GENERAL NOTES (APPLICABLE TO ALL SHEETS):

A. EACH CONTRACTOR, PROPOSER, SUPPLIER AND/OR MANUFACTURER SHALL REFER TO ALL DOCUMENTS PERTAINING TO THIS PROJECT AND COORDINATE ACCORDINGLY SO AS TO ENSURE ADEQUACY OF FIT, COMPLIANCE WITH SPECIFICATIONS, PROPER VOLTAGE AND CURRENT CHARACTERISTICS TO AVOID CONFLICT WITH ANY OTHER BUILDINGS SYSTEMS. VERIFY SAME WITH SHOP DRAWINGS.

B. WORK SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF ALL LOCAL, STATE, AND NATIONAL CODES. INCLUDING BUT NOT LIMITED TO NFPA 70 (NEC), NFPA 72, INTERNATIONAL BUILDING CODES, ETC. IN ADDITION, OBSERVE ALL APPLICABLE RULES AND REGULATIONS THAT MAY APPLY TO THE WORK UNDER THIS CONTRACT FROM CITY, COUNTY, LOCAL, STATE, FEDERAL, MUNICIPALITY, UTILITY COMPANY, OSHA, ETC.

C. CONTRACTOR SHALL FOLLOW SEISMIC RESTRAINT AND DESIGN REQUIREMENTS CONTAINED IN LATEST ADOPTED STATE AND INTERNATIONAL BUILDING CODES, WITH ALL AMENDMENTS AS ADOPTED BY THE CURRENT LEGISLATION. REFER TO ELECTRICAL AND STRUCTURAL SPECIFICATIONS FOR ADDITIONAL INFORMATION.

D. ADVISE THE ENGINEER OF ANY CONFLICTS, ERRORS, OMISSIONS, ETC. AT LEAST TEN DAYS PRIOR TO BID DATE, TO ALLOW CLARIFICATION BY WRITTEN ADDENDUM.

E. WHERE CONFLICTS ARE FOUND BETWEEN DRAWINGS, DETAILS, OR SPECIFICATIONS, THE MORE STRINGENT REQUIREMENT SHALL APPLY. NOTIFY ARCHITECT OF DISCREPANCY IN WRITING.

F. DEVIATION FROM SPECIFICATIONS OR PLANS REQUIRES PRIOR WRITTEN APPROVAL FROM THE ENGINEERS AND MUST BE SUBMITTED IN WRITING NO LATER THAN TEN DAYS PRIOR TO THE BID DATE.

G. ALL ELECTRICAL COMPONENTS OR EQUIPMENT SHALL BE LISTED AND LABELED BY UNDERWRITER'S LABORATORIES OR OTHER APPROVED LISTING AGENCY. APPROVAL AND LABELING OF INDIVIDUAL COMPONENTS ON AN ASSEMBLY IS NOT ACCEPTABLE AS MEETING THIS REQUIREMENT, UNLESS WAIVED BY THE ENGINEER IN WRITING.

H. ALL MATERIALS FURNISHED AND ALL WORK INSTALLED SHALL COMPLY WITH THE CURRENT EDITION OF THE NATIONAL ELECTRICAL CODES, NATIONAL FIRE CODES OF THE NATIONAL FIRE PROTECTION ASSOCIATION, THE REQUIREMENTS OF LOCAL UTILITY COMPANIES, AND WITH THE REQUIREMENTS OF ALL GOVERNMENTAL AGENCIES OR DEPARTMENTS HAVING JURISDICTION. IF ANY CONFLICTS OR DISCREPANCIES OCCUR THE MOST STRINGENT SHALL APPLY.

I. DO NOT SCALE FROM DRAWINGS, AS PRINTING DISTORTS SCALE. WORK SHALL BE LAID OUT FROM DIMENSIONED DRAWINGS, OR DIMENSIONS SUPPLIED TO THE CONTRACTOR.

J. INSTALL EQUIPMENT, MATERIALS, ETC. IN STRICT ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND DIRECTIONS. IF IN CONFLICT WITH THE DESIGN INDICATED IN CONTRACT DOCUMENTS, ADVISE THE ENGINEER PRIOR TO INSTALLATION FOR CLARIFICATION.

K. THE CONSTRUCTION MANAGER, GENERAL CONTRACTOR, OR WHOMEVER HOLDS THE PRIME CONTRACT(S) FOR THIS CONSTRUCTION IS RESPONSIBLE FOR THE COORDINATION, APPEARANCE, SCHEDULING AND TIMELINESS OF THE WORK OF ALL TRADES, CONTRACTORS, SUPPLIERS, INSTALLERS, ETC. POOR OR UNTIMELY WORK ON THE PART OF ANY SUBCONTRACTOR SHALL BE RESOLVED BY THE PARTY WHO ENGAGED THEM ON THIS PROJECT.

L. THE PURPOSE AND INTENT OF ALL OF THE DOCUMENTS PERTAINING TO THIS PROJECT IS TO PROVIDE A COMPLETE, FUNCTIONAL, SAFE, LIKE-NEW FACILITY. ANYTHING LESS SHALL BE UNACCEPTABLE.

M. ALL SYSTEMS, EQUIPMENT AND MATERIALS ARE TO BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER. WORK NOT MEETING THIS CRITERION SHALL BE REMOVED AND REINSTALLED SATISFACTORILY. FINAL DETERMINATION OF THE ACCEPTABILITY OF THE QUALITY OF WORK RESIDES WITH THE ENGINEER

N. ALL WORK, MATERIALS, EQUIPMENT, ETC. SHALL BE FULLY GUARANTEED FOR ONE FULL CALENDAR YEAR FROM THE DATE OF SUBSTANTIAL COMPLETION AS DOCUMENTED BY THE ENGINEER, UNLESS LONGER WARRANTY PERIODS FOR EQUIPMENT ARE SPECIFIED.

O. ALL WORK SHALL BE CONCEALED UNLESS SPECIFICALLY INDICATED TO BE EXPOSED, OR REQUIRED TO BE EXPOSED. IF IN DOUBT, CONTACT THE ENGINEER FOR CLARIFICATIONS PRIOR TO INSTALLING ANY SUCH WORK.

P. UNLESS OTHERWISE SPECIFIED OR INDICATED, ALL EQUIPMENT AND/OR MATERIALS WITHIN OCCUPIED SPACES OR EXPOSED TO VIEW ON THE BUILDING EXTERIOR SHALL BE PRIMED AND FINISHED SO AS TO COMPLEMENT ADJACENT SURFACE, UNLESS OTHERWISE NOTED. COORDINATE WORK AND COLORS WITH ARCHITECT.

Q. PROVIDE DETAILED SHOP DRAWINGS TO ENGINEER PRIOR TO PURCHASING OR INSTALLING ANY EQUIPMENT DEVIATIONS IN SIZES, CAPACITIES, FIT, FINISH, ETC. FOR EQUIPMENT FROM THAT PRIME SPECIFIED SHALL BE THE RESPONSIBILITY OF THE PURCHASER OF THAT EQUIPMENT. ANY PROVISIONS REQUIRED TO ACCOMMODATE A DEVIATION, WHETHER APPROVED BY THE ENGINEER OR NOT, SHALL BE THE RESPONSIBILITY OF THE PURCHASER.

R. ALL OFFSETS, TURNS, FITTINGS, TRIM, DETAIL, ETC. MAY NOT BE INDICATED, BUT SHALL BE PROVIDED AS REQUIRED. ADDITIONAL ALLOWANCES SHALL BE INCLUDED FOR SAME AT EACH PROPOSER'S DISCRETION.

S. INSTALL NO PIPING, CONDUIT, DUCTWORK, ETC. IN A LOCATION OR IN A MANNER WHICH WILL ALLOW FREEZING OR THE COLLECTION OF CONDENSATION THEREON. IF IN DOUBT, CONTACT THE ENGINEER.

T. ALL WIRING SYSTEMS SHALL BE INSTALLED WITH A MINIMUM OF SPLICES. CONDUCTORS, WHETHER SINGLE OR MULTI-PAIR, SHALL BE INSTALLED CONTINUOUS INSOFAR AS POSSIBLE FROM TERMINAL POINT TO TERMINAL POINT.

U. NO CONDUIT, SUPPORTS, ETC. SHALL BE RUN THROUGH ACCESS CLEARANCES OF EQUIPMENT BY OTHER TRADES (I.E. VAV BOXES). COORDINATE WITH ALL TRADES PRIOR TO CONSTRUCTION.

V. ALL SUPPORTS FOR EQUIPMENT, DEVICES OR FIXTURES SHALL BE UNIQUE, DIRECTLY FROM THE BUILDING STRUCTURE. DO NOT SUPPORT WORK FROM OTHER TRADES EQUIPMENT OR SUPPORTS WITHOUT WRITTEN PERMISSION FROM THE ENGINEER AND CONSENT OF THE OTHER TRADE, IN WRITING.

W. ALL ITEMS HAVING KEYED LOCKS/OPERATORS SHALL HAVE CORED LOCKS/OPERATORS. ALL KEYING SHALL MATCH THE OWNER'S EXISTING KEY-WAYS. COORDINATE EXACT REQUIREMENTS WITH OWNER PRIOR TO CONSTRUCTION.

X. NOISY WORK, WORK OUTSIDE CONSTRUCTION BARRIERS, WORK IN OCCUPIED AREAS, ETC. SHALL BE PERFORMED AFTER HOURS OR ON WEEKENDS. COORDINATE EXACT SCHEDULING WITH FACILITY PRIOR TO CONSTRUCTION.

Y. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CUTTING AND PATCHING REQUIRED FOR HIS WORK. ALL CUTTING AND PATCHING SHALL BE IN ACCORDANCE WITH THE ARCHITECT'S STANDARDS FOR SUCH WORK.

Z. THE CONTRACTOR IS RESPONSIBLE FOR ALL UTILITY COMPANY FEES, CASH CONTRIBUTIONS OR OTHER COSTS THAT THE UTILITY COMPANY MAY REQUIRE TO COMPLETE THEIR WORK. (ELECTRIC, TELEPHONE, TELEVISION, DATA, ETC.).

AA. ALL CONTRACTORS SHALL EXERCISE EXTREME CARE IN THE COURSE OF THEIR WORK SO AS TO ENSURE THAT THEY DO NOT INTERRUPT ANY EXISTING SERVICE OR SUB-SERVICE FOR SAFETY PURPOSES. PAY PARTICULAR ATTENTION TO THIS PRECAUTION RELATIVE TO NATURAL GAS AND ELECTRICAL LINES. VERIFY THE LOCATION, SIZE, TYPE, ETC. OF EACH UNDERGROUND OR OVERHEAD UTILITY. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH ALL FEDERAL, STATE AND/OR LOCAL RULES, REGULATIONS, STANDARD AND SAFETY REQUIREMENTS. UTILITIES SHALL BE INSTALLED IN ACCORDANCE WITH THE APPLICABLE MUNICIPALITY OR UTILITY COMPANY STANDARDS. IN ALL CASES, THE MOST STRINGENT REQUIREMENT SHALL APPLY.

BB. INTERRUPTION OF ANY EXISTING SERVICES SHALL BE COORDINATED WITH THE OWNER, GENERAL CONTRACTOR, UTILITY COMPANY AS NECESSARY, AND THE ARCHITECT, AT LEAST TWO WEEKS IN ADVANCE OF ANTICIPATED INTERRUPTION. A SCHEDULE FOR THESE OUTAGES SHALL BE DEVELOPED AND AGREED UPON BETWEEN THE PARTIES MENTIONED TO AVOID UNNECESSARY INCONVENIENCE TO THE OWNER OR ANY AFFECTED PARTY. NOTIFY THE UTILITY COMPANY OF ANY ANTICIPATED SERVICES REQUIRED TWO WEEKS IN ADVANCE, IN WRITING. IF UTILITY COMPANY REQUIRES A LONGER NOTIFICATION PERIOD, SO PROVIDE.

CC. WHERE INTERRUPTING AN EXISTING UTILITY OR SERVICE DELIBERATELY OR ACCIDENTALLY, THE RESPONSIBLE CONTRACTOR SHALL WORK CONTINUOUSLY AS NEEDED TO RESTORE SAME, PROVIDING PREMIUM TIME AS NEEDED.

GENERAL INFORMATION

GOVERNING REGULATIONS

MICHIGAN BUILDING CODE 2015

NATIONAL ELECTRICAL CODE NFPA 70...2017

PROJECT DESCRIPTION

THIS PROJECT CONSISTS OF ELECTRICAL WORK REQUIRED FOR THE INSTALLATION OF A NEW 180kW PHOTOVOLTAIC SYSTEM. THE PROJECT INCLUDES EXPANSION OF THE EXISTING PHOTOVOLTAIC COMBINER PANEL TO TIE-IN THE NEW PHOTOVOLTAIC ARRAYS.

SHEET LIST

Sheet Number	Sheet Name
C100	COVER SHEET
E100	ROOF PLAN - PHOTOVOLTAIC LAYOUT
E200	ELECTRICAL DETAILS AND RISER
E300	PHOTOVOLTAIC MODELING

HIGH POINT SCHOOL - SOLAR PHASE 2

Washtenaw I S D
A REGIONAL EDUCATIONAL SERVICE AGENCY

WASHTENAW INTERMEDIATE SCHOOL DISTRICT

1735 South Wagner Road
Ann Arbor, Michigan

CONSTRUCTION DOCUMENTS

03.13.2024

CLIENT PROJECT #: 19 003

PROJECT MANAGER: TANNER ROWE

CMTA

BUILDING SCIENCE LEADERSHIP

10411 Meeting Street
Prospect, KY 40059
T: 502 326.3085 F: 502 326.2691

CMTA

CONSTRUCTION DOCUMENTS

STATE OF MICHIGAN
ROBERT A. HANS
ENGINEER NO. 6201055572
LICENSED PROFESSIONAL ENGINEER

HIGH POINT SCHOOL - SOLAR PHASE 2
WASHTENAW INTERMEDIATE SCHOOL DISTRICT
1735 South Wagner Road
Ann Arbor, Michigan

COVER SHEET

CLIENT/CMTA JOB #:	VHPS24
DATE:	03.13.2024
DRAWN:	DDY
CHECKED:	DDY

REVISIONS

C100

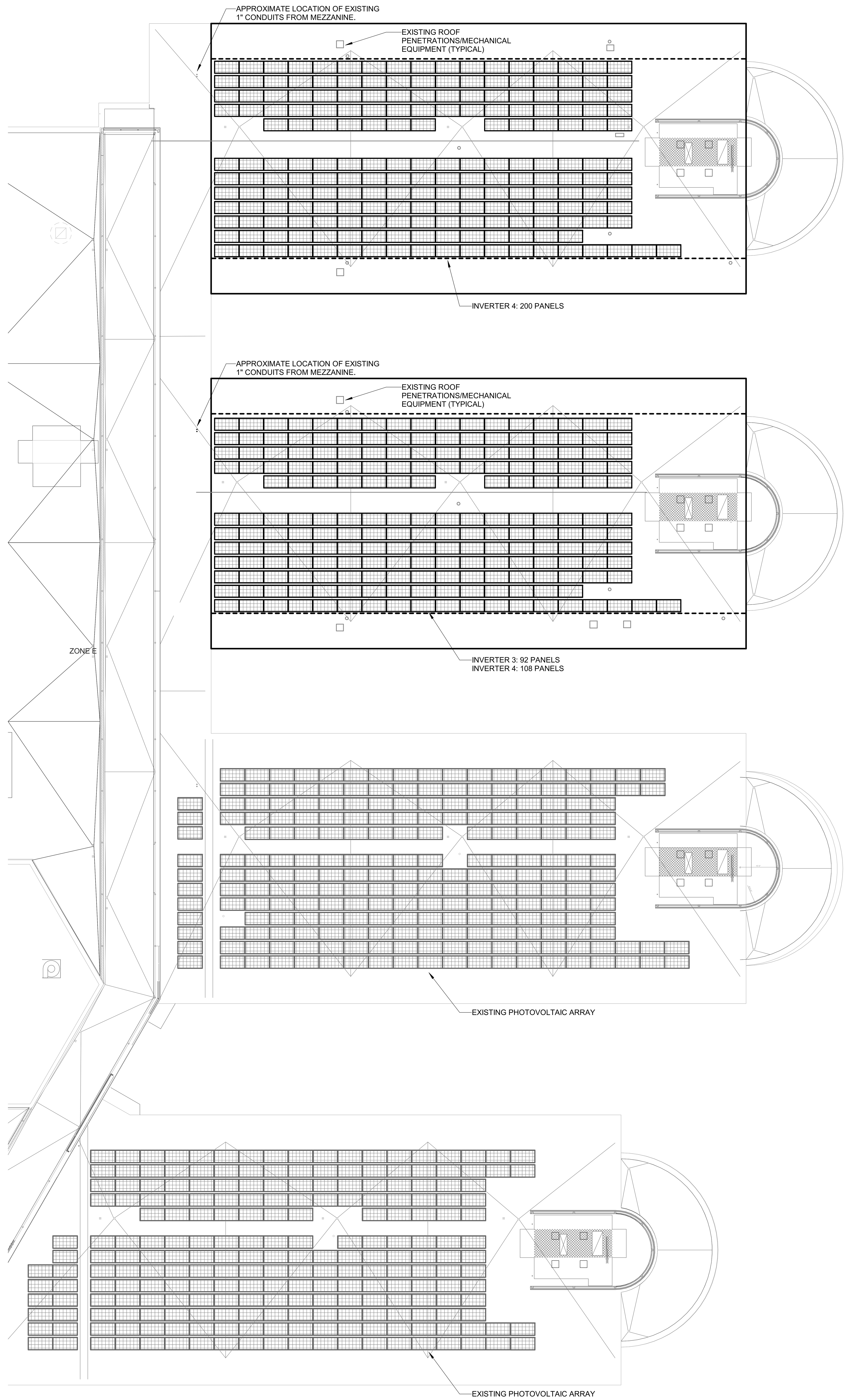
FILENAME: C:\Users\dyaste\Documents\VHPS24_ELEC_R22_dyaste62.rvt
PLOT TIME: 3/13/2024 2:42:10 PM

GENERAL NOTES (ROOF):

A. ALL CONDUIT EXPOSED TO DIRECT SUNLIGHT SHALL BE AT LEAST 12" ABOVE THE ROOF-TOP. NO CONDUIT SHALL BE EXPOSED TO DIRECT SUNLIGHT BELOW THIS HEIGHT.
B. WHERE RACEWAY OR CONDUCTORS ARE INSTALLED EXPOSED ON ROOF, DERATE AMPACITY OF CONDUCTORS IN ACCORDANCE WITH NEC.
C. PV WIRE CABLE MANAGEMENT SHALL CONSIST OF METALLIC WIRE CLIPS WHERE CONDUCTORS ARE ROUTED BELOW MODULES/ARRAY. ROUTE PV WIRE IN RAY TRAY (V2) WHERE NOT BELOW MODULES/ARRAY. WHERE CONDUIT IS USED ON THE ROOFTOP, IT SHALL BE GALVANIZED RIGID STEEL.
D. ALL MODULES AND RACKING SHALL BE GROUNDED USING EITHER APPROVED STAINLESS STEEL WEBS OR TIN PLATED DIRECT BURIAL RATED LUGS USING STAINLESS STEEL HARDWARE, STAR WASHERS, AND THREAD FORMING BOLTS.
E. ALL EQUIPMENT SHALL BE GROUNDED, INCLUDING BONDING JUMPERS WHERE NECESSARY ACROSS RAIL SPLICE PLATES TO BOND INDIVIDUAL PIECES OF RAIL.

PV SYSTEM SUMMARY	
PANEL BOD (QTY.)	TALESUN #BIPRO-455W (400)
APPROVED ALT. MANUFACTURERS	JA SOLAR, JINKO, Q-CELL
INVERTERS (QTY.)	SOLAR EDGE SE100KUS (1) & SE30KUS (1)
SYSTEM SIZE (DC/AC)	182kW / 130kW
SYSTEM PRODUCTION	214,392 kWh
STRUCTURAL SUPPORT	5 psf maximum

NOTES:
1. ALL REFERENCES TO SYSTEM SIZE, PANEL QUANTITY, ETC. ON OTHER SHEETS SHALL DEFER TO THE PV SYSTEM SUMMARY.
2. ADDITIONAL MANUFACTURERS HAVE BEEN PRE-APPROVED AS ACCEPTABLE ALTERNATIVES TO THE BASIS OF DESIGN. HOWEVER, ANY REQUIRED MODIFICATIONS TO THE OVERALL SYSTEM DESIGN SHALL BE INCLUDED BY THE CONTRACTOR WHEN MAKING SUBSTITUTIONS TO THE BASIS OF DESIGN.



(1) ROOF PLAN - PHOTOVOLTAIC LAYOUT
NO SCALE

CMTA

CONSTRUCTION DOCUMENTS

STATE OF MICHIGAN
ROBERT A. HANS
ENGINEER NO. 6201055572
LICENSED PROFESSIONAL ENGINEER

HIGH POINT SCHOOL - SOLAR PHASE 2
WASHTENAW INTERMEDIATE SCHOOL DISTRICT
1735 South Wagner Road
Ann Arbor, Michigan

ROOF PLAN - PHOTOVOLTAIC LAYOUT

CLIENT/CMTA JOB #:	VHPS24
DATE:	03.13.2024
DRAWN:	DDY
CHECKED:	DDY

REVISIONS

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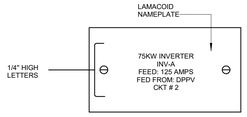
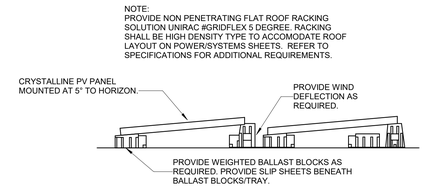
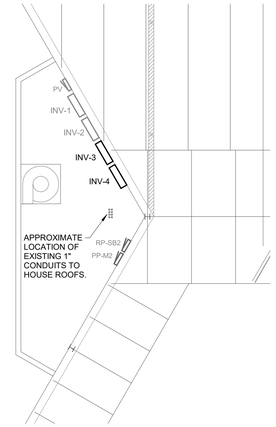


1 TYPICAL INVERTER NAMEPLATE DETAIL
NO SCALE



2 SELF-BALLASTED PV RACKING DETAIL
NO SCALE

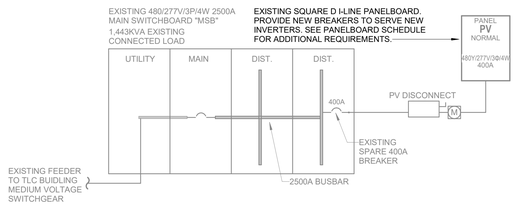


3 MEZZANINE PLAN - POWER
1/8" = 1'-0"

GENERAL NOTES (RISER):

A. PROVIDE ENGRAVED LAMACOID LABELS FOR ALL POWER DISTRIBUTION EQUIPMENT FURNISHED OR MODIFIED IN THIS PROJECT, LABELS PER DETAILS AND SPECIFICATIONS.

B. SERVICE EQUIPMENT SHALL BE MARKED WITH THE MAXIMUM AVAILABLE FAULT-CURRENT AT THE EQUIPMENT AND THE DATE THE CALCULATION WAS PERFORMED. APPLY A TYPE-WRITTEN ADHESIVE LABEL WITH WHITE BACKGROUND, 1/2" HIGH BLACK LETTERING.



4 EXISTING POWER DISTRIBUTION RISER DIAGRAM
NO SCALE

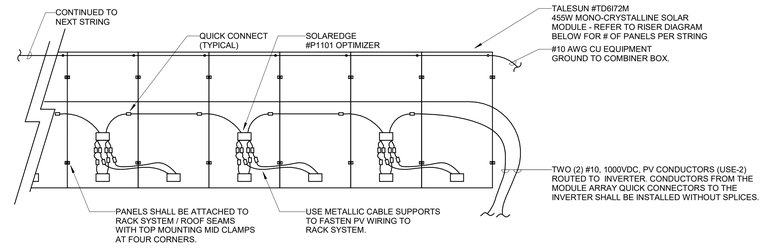
PANELBOARD AND WIRING SCHEDULE

PANEL: PV — **MAINS TYPE:** MLO — **SCCR (kA):** 12.7
VOLTAGE: 480Y/277V,3P,4W — **SPD:** No — **AVAIL FAULT CURRENT (kA):** 18.0
AMPERES: 400 A — **MOUNTING:** SURFACE — **SUPPLY FROM:** MSB

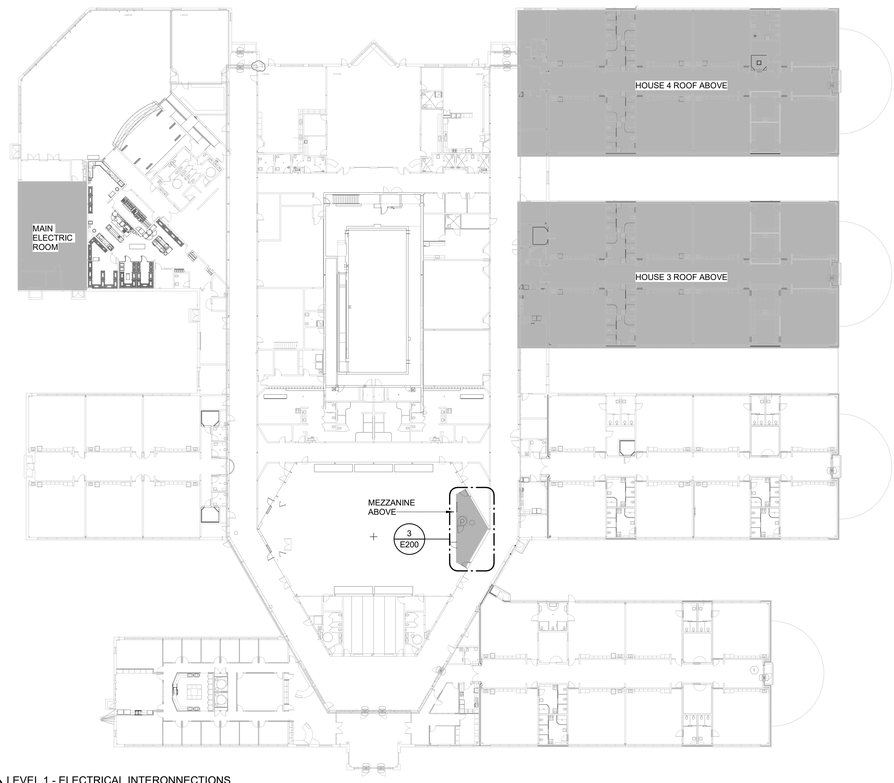
CIRCUIT DESCRIPTION	NOTE	WIRE	GND	C	OCP	P	CKT	A	B	C	CKT	P	OCP	C	GND	WIRE	NOTE	CIRCUIT DESCRIPTION
							1	22.2			2							
INVERTER -1					100	3	3		22.2	22.2	4	3	100					INVERTER -2
							5			22.2	6							
							7	10.0			8							
INVERTER-3	1	6	10	1"	50	3	9		10.0	33.3	10	3	150	1.5"	6	1/0	1	INVERTER-4
							11			10.0	12							
SPACE		--	--	--	--	1	13	--	--		14	1	--	--	--	--		SPACE
SPACE		--	--	--	--	1	15		--	--	16	1	--	--	--	--		SPACE
SPACE		--	--	--	--	1	17			--	18	1	--	--	--	--		SPACE
SPACE		--	--	--	--	1	19	--	--		20	1	--	--	--	--		SPACE
SPACE		--	--	--	--	1	21		--	--	22	1	--	--	--	--		SPACE
SPACE		--	--	--	--	1	23			--	24	1	--	--	--	--		SPACE
SPACE		--	--	--	--	1	25	--	--		26	1	--	--	--	--		SPACE
SPACE		--	--	--	--	1	27		--	--	28	1	--	--	--	--		SPACE
SPACE		--	--	--	--	1	29			--	30	1	--	--	--	--		SPACE
			TOTAL LOAD (kVA):					87.7 kVA	87.7 kVA	87.7 kVA								
			TOTAL CURRENT (A):					317 A	317 A	317 A								

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
EQUIP	263200 VA	100.00%	263200 VA	TOTAL CONNECTED LOAD:	263 kVA
				TOTAL ESTIMATED DEMAND:	263 kVA
				TOTAL CONNECTED CURRENT:	317 A
				TOTAL ESTIMATED DEMAND CURRENT:	317 A

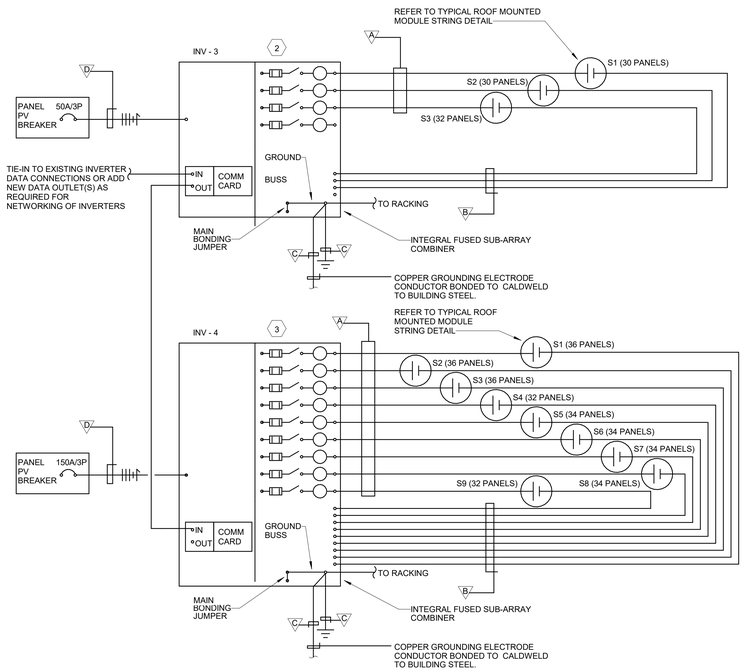
NOTES: WHERE NOT LISTED, WIRE AND CONDUIT SHALL BE MINIMUM PER SPECIFICATIONS. SPARE BREAKERS TO BE 20A/1P.
1. PROVIDE NEW CIRCUIT BREAKER IN EXISTING PANELBOARD. MATCH AIC RATINGS OF EXISTING BREAKERS.



5 TYPICAL ROOF MOUNTED MODULE STRING DETAIL
NO SCALE



6 LEVEL 1 - ELECTRICAL INTERONNECTIONS
1/32" = 1'-0"



7 PHOTOVOLTAIC RISER DIAGRAM
NO SCALE

POWER RISER GENERAL NOTES :

A. ALL CONDUCTORS SHALL BE COPPER (SEE SPECIFICATIONS FOR TYPES).

B. AS PART OF THIS CONTRACT, PROVIDE A COMPREHENSIVE ARC FLASH HAZARD ANALYSIS FOR POWER DISTRIBUTION DEVICES ON THIS PROJECT. PROVIDE ALL LABELS, WARNING SIGNAGE, ETC. PER NPFA-70E AND OSHA REQUIREMENTS.

POWER RISER TAGGED NOTES :

1. PROVIDE COPPER GROUNDING ELECTRODE FROM NEW GROUND BAR AT INVERTER TO BUILDING MAIN GROUND.

2. PROVIDE 1000VDC/277/480 VAC/3PH/30KW PHOTOVOLTAIC INVERTER WITH MINIMUM CALIFORNIA ENERGY COMMISSION (CEC) EFFICIENCY RATING OF 96.5%. SOLAREDGE SE30KUS OR APPROVED EQUAL. INVERTER SHALL BE PROVIDED WITH THE FOLLOWING CHARACTERISTICS AND OPTIONS:
   A. PV VIEW SUB-ARRAY MONITORING
   B. PV ZONE SUB-ARRAY MONITORING
   C. ENVIRONMENTAL MONITORING
   D. BACKFEED PROTECTION
   E. AUTOMATIC ARRAY FAULT ISOLATION
   F. INTEGRATED AC CONTACTOR SHALL OPEN AT NIGHT AND MINIMIZE STANDBY LOSSES.
   G. GROUND FAULT INTERRUPTION
   H. MAXIMUM WEIGHT OF 106 LBS
   I. SHALL CONFORM TO NEC 690.12
   J. ARC-FAULT INTERRUPTION
   K. SHALL CONFORM TO NEC 705.40

3. PROVIDE 1000VDC/277/480 VAC/3PH/100KW PHOTOVOLTAIC INVERTER WITH MINIMUM CALIFORNIA ENERGY COMMISSION (CEC) EFFICIENCY RATING OF 96.5%. SOLAREDGE SE100KUS OR APPROVED EQUAL. INVERTER SHALL BE PROVIDED WITH THE FOLLOWING CHARACTERISTICS AND OPTIONS:
   A. PV VIEW SUB-ARRAY MONITORING
   B. PV ZONE SUB-ARRAY MONITORING
   C. ENVIRONMENTAL MONITORING
   D. BACKFEED PROTECTION
   E. AUTOMATIC ARRAY FAULT ISOLATION
   F. INTEGRATED AC CONTACTOR SHALL OPEN AT NIGHT AND MINIMIZE STANDBY LOSSES.
   G. GROUND FAULT INTERRUPTION
   H. MAXIMUM WEIGHT OF 106 LBS
   I. SHALL CONFORM TO NEC 690.12
   J. ARC-FAULT INTERRUPTION
   K. SHALL CONFORM TO NEC 705.40

POWER RISER FEEDERS :

A. PROVIDE # OF #10 INDICATED, 1000VDC, PV WITH BLACK INSULATION. CONTRACTOR SHALL UTILIZE EXISTING 1" CONDUITS FROM MEZZANINE TO ROOF. INTERCEPT AND EXTEND EXISTING CONDUIT AS REQUIRED.

B. PROVIDE # OF #10 INDICATED, 1000VDC, PV WITH BLACK INSULATION AND GRAY STRIPE. CONTRACTOR SHALL UTILIZE EXISTING 1" CONDUITS FROM MEZZANINE TO ROOF. INTERCEPT AND EXTEND EXISTING CONDUIT AS REQUIRED.

C. PROVIDE ONE (1) #6 GROUND. ROUTE IN 3/4" CONDUIT WHERE EXPOSED.

D. REFER TO PV PANELBOARD SCHEDULE FOR FEEDER WIRE, GROUND, AND CONDUIT SIZE.

CMTA

CONSTRUCTION DOCUMENTS

STATE OF MICHIGAN — ROBERT A. HANS — ENGINEER NO. 6201055872 — PROFESSIONAL ENGINEER

HIGH POINT SCHOOL - SOLAR PHASE 2
WASHTENAW INTERMEDIATE SCHOOL DISTRICT
1735 South Wagner Road
Ann Arbor, Michigan

ELECTRICAL DETAILS AND RISER

CLIENT/CMTA JOB #:	VHPS24
DATE:	03.13.2024
DRAWN:	DDY
CHECKED:	DDY

REVISIONS

E200

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HelioScope — Annual Production Report produced by Johnathan Stewart

Design 2 New High Point School, 1735 S Wagner Road

Report

Project Name	New High Point School
Project Address	1735 S Wagner Road
Prepared By	Johnathan Stewart jstewart@cmtaegrs.com

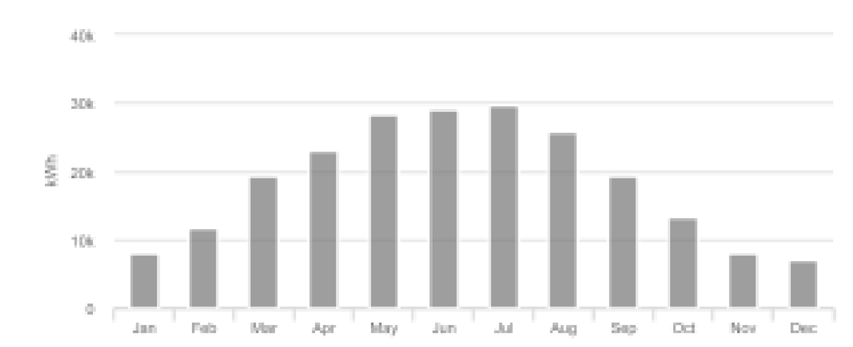
CMTA

System Metrics

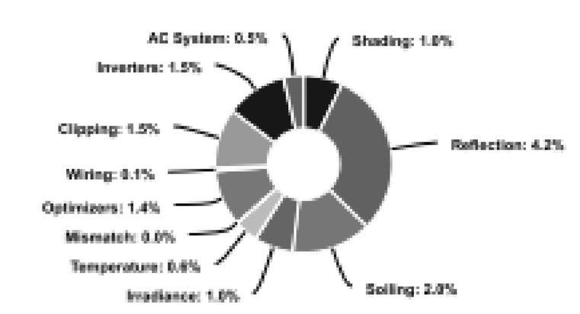
Design	Design 2
Module DC Nameplate	182.0 kW
Inverter AC Nameplate	133.2 kW Load Ratio: 1.37
Annual Production	222.5 MWh
Performance Ratio	87.1%
kWh/kWp	1,222.3
Weather Dataset	TMY, 10km grid (42.25,-83.75), NREL (prospector)
Simulator Version	13481b1254-23ad5ce6b8-2c24aee3ce-e57274df7f

Project Location

Monthly Production



Sources of System Loss



HelioScope — Annual Production Report produced by Johnathan Stewart

Annual Production

	Description	Output	% Delta
Irradiance (kWh/m²)	Annual Global Horizontal Irradiance	1,432.0	
	POA Irradiance	1,402.6	-2.1%
	Shaded Irradiance	1,388.9	-1.0%
	Irradiance after Reflection	1,331.2	-4.2%
	Irradiance after Soiling	1,304.6	-2.0%
	Total Collector Irradiance	**1,304.7**	**0.0%**
Energy (kWh)	Nameplate	237,667.2	
	Output at Irradiance Levels	235,377.8	-1.0%
	Output at Cell Temperature Derate	233,950.6	-0.6%
	Output After Mismatch	233,950.1	0.0%
	Optimizer Output	230,674.5	-1.4%
	Optimal DC Output	230,495.8	-0.1%
	Constrained DC Output	227,030.3	-1.5%
	Inverter Output	223,583.7	-1.5%
	Energy to Grid	**222,465.8**	**-0.5%**
Temperature Metrics			
	Avg. Operating Ambient Temp		11.1 °C
	Avg. Operating Cell Temp		18.0 °C
Simulation Metrics			
	Operating Hours		4641
	Solved Hours		4641

Condition Set

Description	Condition Set 1											
Weather Dataset	TMY, 10km grid (42.25,-83.75), NREL (prospector)											
Solar Angle Location	Meteo Lat/Lng											
Transposition Model	Perez Model											
Temperature Model	Diffusion Model											
Temperature Model Parameters	Rack Type					U_{const}				U_{wind}		
	Fixed Tilt					29				0		
	Flush Mount					15				0		
	East-West					29				0		
	Carport					29				0		
Soiling (%)	J	F	M	A	M	J	J	A	S	O	N	D
	2	2	2	2	2	2	2	2	2	2	2	2
Irradiation Variance	5%											
Cell Temperature Spread	4° C											
Module Binning Range	-2.5% to 2.5%											
AC System Derate	0.50%											
Module Characterizations	Module					Uploaded By				Characterization		
	TP6L72M 144-cell 455 (Talesun)					HelioScope				Spec Sheet Characterization, PAN		
Component Characterizations	Device					Uploaded By				Characterization		
	SE66.6KUS (SolarEdge)					HelioScope				Spec Sheet		
	P860 (SolarEdge)					HelioScope				Sheet		

Components

Component	Name	Count
Inverters	SE66.6KUS (SolarEdge)	2 (133.2 kW)
Strings	10 AWG (Copper)	13 (1,349.7 ft)
Optimizers	P860 (SolarEdge)	400 (344.0 kW)
Module	Talesun, TP6L72M 144-cell 455 (455W)	400 (182.0 kW)

Wiring Zones

Description	Combiner Poles	String Size	Stringing Strategy
Wiring Zone	-	12-33	Along Racking

Field Segments

Description	Racking	Orientation	Tilt	Azimuth	Intrarow Spacing	Frame Size	Frames	Modules	Power
Field Segment 1	Fixed Tilt	Landscape (Horizontal)	5°	60°	0.7 ft	1x1	200	200	91.0 kW
Field Segment 1 (copy)	Fixed Tilt	Landscape (Horizontal)	5°	60°	0.7 ft	1x1	200	200	91.0 kW

UNIRAC

ENGINEERING REPORT

Plan Review

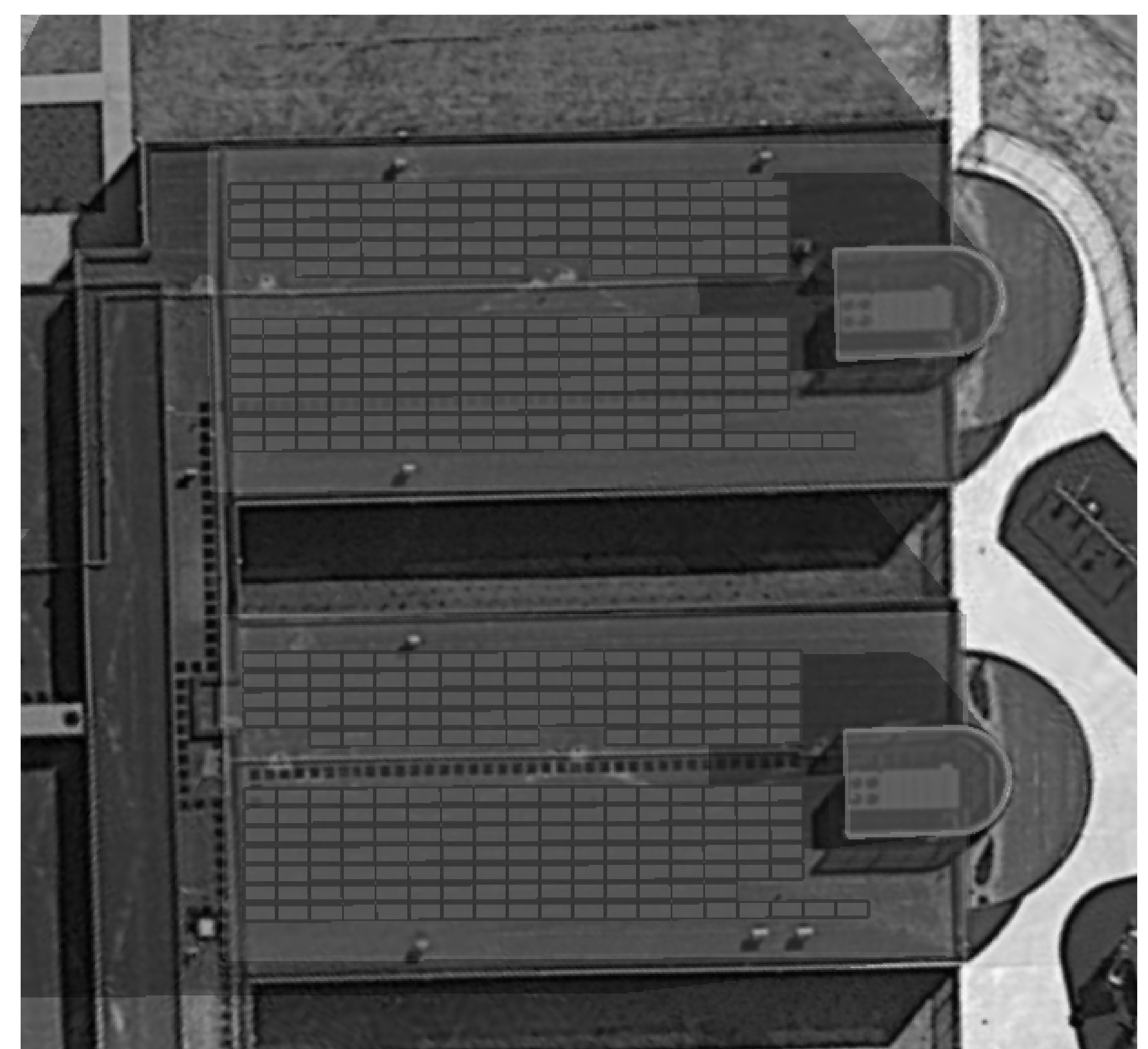
AVERAGE PSF	4.24 psf
TOTAL NUMBER OF MODULES	200
TOTAL KW	91.00 KW
TOTAL STRUCTURE AREA	~5730 ft²
TOTAL WEIGHT ON ROOF	24298 lbs
RACKING WEIGHT	3682 lbs
MODULE WEIGHT	11240 lbs
BALLAST WEIGHT	9376 lbs
MAX BAY LOAD (DEAD)	130 lbs
TOTAL ATTACHMENT COUNT	0

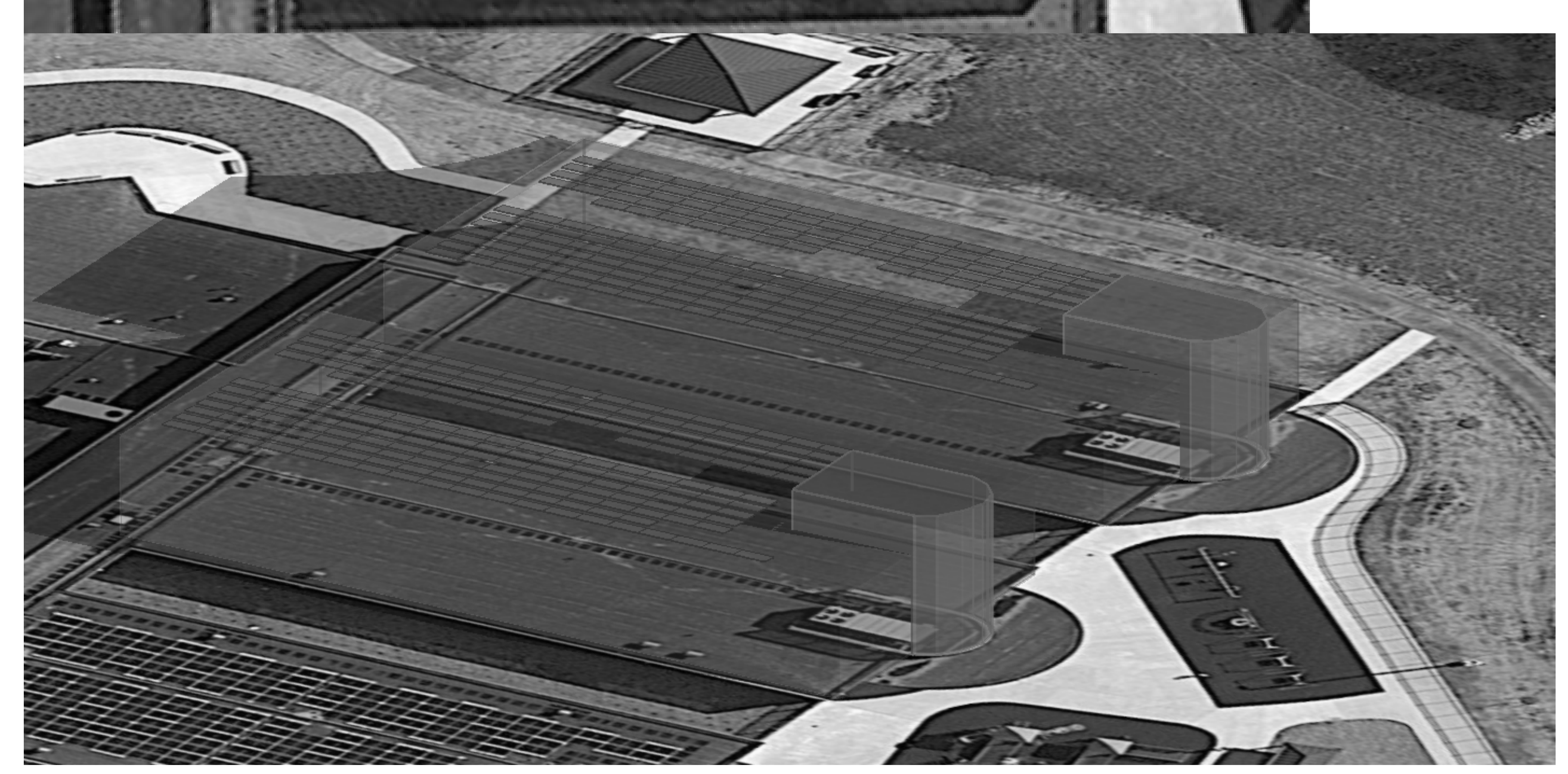
Loads Used for Design

BUILDING CODE	ASCE 7-10
WIND SPEED	115.00 mph
GROUND SNOW LOAD	20.00 psf
SEISMIC, S_S	0.094
SEISMIC, S_1	0.048
ELEVATION	1015.00 ft
WIND EXPOSURE	B
MRI	25
RISK CATEGORY	II
VELOCITY PRESSURE, Q_Z	15.04 psf
DEAD LOAD FACTOR MODIFICATION	1.0

Inspection

PRODUCT	ROOFMOUNT RMS
MODULE MANUFACTURER	Talesun
MODEL	BISTAR-TP6L72M-455
MODULE WATTS	455 watts
MODULE LENGTH	82.60"
MODULE WIDTH	41.18"
MODULE THICKNESS	1.38"
MODULE WEIGHT	56.20 lbs
ADD SUPPLEMENTAL BAYS	No
SETBACK DISTANCE	3.0 ft
HALF BLOCK ALLOWED	No
BALLAST BLOCK (CMU) WEIGHT	32.0 lbs
MAX BLOCKS PER BAY	2
BUILDING HEIGHT	20.0 ft
ROOF TYPE	OTHER
LONGEST BUILDING LENGTH	165.00 ft
SHORTEST BUILDING LENGTH	78.0 ft
PARAPET HEIGHT	<= 1 Array Height (<= 8 inches)
WIND DEFLECTORS	EVERYWHERE
DEAD LOAD FACTOR	1.0
ATTACHMENTS OPTIMIZATION CRITERIA	Maximize Ballast
ATTACHMENT TYPE	UNIRAC FLASHLOC RM
ASD ALLOWABLE UPLIFT	355.0 lbs
ASD ALLOWABLE SHEAR	194.0 lbs
CONTROLLING COMPONENT UPLIFT CAPACITY	RACKING
CONTROLLING COMPONENT SHEAR CAPACITY	RACKING





CMTA

CONSTRUCTION DOCUMENTS

STATE OF MICHIGAN ROBERT A. HANS ENGINEER NO. 6201055572 LICENSED PROFESSIONAL ENGINEER

HIGH POINT SCHOOL - SOLAR PHASE 2
WASHTENAW INTERMEDIATE SCHOOL DISTRICT
1735 South Wagner Road
Ann Arbor, Michigan

PHOTOVOLTAIC MODELING

CLIENT/CMTA JOB #:	VHPS24
DATE:	03.13.2024
DRAWN:	DDY
CHECKED:	DDY

REVISIONS

E300

FILENAME: C:\Users\dyaste\Documents\VHPS24_ELEC_R22_dyaste62.rvt
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