYS THAT USE A SEISMIC ANALYSIS METHOD OF DELTA MPV PER SEAOC OR ASCE 7-16 HAVE THEIR OWN CLEARANCE REQUIREMENTS. REFER TO THE BALLAST LAYOUT SHEETS WITHIN THIS DOCUMENT FOR DETAILS.
- BALLAST BLOCK DIMENSIONS MUST CONFORM TO THE FOLLOWING SPECIFICATIONS: 3-3/4" THICK MAX., 7-5/8" ± 1/8" WIDTH, 15-5/8" ± 1/8" LENGTH.
- 9. IF AN ARRAY CLEARANCES TABLE APPEARS BELOW ON THIS PAGE, THE DESIGN UTILIZES THIRD PARTY SEISMIC NON-LINEAR RESPONSE ANALYSIS TO ESTIMATE MAXIMUM ARRAY SEISMIC DISPLACEMENT. THE PREDICTED MOVEMENT IS ONLY AN ESTIMATE. PANELCLAW IS NOT RESPONSIBLE OR LIABLE FOR ANY DAMAGES OR COSTS ASSOCIATED WITH PV ARRAY MOVEMENT INCLUDING MOVEMENT IN EXCESS OF THE CLEARANCES NOTED IN THIS DOCUMENT OR ANY REQUIREMENT TO REPOSITION THE ARRAYS IF MOVEMENT OCCURS.
- 10. DEFLECTORS MUST BE INSTALLED WHEN WINDS ARE EXPECTED TO EXCEED APPROX. 25% OF WIND SPEED DOCUMENTED IN SITE DESIGN CRITERIA TABLE. DEFLECTORS ARE REQUIRED ON ALL MODULES UNLESS OTHERWISE NOTED ON BALLAST LAYOUT PAGES.

NOT APPROVED FOR CONSTRUCTION

STAMP:

SHEET INDEX NO. DESCRIPTION PC-1 COVER SHEET PC-2 PROJECT SUMMARY PC-3 ARRAY SITE MAP PC-4 TYPICAL ARRAY DIMENSIONS PC-5 ASSEMBLIES PC-6 RACKING COMPONENTS PC-7 BALLAST LEGEND PC-8 TO PC-9 BALLAST LAYOUT - 1 TO 2 PC-10 MECHANICAL ATTACHMENT DETAIL

2

D (\mathbf{C}) PANELCLAW RACKING CONSTRUCTION SET 1600 OSGOOD ST. SUITE 2023 NORTH ANDOVER, MA 01845 TEL: 978.688.4900 www.panelclaw.com O PANELCLAW, INC ALL INFORMATION CONTAINED WITHIN THIS DOCUMENT IS PROPERTY OF PANELCLAW, INC. THE PURPOSE OF THIS DOCUMENT IS TO FACILITATE THE INSTALLATION OF PANELCLAW SOLAR PHOTOVOLTAIC MOUNTING SYSTEMS. DO NOT COPY OR DISTRIBUTE WITHOUT PERMISSION. 19 DAT -90 DH PR đ R 0 SCALE: 0" 1/2" ORIGINAL SIZE 36"X24' SHEET SIZE ARCH "D" PREPARED FOR: Collins Electrical Company **PROJECT:** San Mateo Medical Center LOCATION: 222 W 39th Ave, San Mateo, A CA 94403, USA SHEET TITLE: COVER SHEET

SHEET:

PC-1

REVISION:

2

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NOT APPROVED FOR CONSTRUCTION

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		2	
	PROJECT SUMMARY		
MODULE TYPE		LONGI SOLAR LR4-72HPH-455M	
MODULE DIMENS	IONS (IN.)	82.44 X 40.87 X 1.38	
NUMBER OF MOD	ULES	281	
MODULE WATTAG	GE (W STC)	455	
SYSTEM SIZE (kW	/ STC)	127.855	
SYSTEM WEIGHT	(LB)	36138	
SYSTEM AREA (S	Q FT.)	8740	
AGGREGATE SYS	TEM LOAD (PSF)	4.14	
NUMBER OF ARR	AYS	2	
ARRAY TILT (DEG)	9.82	
L			_

clawF	R 10 Degree - 35 cm			
PROJECT PART QUANTITY				
ITEM	PART NUMBER	QTY		
Base	500050203	616		
BASE, 03, CFR				
Module Connector	500050702	562		
MODULE CONNECTOR, 1070, 10D, CFR				
Rail	2000695	752		
RAIL, CFR				
Cam	5000500	562		
CAM, 10D, CFR				
Cam Claw	2000673	562		
CAM CLAW, CFR				
Deflector	200088703	281		
DEFLECTOR, 10D, 2100, CFR				
Bolt	2000697	2829		
BLT, HEX FLG, TRI, M6X16, GR8.8, PATCH				
Base Pad	2000678	0		
PAD, BASE, CFR				
CONCRETE MASONRY UNIT	CONCRETE MASONRY UNIT N/A 509			
BLOCK, CONCRETE, <u>32.6 LB</u> , - Xin x 8in x 16in NOMI	NAL, PARTNER SUPPLIED, SEE INSTALLATION	N MANUAL		

MECHANICAL ATTACHMENT PART QUANTITY

MA Hardware Kit	5000423	12	
HW KIT, MA STRUT, 2500, CFR			
MA Strut	2000830	115	
MA STRUT, CFR			
Mechanical Attachment	TBD	115	
To Be Determined (Facet)			
TOTAL MECHANICAL ATTACHMENT COUNT		115	





ROOF NAM

Roof 1

KEEPOUT

3





2

ME	ROOF SETBACK	ROOF HEIGHT	PARAPET	ROOF TILT
	(FT.)	(FT)	HEIGHT (FT)	(DEG)
	4.00	45.00	4.5	1

NAME	KEEPOUT CLEARANCE (FT.)	KEEPOUT HEIGHT (IN.)
	1	24
	1	72
	1	12



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NOTE: EXAMPLE BALLAST AND ATTACHMENTS SHOWN ON THIS PAGE ARE FOR REFERENCE ONLY. REFER TO BALLAST MAP SHEETS FOR ARRAY SPECIFIC BALLAST/ATTACHMENT **REQUIREMENTS.**





23.05.22.1

NOT APPROVED FOR CONSTRUCTION

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STAMP:

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3

ROOF INFORMATION			
ROOF HEIGHT (FT)	45.00		
PARAPET HEIGHT (FT)	4.5		
ROOF TILT (DEG)	1		
ROOF TYPE	TPO		
SPECIFICATIONS			
NUMBER OF MODULES	152		
MODULE POWER (W)	455		
ARRAY OUTPUT (Kw)	69.16		
ARRAY AZIMUTH	153		
PART QUANTITIES			
ITEM	QTY		
Base	334		
Module Connector	304		
Rail	389		
Cam	304		
Cam Claw	304		
Deflector	152		
Base Pad	0		
Ballast Block	223		
Mechanical Attachment	62		
LOADING DETAILS			
SINGLE MODULE WT (LB)	51.8		
SINGLE CMU WT (LB)	32.6		
TOTAL ARRAY WT (LB)	17810		
ARRAY AREA (SQ. FT)	4727		
ARRAY LOAD (PSF)	3.77		

ASSEMBLY QUANTITIES					
ASSEMBLY	QTY				
IORTH ASSEMBLY	30				
OUTH ASSEMBLY	30				
IDDLE ASSEMBLY	244				
IORTH SOUTH ASSEMBLY	0				

D (\bigcirc) PANELCLAW® **RACKING CONSTRUCTION SET** 1600 OSGOOD ST. SUITE 2023 NORTH ANDOVER, MA 01845 TEL: 978.688.4900 www.panelclaw.com PANELCLAW, INC ALL INFORMATION CONTAINED WITHIN THIS DOCUMENT IS PROPERTY OF PANELCLAW, INC. THE PURPOSE OF THIS DOCUMENT IS TO FACILITATE THE INSTALLATION OF PANELCLAW SOLAR PHOTOVOLTAIC MOUNTING SYSTEMS. DO NOT COPY OR DISTRIBUTE WITHOUT PERMISSION. 19 DAT -90 С IECK PREP Ы DESCRIPT đ В 0 REV SCALE: 0" 1/2" 1" ORIGINAL SIZE 36"X24" SHEET SIZE ARCH "D" PREPARED FOR: Collins Electrical Company PROJECT: San Mateo Medical Center LOCATION: 222 W 39th Ave, San Mateo, A CA 94403, USA SHEET TITLE:

BALLAST LAYOUT - 1.1

REVISION:

SHEET: PC-8 0

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ARRAY 1.2

ROOF INFORMATION						
ROOF HEIGHT (FT)	45.00					
PARAPET HEIGHT (FT)	4.5					
ROOF TILT (DEG)	1					
ROOF TYPE	TPO					
SPECIFICATIONS						
NUMBER OF MODULES	129					
MODULE POWER (W)	455					
ARRAY OUTPUT (Kw)	58.695					
ARRAY AZIMUTH	153					
PART QUANTITIES						
ITEM	QTY					
Base	282					
Module Connector	258					
Rail	363					
Cam	258					
Cam Claw	258					
Deflector	129					
Base Pad	0					
Ballast Block	286					
Mechanical Attachment	53					
LOADING DETAILS						
SINGLE MODULE WT (LB)	51.8					
SINGLE CMU WT (LB)	32.6					
TOTAL ARRAY WT (LB)	18328					
ARRAY AREA (SQ. FT)	4013					
ARRAY LOAD (PSF)	4.57					

ASSEMBLY QUANTITIES QTY ASSEMBLY NORTH ASSEMBLY 22 SOUTH ASSEMBLY 22 MIDDLE ASSEMBLY 212 NORTH SOUTH ASSEMBLY 2

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