VORYS

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Founded 1909

Anna Sanyal
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June 14, 2023

Ms. Tanowa M. Troupe, Secretary
Public Utilities Commission of Ohio
180 E. Broad Street, 11th Floor
Columbus, OH 43215-3793

Re: Clearview Solar Project
Case No. 20-1362-EL-BGN
Condition Compliance – Conditions 2, 8, and 9

Dear Ms. Troupe:

In compliance with and pursuant to Conditions 2, 8, and 9 of the August 25, 2021 Joint Stipulation and Recommendation filed in this proceeding (as approved by the Board's October 21, 2021 Opinion, Order, and Certificate), Clearview Solar I, LLC confirms that it has submitted to Board Staff detailed engineering drawings depicting 90% electrical and structural design for the Clearview Solar Project. A copy is attached.

Please call me if you have any questions.

Very truly yours,

Anna Sanyal
Counsel for Clearview Solar I, LLC

AS/jaw
Attachment

cc: Andrew Conway

NOTES:

1. FOR INSTALLATION DETAILS OF MEDIUM VOLTAGE CABLES. REFER TO CABLE TRENCH DRAWINGS E0021.
2. ONE #2/0 AWG CU GROUND CONDUCTOR SHALL BE INSTALLED ALONG EACH MV AC CABLE TRENCH, AND BONDED ON BOTH ENDS TO THE INVERTER STATION, SECTIONALIZING CABINET AND DEADBREAK JUNCTION BOX GROUND GRID AND/OR SWITCHING STATION GROUND GRID.

LEGEND

DBJB (DEAD BREAK JUNCTION BOX)

SECTIONALIZING CABINET

SCX — CABINET NUMBER

INVERTER CALL OUT IDENTIFICATION

IS21 / 342 — INVERTER NUMBER / NUMBER OF STRINGS

4.40 MVA INVERTER STATION
- 4 x 1.10 MVA INVERTER
- 4.40 MVA TRANSFORMER

PROPOSED SECURITY FENCE

PROJECT BOUNDARY

BLOCK OUTLINE

34.5 kV AC COLLECTORS

FEEDER 1
FEEDER 2
FEEDER 3
FEEDER 4
FEEDER 5
FEEDER 6

1000' 0' 1000' 2000' 3000'
FEET 1"=1000'-0"

PRELIMINARY DRAWING

NOT TO BE USED FOR CONSTRUCTION

TETRA TECH

DOCUMENT CONTROL NUMBER
705–2317230200–DWG–E0010–D

DWG. NO.	REFERENCE DRAWINGS	REFERENCE DRAWINGS
705-2317230200-SCH-E0002	AC COLLECTION SYSTEM CABLE SCHEDULE	
705-2317230200-DWG-E0022	AC DIRECTIONAL BORING ROAD/RIVER CROSSING DETAILS	
705-2317230200-DWG-E0021	AC COLLECTION SYSTEM MV CABLE TRENCH DETAILS	
705-2217230200-SCH-E0002	CLEARVIEW SOLAR - 35kVAC CABLE SCHEDULE	
705-2317230200-BOM-E0001	BILL OF MATERIAL	
705-2317230200-DWG-E0011	AC COLLECTION SYSTEM ONE LINE DIAGRAM	

	REVISION DESCRIPTION	BY	DESIGN	CHECK	APPROVED	DATE
D	ISSUED FOR 90% DESIGN	MSM	MSM	SS	MS	05/05/2023
C	ISSUED FOR 60% DESIGN	MSM	MSM	SS	MS	03/23/2023
B	ISSUED FOR 30% DESIGN	MSM	SS	SS	MS	02/21/2023
A	PRELIMINARY	MSM	AS	MS	MS	01/19/2023

SCALE: AS SHOWN		DATE
DESIGNED:	A. SHAHAB	01/25/2023
DRAWN:	J. HARRIS	01/25/2023
CHECKED:	M. SHEN	01/25/2023
APPROVED:	M. SHEN	01/25/2023
CLIENT APP.:		

PCL SOLAR CONSTRUCTORS USA
2322 WEST GRAND PKWY N. SUITE 200
KATY, TEXAS, 77449
PHONE: 647-401-8379

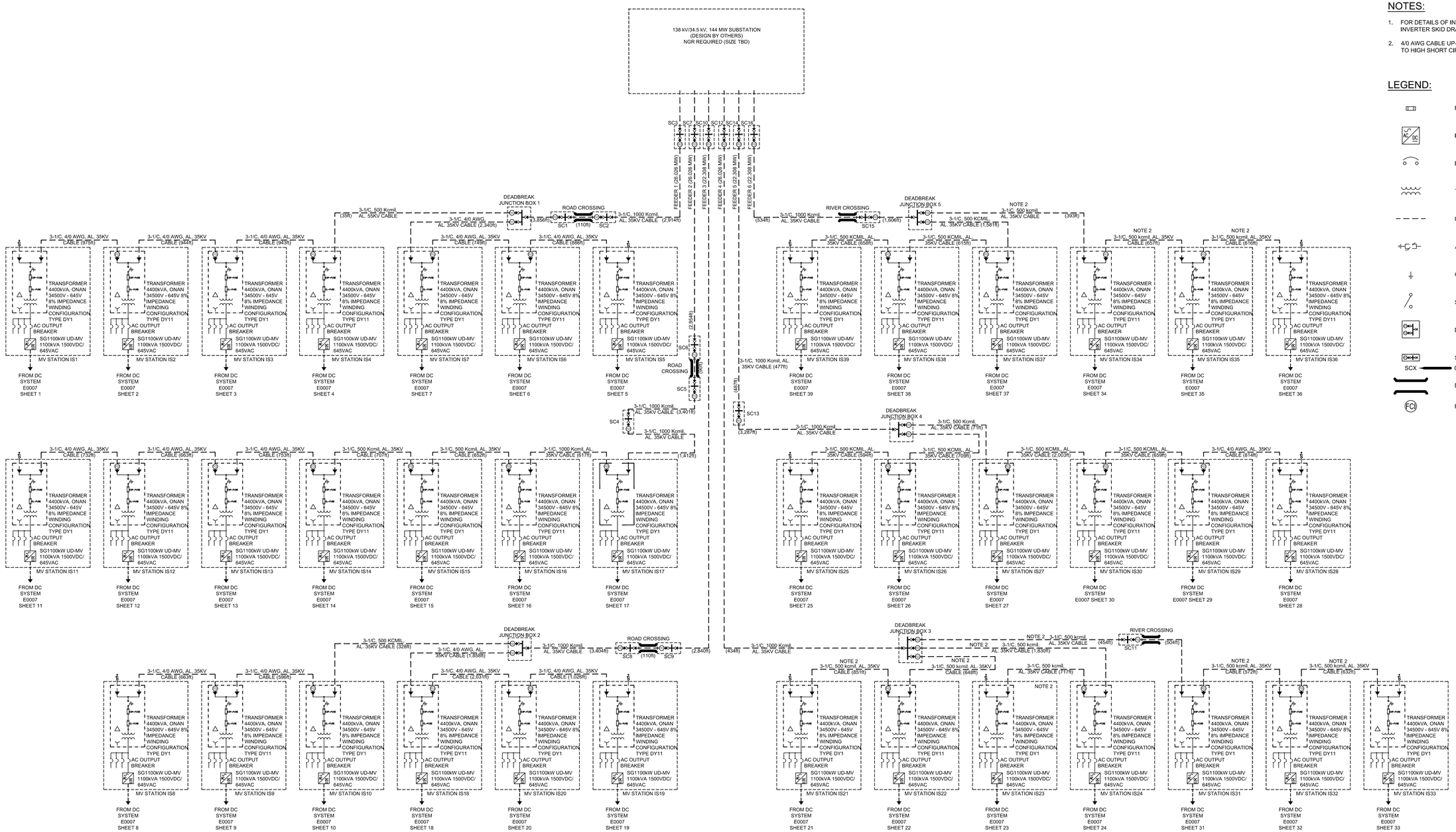
SITE OR AREA: CLEARVIEW SOLAR

TITLE: AC COLLECTION SYSTEM GROUND AND MV FEEDER GENERAL ARRANGEMENT

DRAWING NUMBER: 705-2317230200-DWG-E0010 — D

MAILLE, MIKE 5/3/2023 1:28:52 PM

W:\N-S\PCL CONSTRUCTORS CANADA – 1723\705-23172302.00 – CLEARVIEW SOLAR 144MW\3. EXECUTION\DESIGN\4. DWGS & DOCS\EA\CAD\AC COLLECTOR SYS\705-2317230200-DWG-E0010-D



NOTES:

1. FOR DETAILS OF INVERTERS. REFER TO SUNGROW INVERTER SKID DRAWING. DRAWING NUMBER TBD.
2. 4/0 AWG CABLE UP-SIZED TO 500 kcmil CABLE DUE TO HIGH SHORT CIRCUIT CURRENT.

LEGEND:

- FUSE
- INVERTER
- BREAKER
- TRANSFORMER
- UNDERGROUND CABLE
- ARRESTER
- GROUND
- SWTICH
- DEAD BREAK JUNCTION BOX
- SECTIONALIZING CABINET (SC)
- SCX — CABINET NUMBER
- DIRECTIONAL BORING
- FCI — FAULT CIRCUIT INDICATOR

PRELIMINARY DRAWING

NOT TO BE USED FOR CONSTRUCTION

TETRA TECH

DOCUMENT CONTROL NUMBER 705-2317230200-DWG-E0011-D

DWG. NO.	REFERENCE DRAWINGS	REFERENCE DRAWINGS
705-2317230200-DWG-E0010	AC COLLECTION SYSTEM GENERAL ARRANGEMENT	

	REVISION DESCRIPTION	BY	DESIGN	CHECK	APPROVED	DATE
D	ISSUED FOR 90% DESIGN	MSM	MSM	SS	MS	05/05/2023
C	ISSUED FOR 60% DESIGN	MSM	MSM	SS	MS	03/23/2023
B	ISSUED FOR 30% DESIGN	MSM	SS	SS	MS	02/21/2023
A	PRELIMINARY	DWM	AS	MS	MS	01/19/2023

SCALE: NTS		DATE
DESIGNED:	A. SHAHAB	01/23/2023
DRAWN:	D. MAH	01/19/2023
CHECKED:	M. SHEN	01/19/2023
APPROVED:	M. SHEN	01/19/2023
CLIENT APP.:		

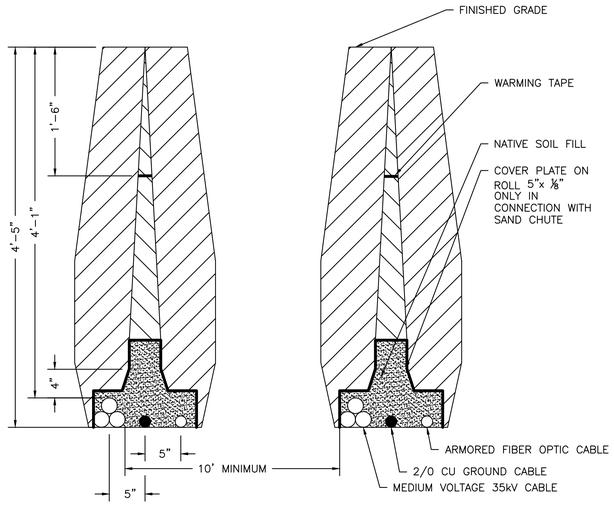
PCL

PCL SOLAR CONSTRUCTORS USA
2322 WEST GRAND PKWY N. SUITE 200
KATY, TEXAS, 77449
PHONE: 647-401-8379

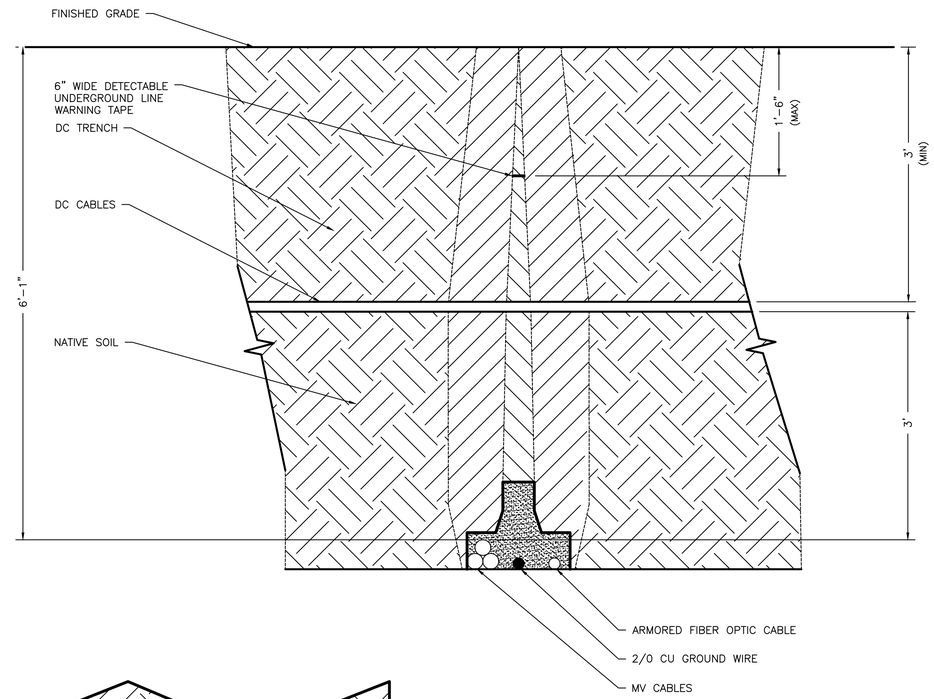
SITE OR AREA: CLEARVIEW SOLAR

TITLE: AC COLLECTION SYSTEM SINGLE LINE DIAGRAM

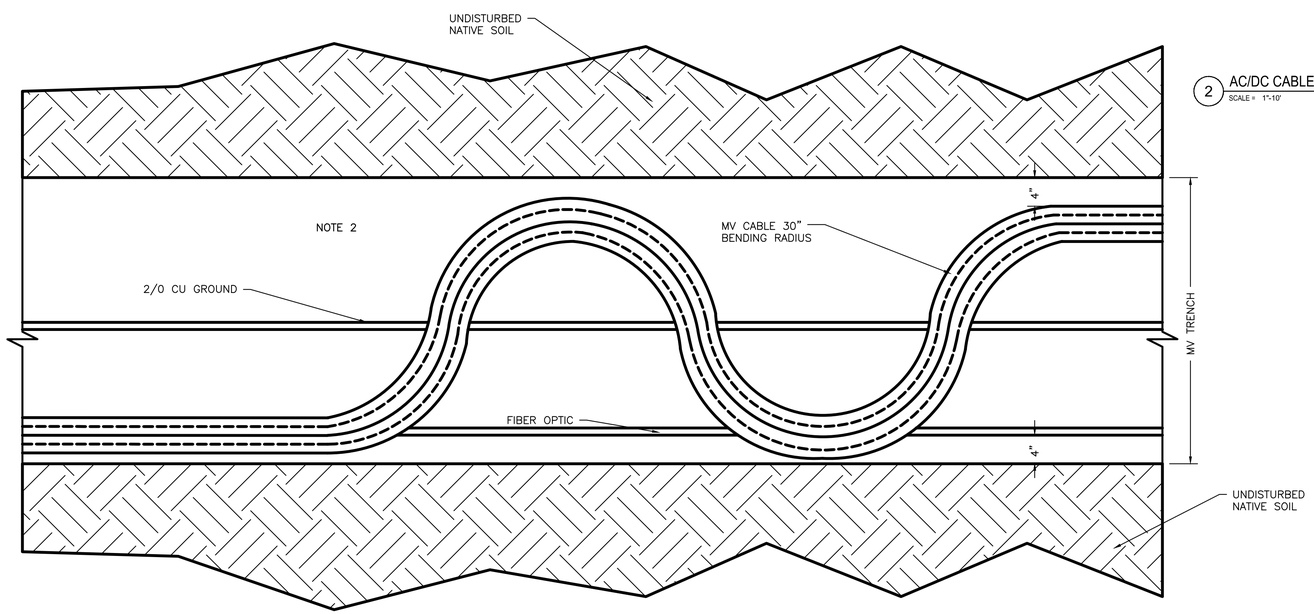
DRAWING NUMBER: 705-2317230200-DWG-E0011 — D



1 MV CABLE PLOW TRENCH DETAIL
SCALE = 1"-10'



2 AC/DC CABLE CROSSING DETAIL
SCALE = 1"-10'



3 MV CABLE S LOOP PRIOR TO THE INVERTER DETAIL
SCALE = 1"-10'

NOTES:

1. THE PLOW TRENCH SPACING BETWEEN FEEDER CIRCUITS SHALL BE 10' MINIMUM.
2. MV PLOW TRENCH FOR THE MAJORITY LENGTH OF CABLE RUN, WHICH WILL CONVERT TO STANDARD OPEN TRENCH 20 FEET IN LENGTH PRIOR TO INVERTER, TO HAVE A S LOOP PROVIDING 12 FEET OF EXTRA CABLE LENGTH. MV CABLE BEND RADIUS 30 INCH MINIMUM.

PRELIMINARY DRAWING

NOT TO BE USED FOR CONSTRUCTION

TETRA TECH

DOCUMENT CONTROL NUMBER
705-2317230200-DWG-E0021-C

DWG. NO.	REFERENCE DRAWINGS	REFERENCE DRAWINGS
705-2317230200-DWG-E00010	AC COLLECTION GENERAL ARRANGEMENT	

	REVISION DESCRIPTION	BY	DESIGN	CHECK	APPROVED	DATE
C	ISSUED FOR 90% DESIGN	MSM	MSM	SS	MS	05/05/2023
B	ISSUED FOR 60% DESIGN	MSM	MSM	SS	MS	03/23/2023
A	ISSUED FOR 30% DESIGN	HP	SS	SS	MS	02/21/2023

SCALE: AS SHOWN		DATE
DESIGNED:	S.SAHIB	02/10/2023
DRAWN:	H.PATEL	02/13/2023
CHECKED:	S.SAHIB	02/13/2023
APPROVED:	M. SHEN	03/23/2023
CLIENT APP.:		

PCL SOLAR CONSTRUCTORS USA
2322 WEST GRAND PKWY N. SUITE 200
KATY, TEXAS, 77449
PHONE: 647-401-8379

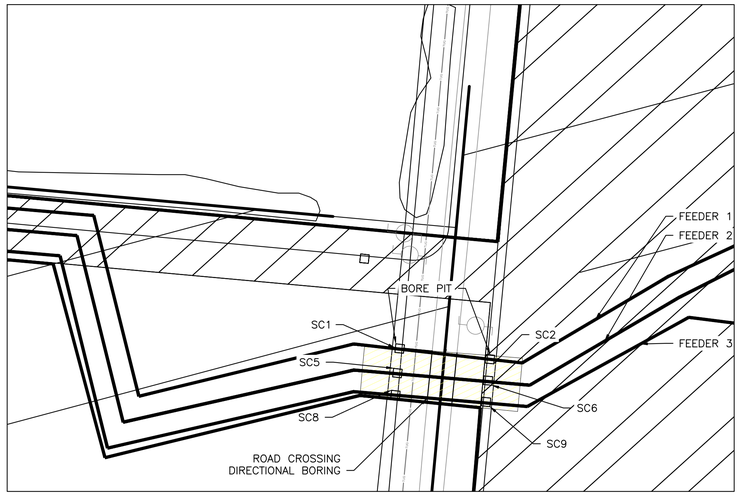
SITE OR AREA: CLEARVIEW SOLAR

TITLE: AC COLLECTION SYSTEM
MV CABLE PLOW TRENCH DETAILS

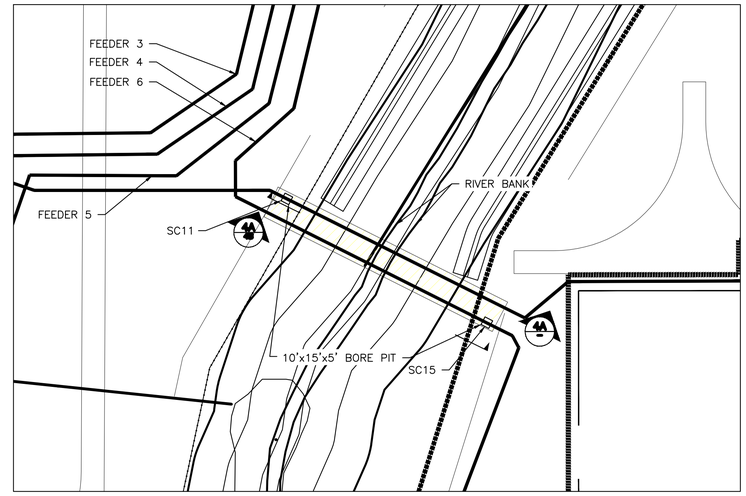
DRAWING NUMBER: 705-2317230200-DWG-E0021 — C

MAILLE, MIKE 5/3/2023 6:50:33 AM

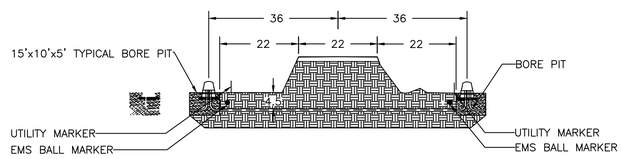
W:\N-S\PCL CONSTRUCTORS CANADA - 1723\705-23172302.00 - CLEARVIEW SOLAR 144MW\3. EXECUTION\DESIGN\4. DWGS & DOCS\EA\CAD\AC COLLECTOR SYS\705-2317230200-DWG-E0021-C



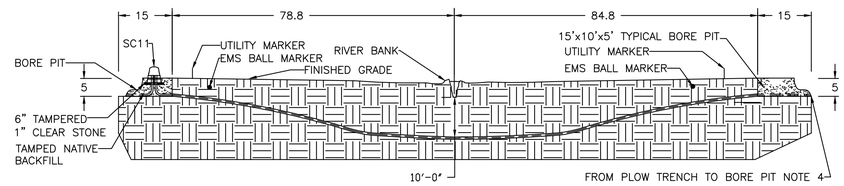
1 ROAD DIRECTIONAL BORING PLAN
SCALE = 1:50



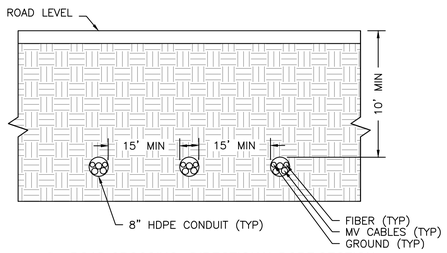
2 RIVER DIRECTIONAL BORING PLAN
SCALE = 1:50



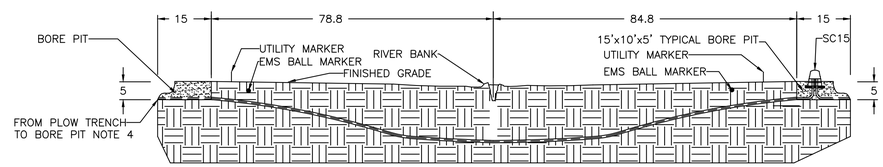
3 ROAD CROSSING PROFILE - DIRECTIONAL BORING
SCALE = 1"=150'



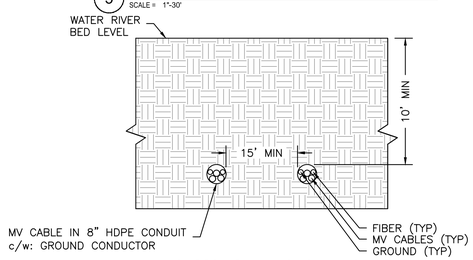
4A RIVER CROSSING PROFILE - DIRECTIONAL BORING
SCALE = 1"=150'



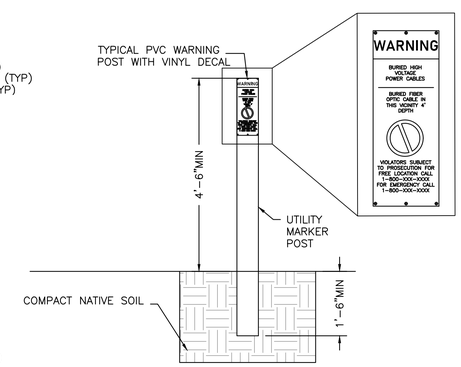
5 ROAD CROSSING - DIRECTIONAL BORE SECTION
SCALE = 1"=30'



4B RIVER CROSSING PROFILE - DIRECTIONAL BORING
SCALE = 1"=150'



6 RIVER CROSSING - DIRECTIONAL BORE SECTION
SCALE = 1"=30'



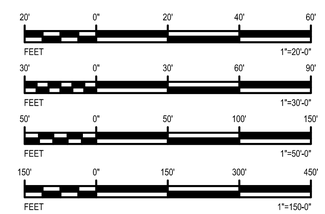
7 UTILITY MARKER DETAIL
SCALE = 1"=20'

NOTES:

1. ABOVE GROUND MARKER SHALL BE PLACED WHERE PROPOSED UNDERGROUND INFRASTRUCTURE ENTERS AND EXITS RIGHT-OF WAY AND EXITING UTILITY EASEMENTS.
2. EMS BALL MARKER SHALL BE PLACED 24" - 36" BELOW GRADE WHERE UTILITY MARKER IS INSTALLED.
3. 10' X 15' X 5' BORE PIT LOCATION TO BE COORDINATED WITH THE MVAC AND FIBER CIRCUITS CROSSING THROUGH THIS AREA AND TO BE ADJUSTED AS NECESSARY BY THE CONTRACTOR WITH APPROVAL FROM THE ENGINEER AS NEEDED.
4. FOR RIVER CROSSING, PLOW TRENCH TO BORE PIT, COIL EXTRA CABLE LENGTH TO PULL THROUGH TO SECTIONALIZING CABINET. FIELD VERIFY.

LEGEND:

SCX — SECTIONALIZING CABINET



PRELIMINARY DRAWING

NOT TO BE USED FOR CONSTRUCTION

TETRA TECH

DOCUMENT CONTROL NUMBER
705-2317230200-DWG-E0022-C

DWG. NO.	REFERENCE DRAWINGS
705-2317230200-DWG-E00010	GENERAL ARRANGEMENT

	REFERENCE DRAWINGS

	REVISION DESCRIPTION	BY	DESIGN	CHECK	APPROVED	DATE
C	ISSUED FOR 90% DESIGN	MSM	MSM	SS	MS	05/05/2023
B	ISSUED FOR 60% DESIGN	MSM	MSM	SS	MS	03/23/2023
A	ISSUED FOR 30% DESIGN	HP	SS	SS	MS	02/17/2023

SCALE: AS SHOWN		DATE
DESIGNED:	S.SAHIB	02/10/2023
DRAWN:	H.PATEL	02/17/2023
CHECKED:	S.SAHIB	02/13/2023
APPROVED:	M. SHEN	02/17/2023
CLIENT APP.:		

PCL SOLAR CONSTRUCTORS USA
2322 WEST GRAND PKWY N. SUITE 200
KATY, TEXAS, 77449
PHONE: 647-401-8379

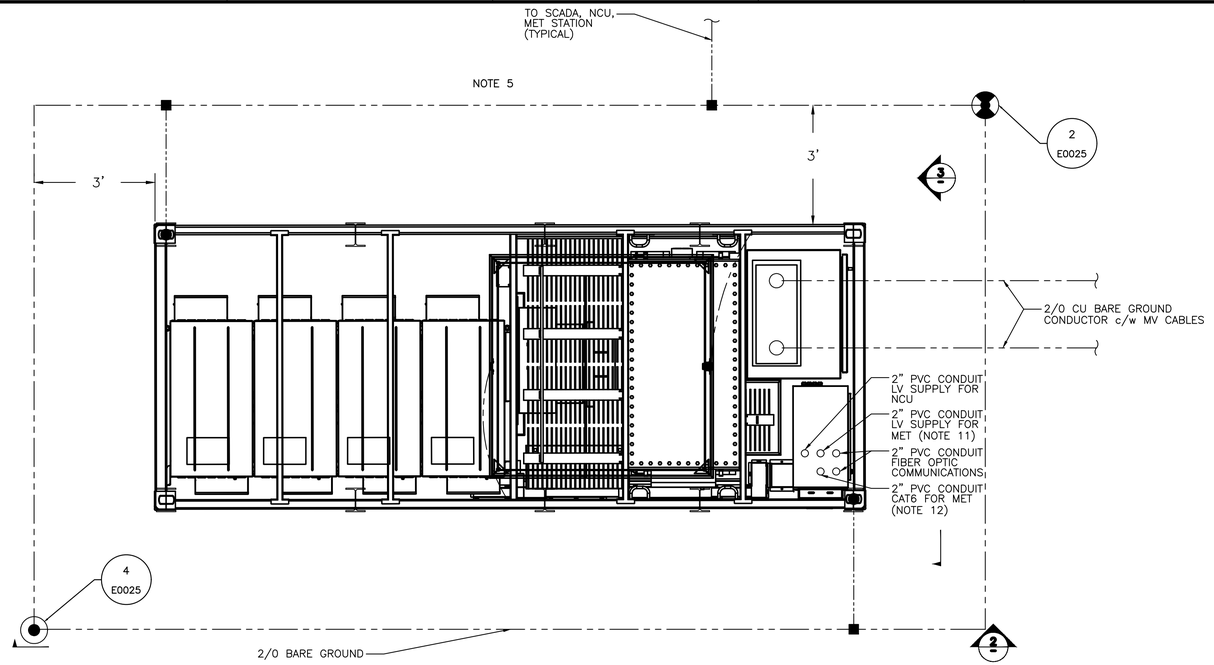
SITE OR AREA: CLEARVIEW SOLAR

TITLE: AC COLLECTION SYSTEM
DIRECTIONAL BORING
ROAD AND RIVER CROSSING
PLAN, PROFILE, SECTION AND DETAILS

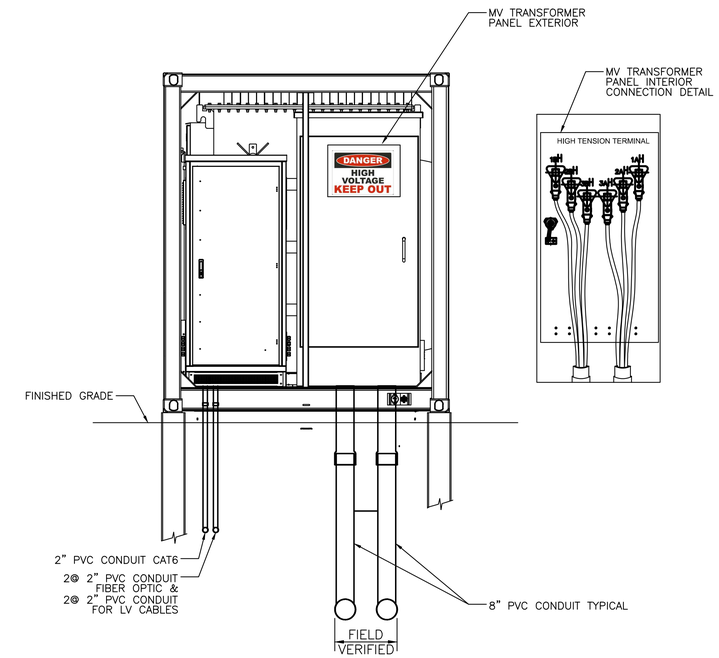
DRAWING NUMBER: 705-2317230200-DWG-E0022 — C

PATEL, HARDEEP 2/17/2023 10:10:33 AM

\\TT.LOCAL\GFS\CAVOLUME2\LEGACY\TTS281FS1\PROJECTS\N-S\PCL CONSTRUCTORS CANADA - 1723\705-2317230200 - CLEARVIEW SOLAR 144MW\3. EXECUTION\DESIGN\4. DWGS & DOCS\EA\CAD\AC COLLECTOR SYS\705-2317230200-DWG-E0022-A

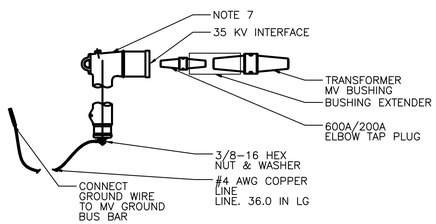


1 TYPICAL INVERTER GROUNDING DETAIL
SCALE = 1"-2'

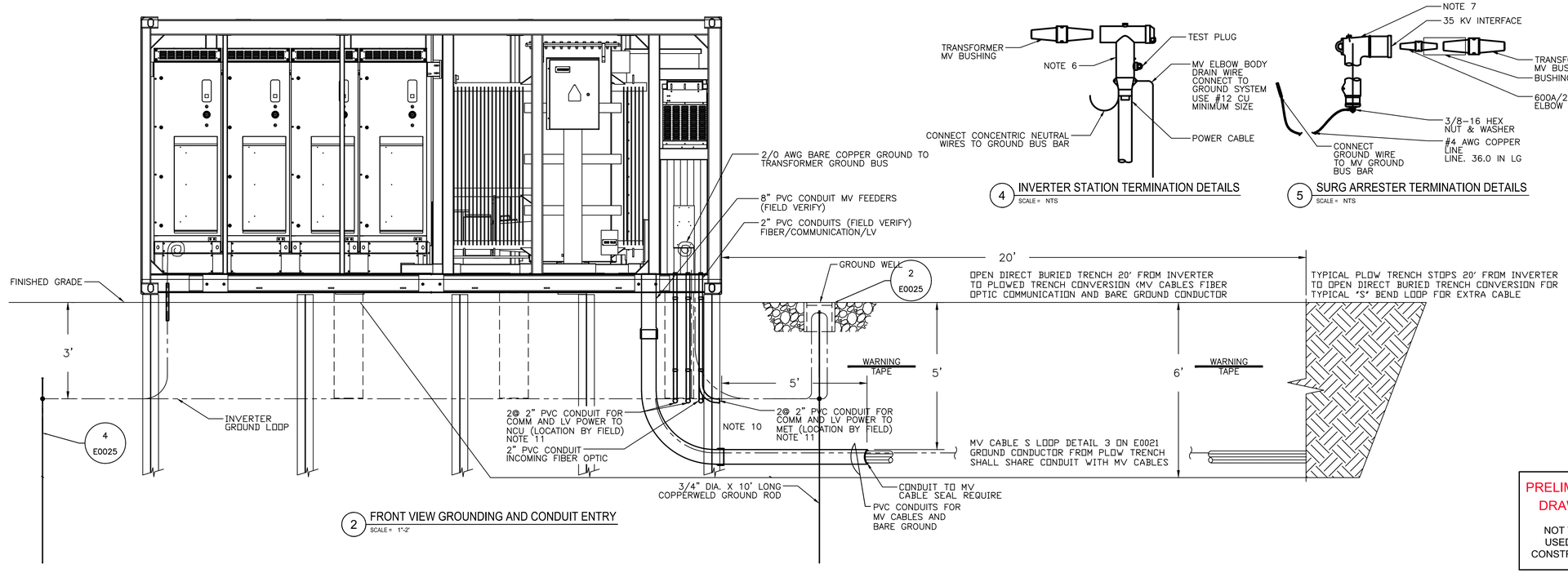


3 SIDE VIEW CONDUIT ENTRY
SCALE = 1"-2'

4 INVERTER STATION TERMINATION DETAILS
SCALE = NTS



5 SURG ARRESTER TERMINATION DETAILS
SCALE = NTS



2 FRONT VIEW GROUNDING AND CONDUIT ENTRY
SCALE = 1"-2'

NOTES:

1. ALL DIMENSION ARE IN FEET AND INCHES UNLESS OTHERWISE NOTED.
2. DIRECTION OF CONDUITS SHALL BE DETERMINED BY FIELD APPLICATION.
3. CONDUITS SHALL BE SCHEDULE 40 PVC.
4. CONDUITS SIZES VARY DEPENDING ON LOCATION AND CABLE SIZE.
5. BARE COPPER GROUNDS SHALL BE COMPRESSION CONNECTOR TO GROUND ROD.
6. CABLE FAULT INDICATORS TO BE INSTALLED AS INDICATED PER DWG 705-2317230200-DWG-E0011.
7. SURGE ARRESTERS TO BE INSTALLED AS INDICATED PER DWG 705-2317230200-DWG-E0011.
8. FOR INVERTER CONDUIT ENTRY, BACK FILL SHALL BE A SLURRY MIXTURE.
9. FOUR MET LOCATIONS WILL REQUIRE 120VAC LV POWER SUPPLY AS WELL AS COMMUNICATIONS IN 2" PVC CONDUIT FROM IS2, IS16, IS22 AND IS37 FIELD FIT TO LOCATIONS.
10. NCU STATIONS SHALL BE SUPPLIED WITH 120VAC LV POWER AND FIBER OPTIC COMMUNICATIONS IN 2" CONDUITS FIELD FIT TO SUIT LOCATIONS.

LEGEND:

- BURIED COMPRESSION CONNECTION
- BURIED 2/0 AWG BARE COPPER CABLE
- 3/4" DIA. X 10' LONG COPPERWELD GROUND ROD
- GROUND WELL
- ABOVE GRADE COMPRESSION CONNECTION
- GROUND CONNECTION
- GROUND PIGTAIL

PRELIMINARY DRAWING

NOT TO BE USED FOR CONSTRUCTION

TETRA TECH

DOCUMENT CONTROL NUMBER
705-2317230200-DWG-E0023-B

DWG. NO.	REFERENCE DRAWINGS	REFERENCE DRAWINGS
705-2317230200-DWG-E00010	AC COLLECTION GENERAL ARRANGEMENT	

	REVISION DESCRIPTION	BY	DESIGN	CHECK	APPROVED	DATE
B	ISSUED FOR 90% DESIGN	MSM	MSM	SS	MS	05/05/2023
A	ISSUED FOR 60% DESIGN	MSM	MSM	SS	MS	03/23/2023

SCALE: AS SHOWN		DATE
DESIGNED:	M. MAILLE	02/27/2023
DRAWN:	M. MAILLE	02/27/2023
CHECKED:	S.SAHIB	02/27/2023
APPROVED:	M. SHEN	02/28/2023
CLIENT APP.:		

PCL

PCL SOLAR CONSTRUCTORS USA
2322 WEST GRAND PKWY N. SUITE 200
KATY, TEXAS, 77449
PHONE: 647-401-8379

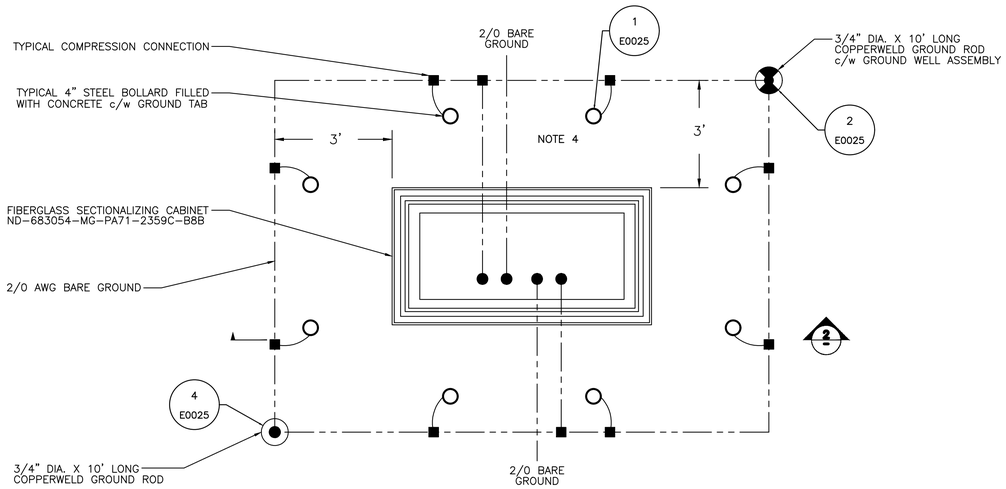
SITE OR AREA: CLEARVIEW SOLAR

TITLE: AC COLLECTION SYSTEM TYPICAL INVERTER GROUNDING AND CONDUIT DETAILS

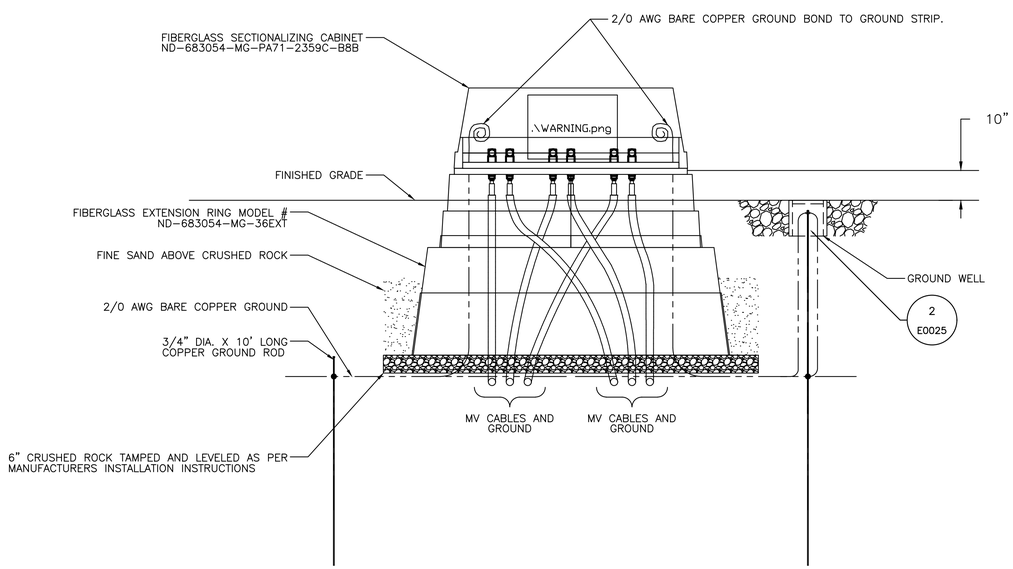
DRAWING NUMBER: 705-2317230200-DWG-E0023 — B

MAILLE, MIKE 5/3/2023 6:54:09 AM

W:\N-S\PCL CONSTRUCTORS CANADA - 1723\705-2317230200 - CLEARVIEW SOLAR 144MW\3. EXECUTION\DESIGN\4. DWGS & DOCS\EA\CAD\AC COLLECTOR SYS\705-2317230200-DWG-E0023-B



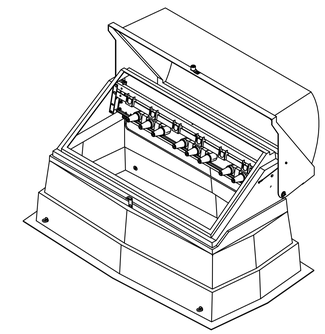
1 TYPICAL SECTION CABINETS GROUNDING DETAIL
SCALE = 1"-2'

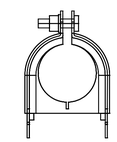


2 FRONT VIEW GROUNDING AND MV CABLE ENTRY ENTRY
SCALE = 1"-2'

TYPICAL SECTIONALIZING CABINET

1. LOCATIONS VARY THROUGHOUT THE SITE.
2. NORDIC FIBERGLASS, INC. SECTIONALIZING CABINETS PRODUCT NUMBER ND-683054-MG-PA71-2356C-B8B USED FOR ROAD AND RIVER CROSSING WITH EXTENSION UNIT ND-683054-MG-36EXT, INCLUDING CABLE SUPPORT BRACKET KIT CSB-6830, AND PORCE-A-CLAMP.
3. ZSi FOSTER PORCE-A-CLAMP SIZES VARY DEPENDING ON CABLE SIZE. REFER TO TABLE FOR CABLE SIZES.





ZSi FOSTER PORCE-A-CLAMP		
CABLE	DIAMETER	PART #
1000 KCMIL	0'-2 1/2"	036CC050
500 KCMIL	0'- 2"	032CC042
4/0 AWG	0'-1 1/2"	024CC034

NOTES:

1. ALL DIMENSION ARE IN FEET AND INCHES UNLESS OTHERWISE NOTED.
2. DIRECTION OF CABLES SHALL BE DETERMINED BY FIELD APPLICATION.
3. BARE COPPER GROUNDS SHALL BE COMPRESSION CONNECTOR TO GROUND ROD.
4. BOLLARDS ARE REQUIRED AROUND SECTIONALIZING CABINETS ON ALL SIDES. SHALL BE DETERMINED BASED ON LOCATION IF SECTIONALIZING CABINET IS OUTSIDE SOLAR FARM FENCE LINE.

LEGEND:

- BURIED COMPRESSION CONNECTION
- BURIED 2/0 AWG BARE COPPER CABLE
- 3/4" DIA. X 10' LONG COPPERWELD GROUND ROD
- GROUND WELL
- ABOVE GRADE COMPRESSION CONNECTION
- GROUND CONNECTION
- GROUND PIGTAIL

PRELIMINARY DRAWING

NOT TO BE USED FOR CONSTRUCTION

TETRA TECH

DOCUMENT CONTROL NUMBER
705-2317230200-DWG-E0024-B

DWG. NO.	REFERENCE DRAWINGS	REFERENCE DRAWINGS
705-2317230200-DWG-E00010	AC COLLECTION GENERAL ARRANGEMENT	

	REVISION DESCRIPTION	BY	DESIGN	CHECK	APPROVED	DATE
B	ISSUED FOR 90% DESIGN	MSM	MSM	SS	MS	05/05/2023
A	ISSUED FOR 60% DESIGN	MSM	MSM	SS	MS	03/23/2023

SCALE: AS SHOWN		DATE
DESIGNED:	M. MAILLE	02/27/2023
DRAWN:	M. MAILLE	02/27/2023
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CLIENT APP.:		

PCL SOLAR CONSTRUCTORS USA
2322 WEST GRAND PKWY N, SUITE 200
KATY, TEXAS, 77449
PHONE: 647-401-8379

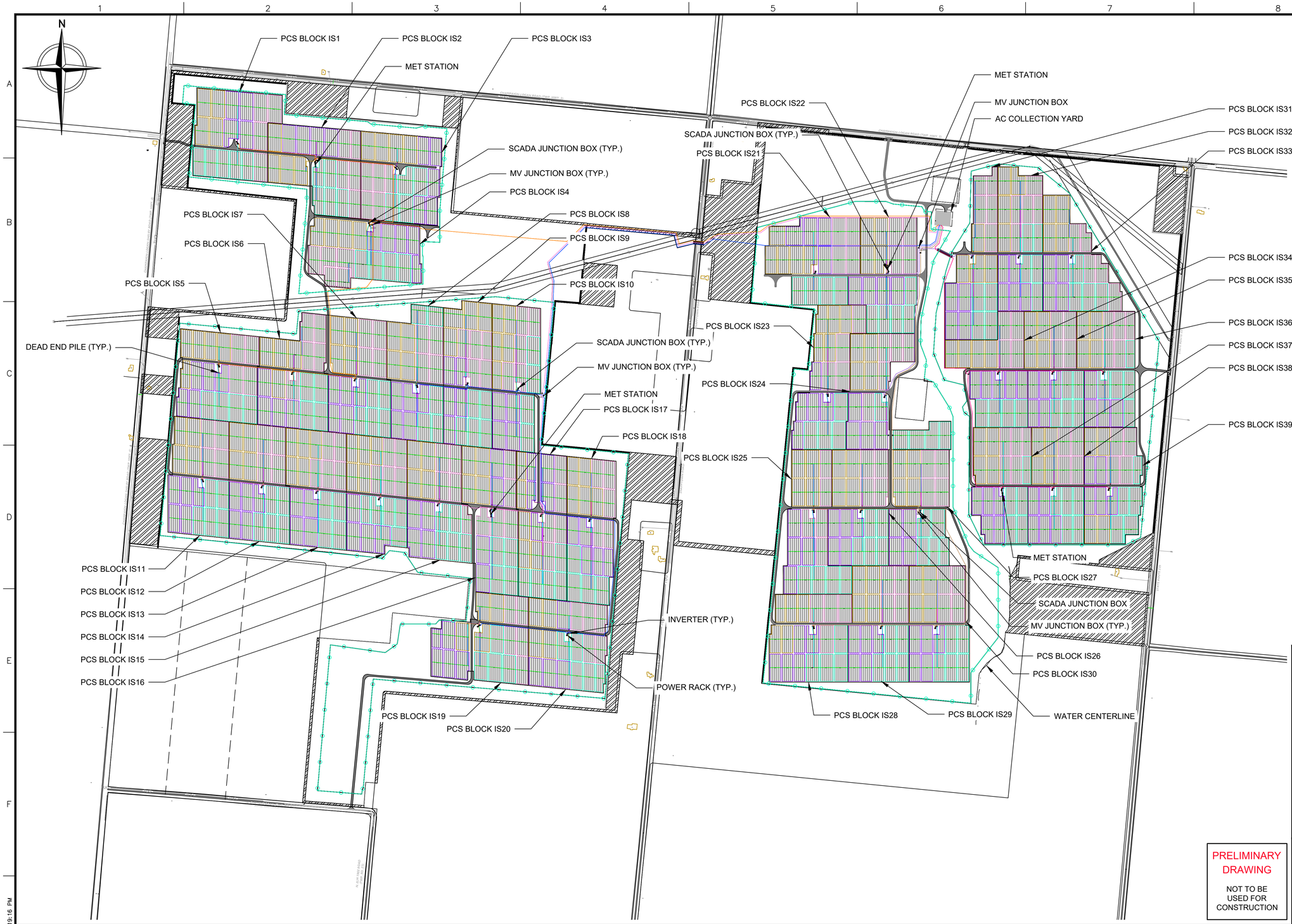
SITE OR AREA: CLEARVIEW SOLAR

TITLE: AC COLLECTION SYSTEM
TYPICAL SECTIONALIZING CABINET
GROUNDING
DETAILS

DRAWING NUMBER: 705-2317230200-DWG-E0024 — B

MAILLE, MIKE 5/1/2023 8:22:21 AM

W:\N-S\PCL CONSTRUCTORS CANADA - 1723\705-23172302.00 - CLEARVIEW SOLAR 144MW\3. EXECUTION\DESIGN\4. DWGS & DOCS\EA\CAD\AC COLLECTOR SYS\705-2317230200-DWG-E0024-B



LEGEND

1P - 3 STRINGS AND 2 STRINGS SAT
26 PV MODULES PER STRING

3 STRINGS = ±299.24ft (GAMECHANGE)

2 STRINGS = ±200.90ft (GAMECHANGE)

SUNGROW SG4400UD-MV-US
4.40 MVA INVERTER STATION
- 4 x 1.10 MVA INVERTER
- 4.40 MVA TRANSFORMER

ISX.X-XXX — COMBINER BOX

PROPOSED SECURITY FENCE

N-S AWM 158 HANGERS

N-S AWM 156 HANGERS

N-S AWM 155 HANGERS

E-W AWM 155 HANGERS

BLOCK OUTLINE

GRAVEL ROAD

POH — OVERHEAD UTILITY LINE

UTILITY ELECTRIC POLE

NO SOLAR BUILD AREA

OVERHEAD UTILITY EASEMENT

MV JUNCTION BOX

COMBINER BOX OUTLINE/ 4.40MVA INVERTER

- INVERTER ISX.A
- INVERTER ISX.B
- INVERTER ISX.C
- INVERTER ISX.D

34.5 kV AC COLLECTORS

- FEEDER 1
- FEEDER 2
- FEEDER 3
- FEEDER 4
- FEEDER 5
- FEEDER 6

PRELIMINARY DRAWING

NOT TO BE USED FOR CONSTRUCTION

TETRA TECH

DOCUMENT CONTROL NUMBER
705-2317230200-DWG-E0008-D SHT 1 OF 1

DWG. NO.	REFERENCE DRAWINGS	REFERENCE DRAWINGS

	REVISION DESCRIPTION	BY	DESIGN	CHECK	APPROVED	DATE
D	90% ISSUED FOR REVIEW	MA	MA	AA	AA	05/05/2023
C	60% ISSUED FOR REVIEW	MA	MA	AA	AA	03/23/2023
B	30% ISSUED FOR REVIEW	MA	MA	AA	AA	02/21/2023
A	EARLY WORKS	DS	DS	AA	AA	01/27/2023

SCALE: AS SHOWN		DATE
DESIGNED:	M.ACKER	05/05/2023
DRAWN:	A.MOLATORE	05/05/2023
CHECKED:	A.AGOPIAN	05/05/2023
APPROVED:	A.AGOPIAN	05/05/2023
CLIENT APP.:		

PCL CONSTRUCTION
2201 BRISTOL CIRCLE, SUITE 500
OAKVILLE, ONTARIO, L6H-0J8
PHONE: 905-276-7600

SITE OR AREA: CLEARVIEW SOLAR

TITLE: SOLAR ARRAY LAYOUT

DRAWING NUMBER	REV
705-2317230200-DWG-E0008-D SHT 1 OF 2	D

C:\USERS\MATT.ACKER\TETRA TECH, INC\CLEARVIEW CAD SHARE – GENERAL\CAD FILES\DC ELECTRICAL\CAD\705-2317230200-DWG-E0008 SOLAR ARRAY LAYOUT

5/3/2023 7:19:16 PM

ACKER, MATT

LEGEND

COMBINER BOX NAMING CONVENTION/LOCATION

IS29.A+CB1-C56/C57-R20-21S

- INVERTER # — IS29
- INVERTER # — A
- A-B-C-D DESIGNATION — B
- COMBINER BOX # — 1
- COLUMN — C56
- IN BETWEEN — C57
- ROW — R20
- # OF STRINGS — 21
- COLUMN — S

ROAD LINK NAMING CONVENTION

R6/R11 LINK E/W

- ROW — R6
- IN BETWEEN — R11
- LINK INDICATOR — LINK
- EAST/WEST INDICATOR IF APPLICABLE — E/W
- ROW

PV STRING NAMING CONVENTION

IS29.A+CB1-C53R20-S10

- INVERTER # — IS29
- INVERTER # — A
- A-B-C-D DESIGNATION — B
- COMBINER BOX # — 1
- COLUMN — C53
- ROW — R20
- STRING CIRCUIT # — S10

INVERTER NAMING CONVENTION

IS29.A

- INVERTER # — IS29
- INVERTER # A-B-C-D DESIGNATION — A

COLUMN NAMING CONVENTION

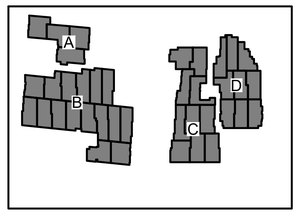
C53

- AREA INDICATOR — C
- COLUMN # — 53

ROW NAMING CONVENTION

R20

- ROW INDICATOR — R
- ROW # — 20



500' 0" 500' 1000' 1500'
FEET 1"=500'-0"

PRELIMINARY DRAWING

NOT TO BE USED FOR CONSTRUCTION

TETRA TECH

DOCUMENT CONTROL NUMBER

705-2317230200-DWG-E0008-D SHT 2 OF 2

DWG. NO.	REFERENCE DRAWINGS	REFERENCE DRAWINGS

		BY	DESIGN	CHECK	APPROVED	DATE
D	90% ISSUED FOR REVIEW	MA	MA	AA	AA	05/05/2023
C	60% ISSUED FOR REVIEW	MA	MA	AA	AA	03/23/2023
B	30% ISSUED FOR REVIEW	MA	MA	AA	AA	02/21/2023
A	EARLY WORKS	DS	DS	AA	AA	01/27/2023

REVISION DESCRIPTION

SCALE: AS SHOWN		DATE
DESIGNED:	M.ACKER	05/05/2023
DRAWN:	A.MOLATORE	05/05/2023
CHECKED:	A.AGOPIAN	05/05/2023
APPROVED:	A.AGOPIAN	05/05/2023
CLIENT APP.:		

PCL CONSTRUCTION
2201 BRISTOL CIRCLE, SUITE 500
OAKVILLE, ONTARIO, L6H-0J8
PHONE: 905-276-7600

SITE OR AREA: CLEARVIEW SOLAR

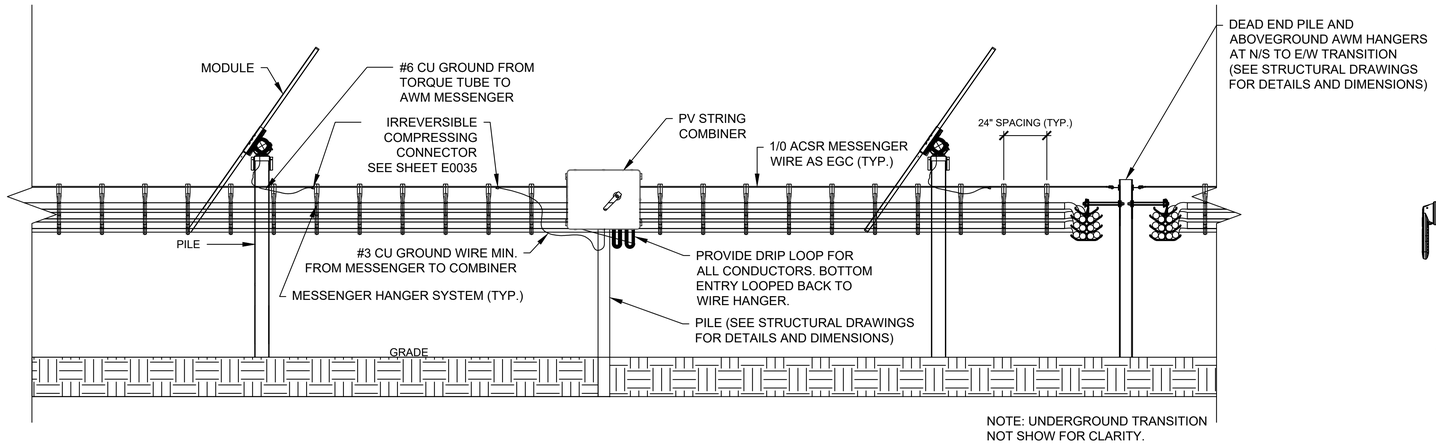
TITLE: SOLAR ARRAY GRID

DRAWING NUMBER	REV
705-2317230200-DWG-E0008 SHT 2 OF 2	D

5/5/2023 7:18:57 PM
ACKER, MATT

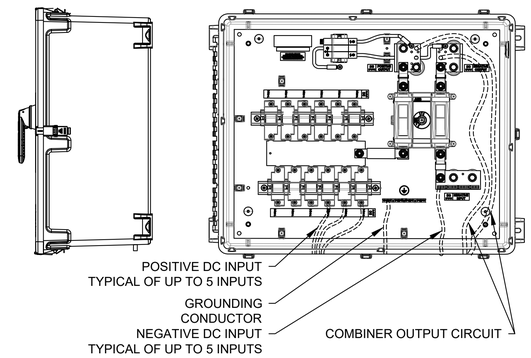
C:\USERS\MATT.ACKER\TETRA TECH, INC\CLEARVIEW CAD SHARE - GENERAL\CAD FILES\DC ELECTRICAL\CAD\705-2317230200-DWG-E0008 SOLAR ARRAY LAYOUT ROWS

NOTES:
1. ENSURE THAT THE COMBINER BOX DOES NOT HAVE A HOLE AT THE BOTTOM FOR CONDUIT.
2. FREE AIR CABLES, SUCH AS MODULE LEADS AND CABLES NOT RESTRAINED BY WIRE MANAGEMENT SYSTEM, MUST BE SECURED WITHIN 12" OF CONNECTION POINTS AND EVERY 24" THEREAFTER BY ZIP TIES. ZIP TIES SHALL BE OUTDOOR RATED, WET RATED, AND UV RATED.



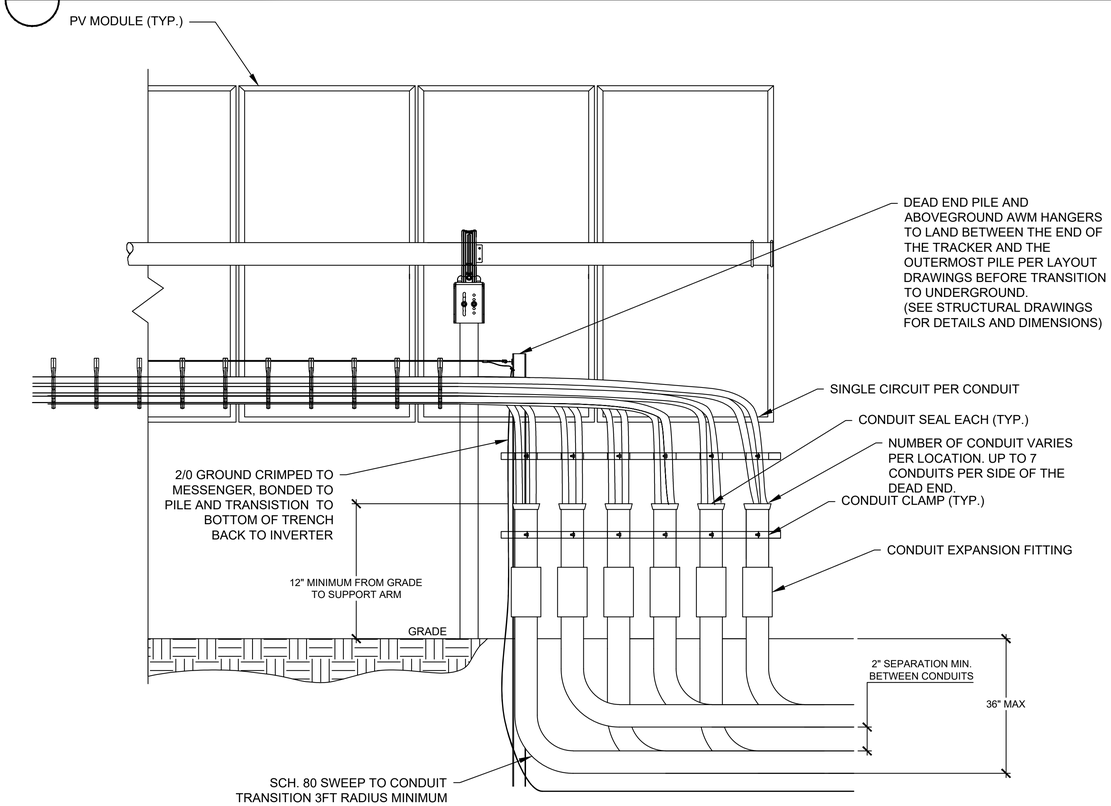
1 AWM AND COMBINER BOX ELEVATION AND E/W TRANSITION DETAILS

N.T.S.



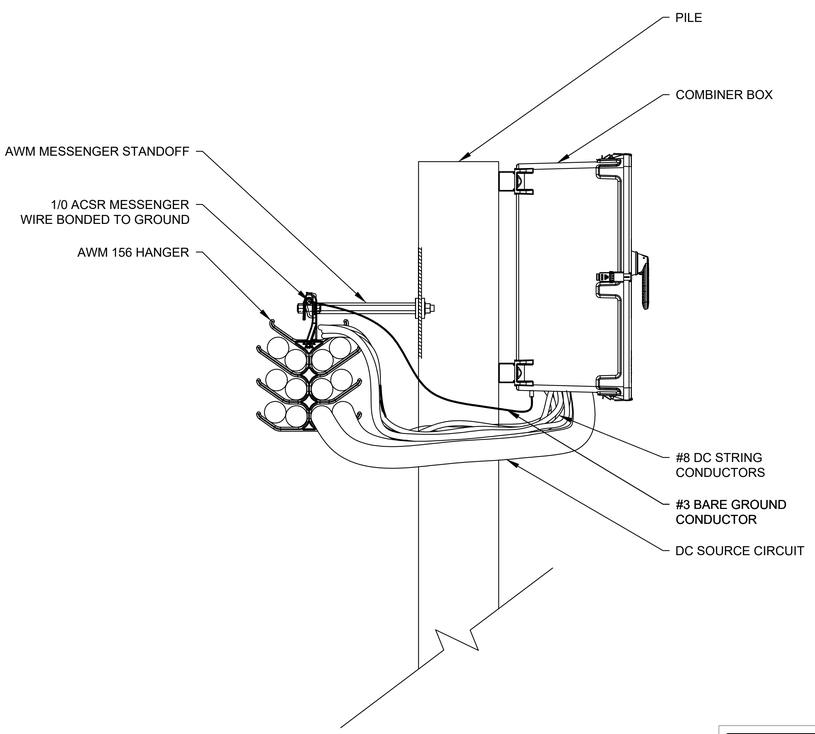
2 COMBINER BOX SIDE AND FRONT DETAIL

N.T.S.



3 DEAD END PILE AND UNDERGROUND TRANSITION DETAIL SIDE VIEW

N.T.S.



4 COMBINER BOX AND AWM PROFILE VIEW

N.T.S.

PRELIMINARY DRAWING

NOT TO BE USED FOR CONSTRUCTION

TETRA TECH

DOCUMENT CONTROL NUMBER
705-2317230200-DWG-E0027-C SHT 1 OF 2

DWG. NO.	REFERENCE DRAWINGS	DWG. NO.	REFERENCE DRAWINGS

	REVISION DESCRIPTION	BY	DESIGN	CHECK	APPROVED	DATE
C	90% ISSUED FOR REVIEW	MA	MA	AA	AA	05/05/2023
B	60% ISSUED FOR REVIEW	MA	MA	AA	AA	03/23/2023
A	30% ISSUED FOR REVIEW	MA	MA	AA	AA	02/21/2023

SCALE:	AS SHOWN	DATE
DESIGNED:	M.ACKER	05/05/2023
DRAWN:	A.MOLATORE	05/05/2023
CHECKED:	A.AGOPIAN	05/05/2023
APPROVED:	A.AGOPIAN	05/05/2023
CLIENT APP.:		

PCL CONSTRUCTION
2201 BRISTOL CIRCLE, SUITE 500
OAKVILLE, ONTARIO, L6H-0J8
PHONE: 905-276-7600

SITE OR AREA: CLEARVIEW SOLAR

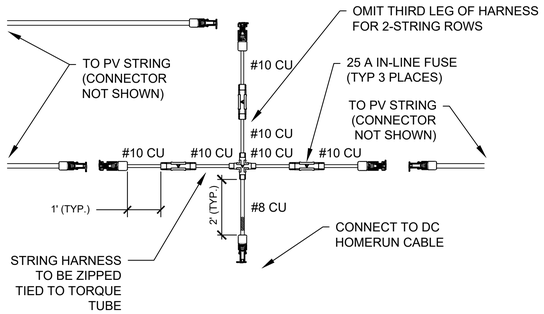
TITLE: AWM, COMBINER BOX ELEVATION & HARNESS

DRAWING NUMBER: 705-2317230200-DWG-E0027-C SHT 1 OF 2

REV: C

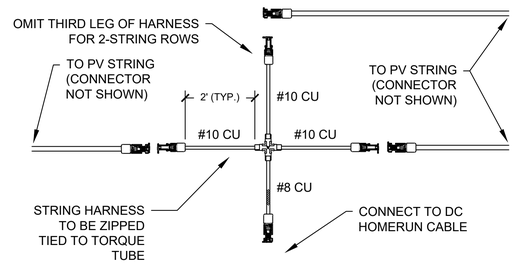
BURDIAK, TIM 5/4/2023 11:52:47 AM

C:\USERS\TIM.BURDIAK\TETRA TECH, INC\CLEARVIEW CAD SHARE - GENERAL\CAD FILES\DC ELECTRICAL\CAD\705-2317230200-DWG-E0027 AWM AND COMBINER BOX ELEVATION



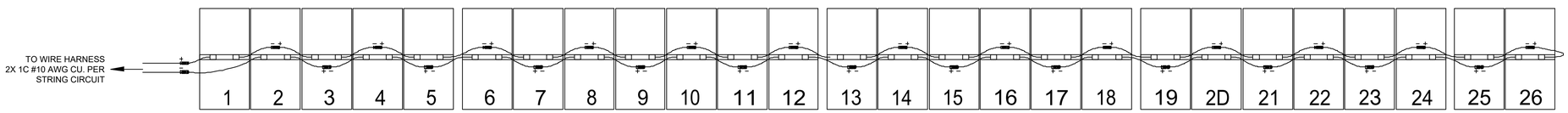
1 PV STRING WIRING HARNESS, POSITIVE (FUSED)

SCALE: N.T.S



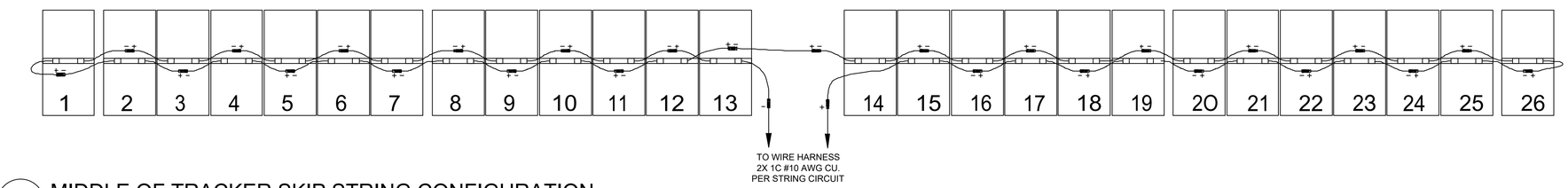
2 PV STRING WIRING HARNESS, NEGATIVE (UNFUSED)

SCALE: N.T.S



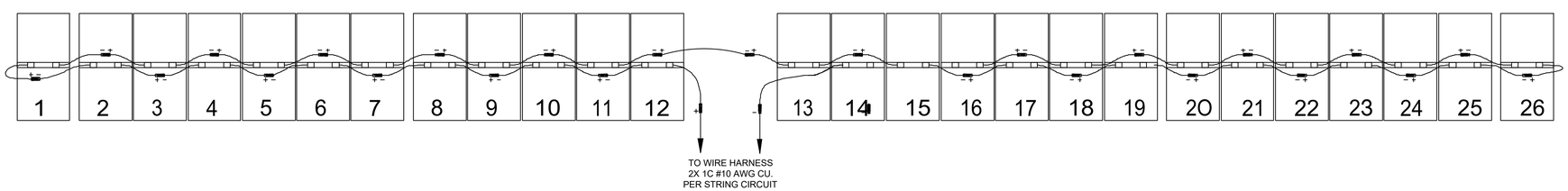
3 END OF TRACKER SKIP STRING CONFIGURATION

SCALE: N.T.S



4 MIDDLE OF TRACKER SKIP STRING CONFIGURATION

SCALE: N.T.S



5 MIDDLE OF TRACKER SKIP STRING CONFIGURATION, TWO STRING TRACKER

SCALE: N.T.S

NOTES:

1. ENSURE THAT THE COMBINER BOX DOES NOT HAVE A HOLE AT THE BOTTOM FOR CONDUIT.
2. POSITIVE PIGTAILS FOR STRINGS TO BE ON NORTH END OF TRACKERS.
3. PROPER BEND RADIUS FOLLOWED FOR ALL LEADS
4. STRINGS TO BE LABELED WITH A WEATHER RESISTANT LABEL
5. FREE AIR CABLES, SUCH AS MODULE LEADS AND CABLES NOT RESTRAINED BY WIRE MANAGEMENT SYSTEM, MUST BE SECURED WITHIN 12" OF CONNECTION POINTS AND EVERY 24" THERAFTER BY ZIP TIES.
6. ZIP TIES SHALL BE OUTDOOR RATED, WET RATED, ADN UV RATED.

PRELIMINARY DRAWING

NOT TO BE USED FOR CONSTRUCTION

TETRA TECH

DOCUMENT CONTROL NUMBER

705-2317230200-DWG-E0027-C SHT 2 OF 2

DWG. NO.	REFERENCE DRAWINGS	REFERENCE DRAWINGS

	REVISION DESCRIPTION	BY	DESIGN	CHECK	APPROVED	DATE
C	90% ISSUED FOR REVIEW	MA	MA	AA	AA	05/05/2023
B	60% ISSUED FOR REVIEW	MA	MA	AA	AA	03/23/2023
A	30% ISSUED FOR REVIEW	MA	MA	AA	AA	02/21/2023

SCALE:	AS SHOWN	DATE
DESIGNED:	M.ACKER	05/05/2023
DRAWN:	A.MOLATORE	05/05/2023
CHECKED:	A.AGOPIAN	05/05/2023
APPROVED:	A.AGOPIAN	05/05/2023
CLIENT APP.:		

PCL CONSTRUCTION
2201 BRISTOL CIRCLE, SUITE 500
OAKVILLE, ONTARIO, L6H-0J8
PHONE: 905-276-7600

SITE OR AREA: CLEARVIEW SOLAR

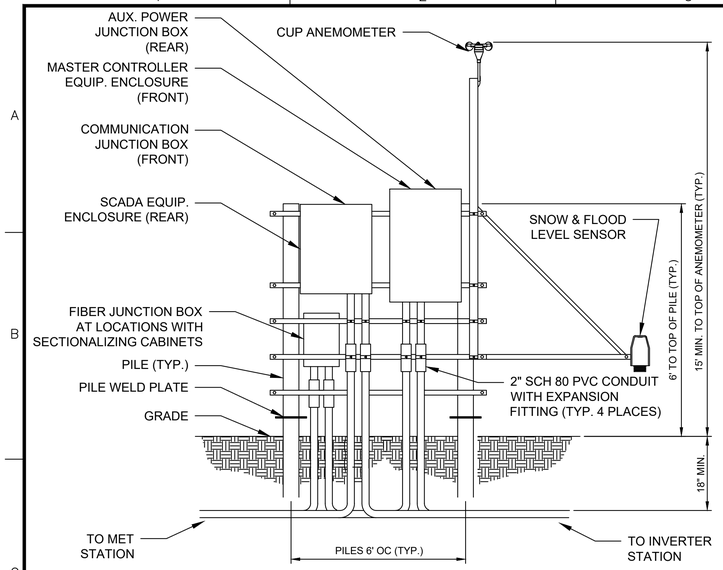
TITLE: MODULE STRING WIRING AND HARNESS

DRAWING NUMBER	REV
705-2317230200-DWG-E0027-C SHT 2 OF 2	C

5/5/2023 12:14:32 PM

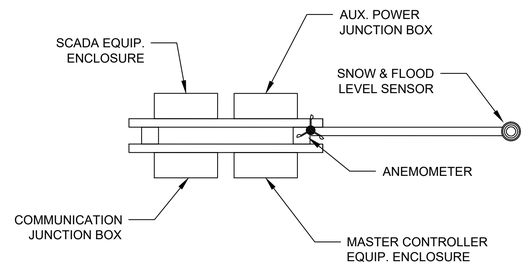
BURDIAK, TIM

C:\USERS\TIM.BURDIAK\TETRA TECH, INC\CLEARVIEW CAD SHARE – GENERAL\CAD FILES\DC ELECTRICAL\CAD\705-2317230200-DWG-E0027 MODULE STRING WIRING



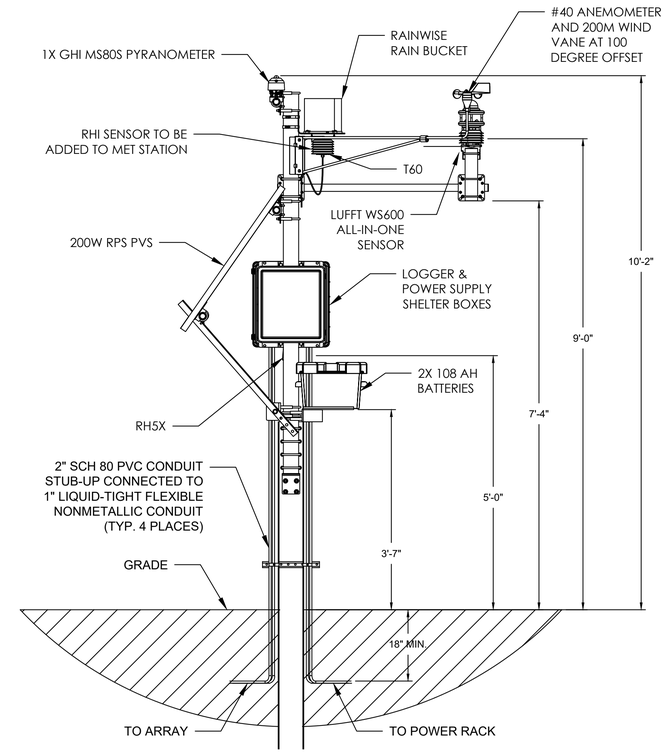
1 POWER RACK ELEVATION VIEW

N.T.S.



2 POWER RACK PLAN VIEW

N.T.S.

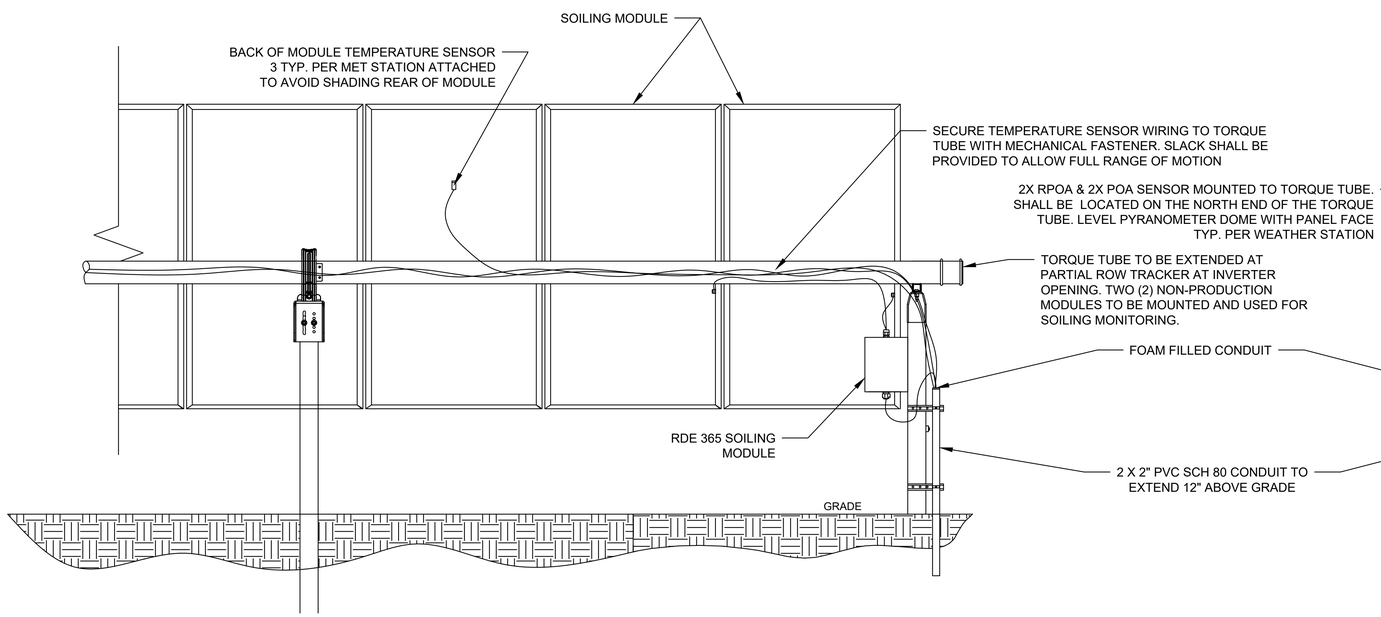


3 METSTATION FRONT VIEW

N.T.S.

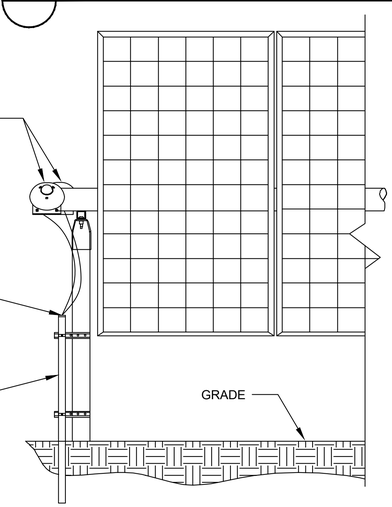
NOTES:

1. METEOROLOGICAL STATION TO BE PLACED AT IS2, IS16, IS22, IS37.
2. MET STATIONS SHALL SUPPORT PERFORMANCE TESTING PER EPC AGREEMENT AS WELL AS ANY TELEMETRY REQUIREMENT FOR WEATHER DATA TO THE ISO/RTO
3. EXPANSION FITTINGS TO BE USED AT ALL BELOW GROUND TO ABOVE GROUND CONDUIT TERMINATIONS UNLESS NOTED.
4. NO TOP CONDUIT ENTRY INTO ENCLOSURES.
5. MET STATION AND POWER RACK TO BE LOCATED TO LIMIT SHADING ONNEARBY PV MODULES



4 SOILING MODULE AND BACK OF MODULE TEMPERATURE SENSOR DETAIL

N.T.S.



5 POA AND RPOA PYRANOMETER DETAIL

N.T.S.

PRELIMINARY DRAWING

NOT TO BE USED FOR CONSTRUCTION

TETRA TECH

DOCUMENT CONTROL NUMBER

705-2317230200-DWG-E0028-B SHT 1 OF 1

DWG. NO.	REFERENCE DRAWINGS	REFERENCE DRAWINGS

	REVISION DESCRIPTION	BY	DESIGN	CHECK	APPROVED	DATE
B	90% ISSUED FOR REVIEW	MA	MA	AA	AA	05/05/2023
A	60% ISSUED FOR REVIEW	MA	MA	AA	AA	03/23/2023

SCALE: AS SHOWN		DATE
DESIGNED:	M.ACKER	05/05/2023
DRAWN:	A.MOLATORE	05/05/2023
CHECKED:	A.AGOPIAN	05/05/2023
APPROVED:	A.AGOPIAN	05/05/2023
CLIENT APP.:		

PCL CONSTRUCTION
2201 BRISTOL CIRCLE, SUITE 500
OAKVILLE, ONTARIO, L6H-0J8
PHONE: 905-276-7600

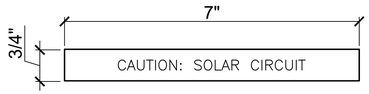
SITE OR AREA: CLEARVIEW SOLAR

TITLE: POWER RACK, MET STATIONS AND SENSORS

DRAWING NUMBER	REV
705-2317230200-DWG-E0028-B SHT 1 OF 1	B

ACKER, MATT 5/5/2023 10:18:23 PM

C:\USERS\MATT.ACKER\TETRA TECH, INC\CLEARVIEW CAD SHARE - GENERAL\CAD FILES\DC ELECTRICAL\CAD\705-2317230200-DWG-E0028 MET STATIONS

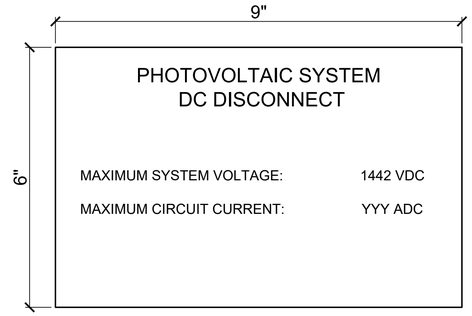


MARKING IS REQUIRED ON ALL INTERIOR AND EXTERIOR DC CONDUIT, RACEWAYS, ENCLOSURES, CABLE ASSEMBLIES, AND JUNCTION BOXES TO ALERT THE FIRE SERVICE TO AVOID CUTTING THEM.

SEE GENERAL NOTES FOR FONT SIZE AND COLORS.

1 PV CONDUIT IDENTIFICATION

N.T.S.



(699 PLACES) - SEE 'DC DISCONNECT VALUES' TABLE

2 SIGNAGE ON ALL DC COMBINERS AND INVERTERS

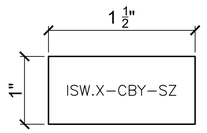
N.T.S.

DC DISCONNECT VALUES (560W MODULES)		
NUMBER OF STRINGS PER COMBINER	RATED PV POWER (KW)	MAXIMUM CIRCUIT CURRENT (A) (YYY)
10	145	147
15	218	221
16	232	236
17	247	250
18	262	265
19	276	280
20	291	295
21	305	309

DC DISCONNECT VALUES (565W MODULES)		
NUMBER OF STRINGS PER COMBINER	RATED PV POWER (KW)	MAXIMUM CIRCUIT CURRENT (A) (YYY)
10	146	148
15	220	222
16	235	237
17	249	252
18	264	266
19	279	281
20	293	296
21	308	311

NOTES:

1. ALL SIGNS SHOWN ARE FIELD INSTALLED. OTHER SIGNAGE MAY BE SHOWN ON SHOP / FABRICATION DRAWINGS.
2. ALL SIGNS (EXCEPT FOR STRING LABELS AND DANGER SIGNS) HAVE: A RED BACKGROUND, WHITE LETTERING, MINIMUM 3/8" LETTER HEIGHT, ALL CAPITAL LETTERS, ARIAL OR SIMILAR FONT (NON BOLD), REFLECTIVE WEATHER RESISTANT MATERIAL SUITABLE FOR THE ENVIRONMENT.
3. WARNING LETTERING IS MINIMUM 1/2" LETTER HEIGHT, ALL CAPITAL LETTERS, AERIAL FONT (BOLD) EXCEPT AS SPECIFICALLY NOTED.
4. ELECTRICAL POWER SOURCE DIRECTORY PLACARD (DETAIL 4) SHALL BE INSTALLED AT EACH SERVICE EQUIPMENT LOCATION, AND AT THE LOCATION(S) OF THE SYSTEM DISCONNECT(S) PER NEC 705.10.



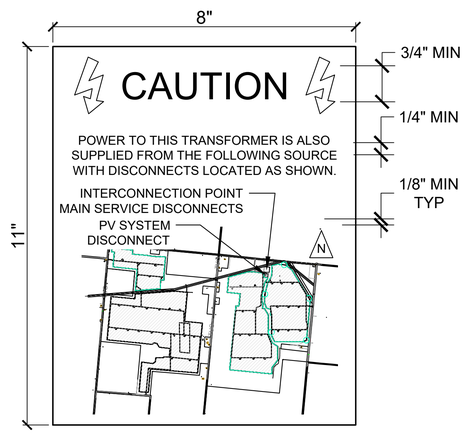
CIRCUIT LEGEND:

ISW - INVERTER STATION

"X" REPRESENTS THE INVERTER DESIGNATION
"Y" REPRESENTS THE COMBINER NUMBER
"Z" REPRESENTS THE STRING NUMBER

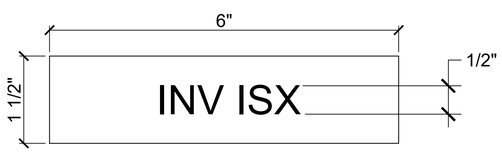
3 SIGNAGE ON ALL STRING PV CIRCUITS

N.T.S.



4 ELECTRICAL POWER SOURCE DIRECTORY

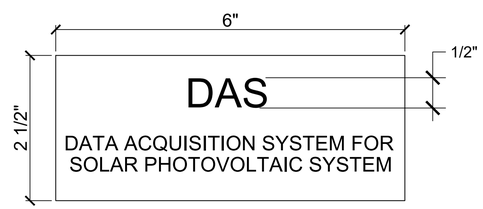
N.T.S.



PLACE THIS INVERTER LABEL
ON A PORTION OF THE ENCLOSURE NOT REMOVED
DURING MAINTENANCE SWAP-OUT (1 PER INVERTER)

5 LAMICOID INVERTER IDENTIFICATION PLACARD

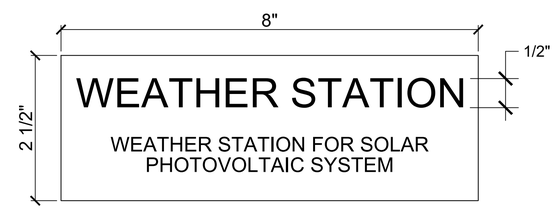
N.T.S.



INSTALL AT ALL DAS LOCATIONS
(39 LOCATIONS)

6 DAS EQUIPMENT PLACARD

N.T.S.



INSTALL AT ALL WEATHER STATION LOCATIONS
(4 LOCATIONS)

7 WEATHER STATION PLACARD

N.T.S.

PRELIMINARY DRAWING

NOT TO BE USED FOR CONSTRUCTION

TETRA TECH

DOCUMENT CONTROL NUMBER
705-2317230200-DWG-E0029-B SHT 1 OF 1

DWG. NO.	REFERENCE DRAWINGS	REFERENCE DRAWINGS

	REVISION DESCRIPTION	BY	DESIGN	CHECK	APPROVED	DATE
B	90% ISSUED FOR REVIEW	MA	MA	AA	AA	05/05/2023
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DESIGNED:	M.ACKER	05/05/2023
DRAWN:	A.MOLATORE	05/05/2023
CHECKED:	A.AGOPIAN	05/05/2023
APPROVED:	A.AGOPIAN	05/05/2023
CLIENT APP.:		

PCL CONSTRUCTION
2201 BRISTOL CIRCLE, SUITE 500
OAKVILLE, ONTARIO, L6H-0J8
PHONE: 905-276-7600

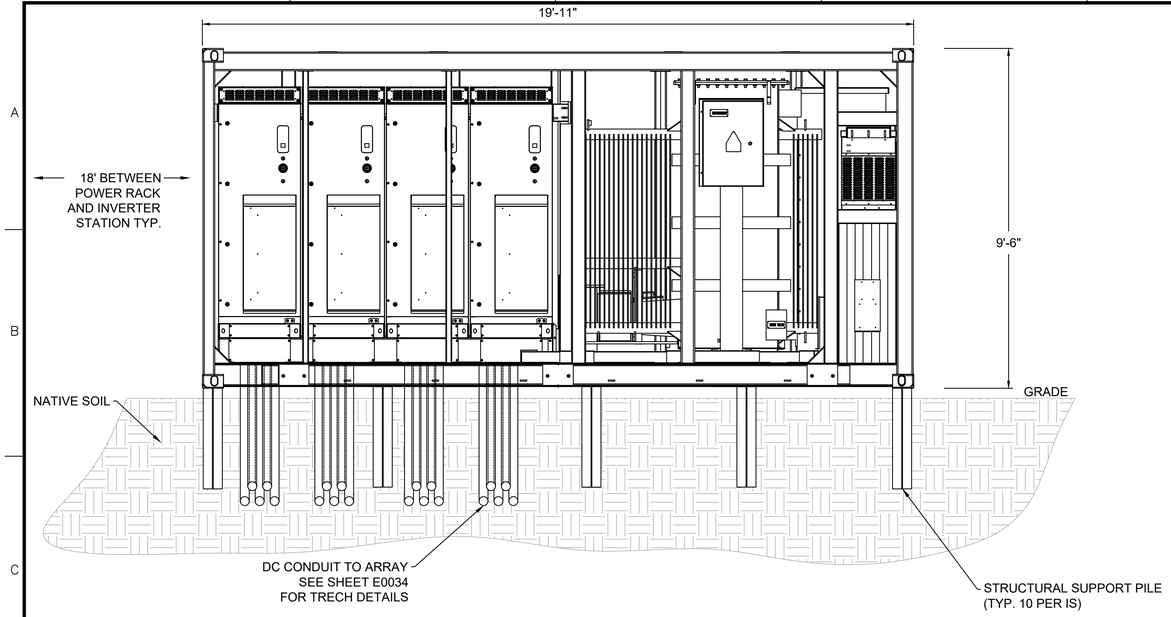
SITE OR AREA: CLEARVIEW SOLAR

TITLE: NAMEPLATES

DRAWING NUMBER	REV
705-2317230200-DWG-E0029-B SHT 1 OF 1	B

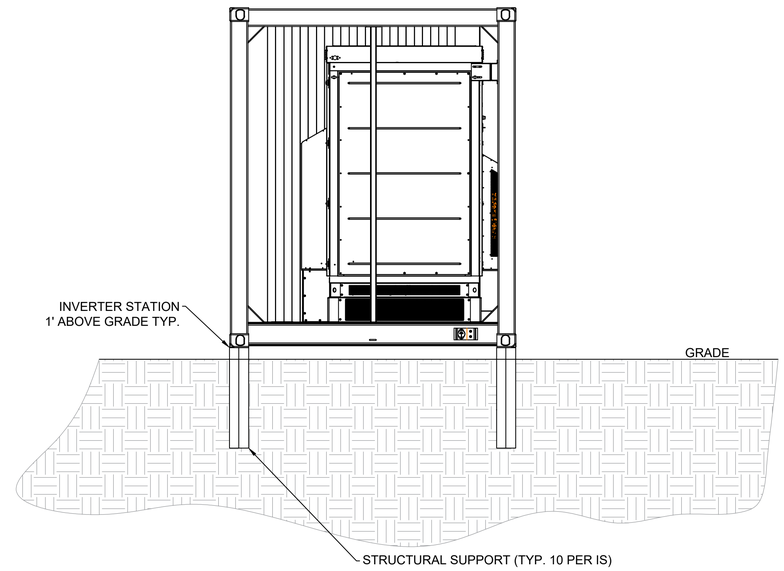
5/3/2023 5:37:31 PM
ACKER, MATT

C:\USERS\MATT.ACKER\TETRA TECH, INC\CLEARVIEW CAD SHARE - GENERAL\CAD FILES\DC ELECTRICAL\CAD\705-2317230200-DWG-E0029 NAMEPLATES



1 SUNGROW SG4400-MV-US FRONT VIEW

N.T.S.

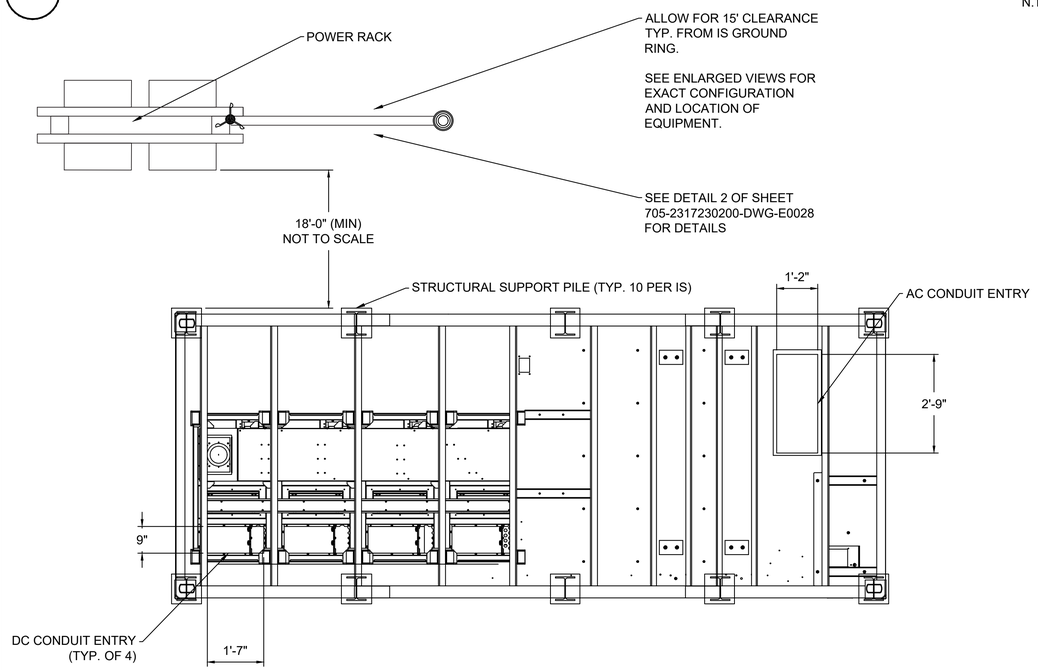


2 SUNGROW SG4400-MV-US LEFT VIEW

N.T.S.

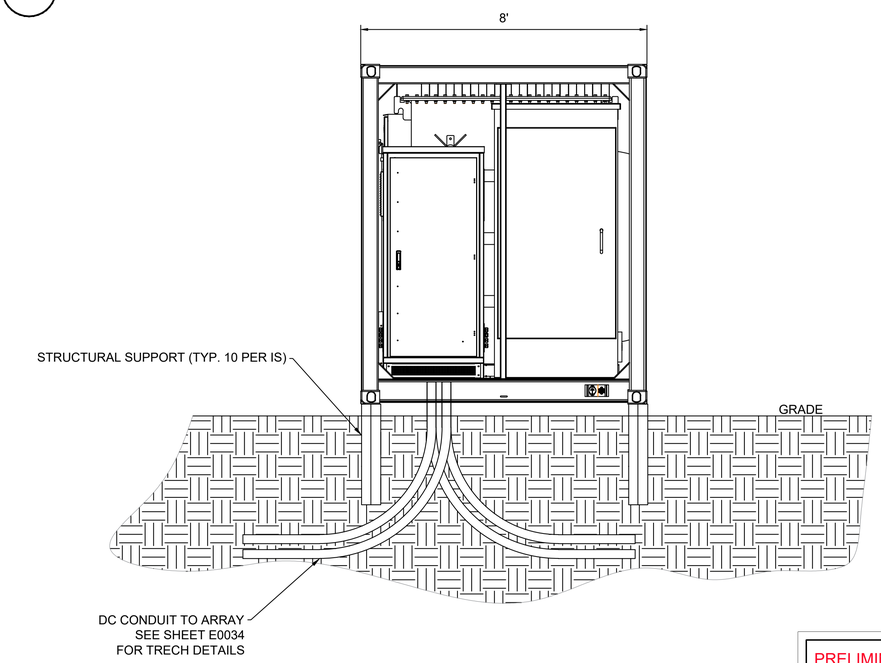
NOTES:

1. SEE CIVIL DRAWINGS FOR GRADING DETAILS AROUND SKID.
2. SEE STRUCTURAL DRAWINGS FOR SKID POST DETAILS.
3. SEE SKID MANUFACTURER DRAWINGS FOR EXACT CONDUIT LOCATIONS.
4. CONDUIT ENTRY POINTS TO BE SEALED WITH EXPANDING FOAM AT TOP ENDS.
5. CONNECT CABLE CONCENTRIC NEUTRALS, BUSHING DRAIN WIRES, ELBOW DRAIN WIRES, ARRESTER GROUND LEADS, AND FEEDER GROUND CONDUCTOR INDIVIDUALLY TO GROUNDING SYSTEM. ENSURE SWITCH IS CLOSED PRIOR TO ENERGIZATION.
6. ALLOW SLACK IN PRIMARY AND NEUTRALS TO ALLOW DISCONNECTING OF ELBOW AND MOUNTING ON PARKING STAND. DO NOT BEND MV CONDUCTORS LESS THAN 12 TIMES CABLE DIAMETER PER NEC 300.34.
7. MAINTAIN 10' CLEAR SPACE REQUIRED IN FRONT OF DOOR.
8. SEE SUNGROW DRAWING PACKAGE FOR INSTALLATION DETAILS
9. STRUCTURAL SUPPORT LOCATIONS FOR INFORMATION ONLY. SEE DRAWING 705-2317230200-DWG-S0003 FOR STRUCTURAL SUPPORT DETAILS.



3 SUNGROW SG4400-MV-US TOP VIEW

N.T.S.



4 SUNGROW SG4400-MV-US RIGHT VIEW

N.T.S.

PRELIMINARY DRAWING

NOT TO BE USED FOR CONSTRUCTION

TETRA TECH

DOCUMENT CONTROL NUMBER

705-2317230200-DWG-E0031-C SHT 1 OF 2

DWG. NO.	REFERENCE DRAWINGS		REFERENCE DRAWINGS

	REVISION DESCRIPTION	BY	DESIGN	CHECK	APPROVED	DATE
C	90% ISSUED FOR REVIEW	MA	MA	AA	AA	05/05/2023
B	60% ISSUED FOR REVIEW	MA	MA	AA	AA	03/23/2023
A	30% ISSUED FOR REVIEW	MA	MA	AA	AA	02/21/2023

SCALE: AS SHOWN		DATE
DESIGNED:	M.ACKER	05/05/2023
DRAWN:	A.MOLATORE	05/05/2023
CHECKED:	A.AGOPIAN	05/05/2023
APPROVED:	A.AGOPIAN	05/05/2023
CLIENT APP.:		

PCL CONSTRUCTION
2201 BRISTOL CIRCLE, SUITE 500
OAKVILLE, ONTARIO, L6H-0J8
PHONE: 905-276-7600

SITE OR AREA: CLEARVIEW SOLAR

TITLE: INVERTER SKID LAYOUT

DRAWING NUMBER: 705-2317230200-DWG-E0031-C SHT 1 OF 2

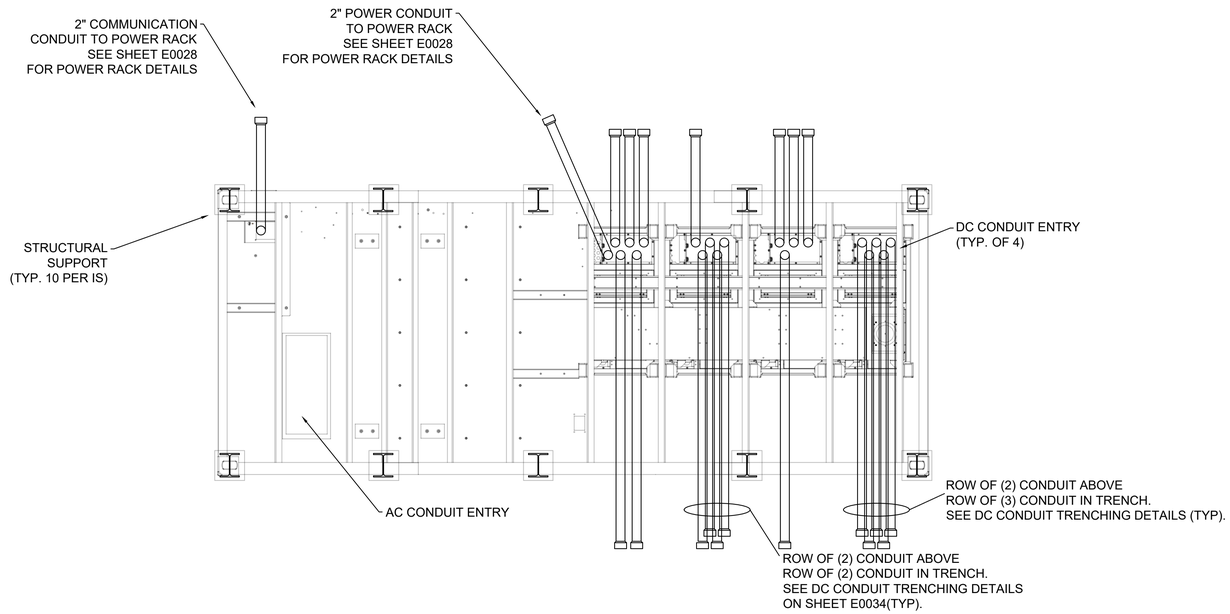
REV:

BURDIAK, TIM 5/4/2023 7:57:27 AM

C:\USERS\TIM.BURDIAK\TETRA TECH, INC\CLEARVIEW CAD SHARE - GENERAL\CAD FILES\DC ELECTRICAL\CAD\705-2317230200-DWG-E0031 INVERTER SKID LAYOUT

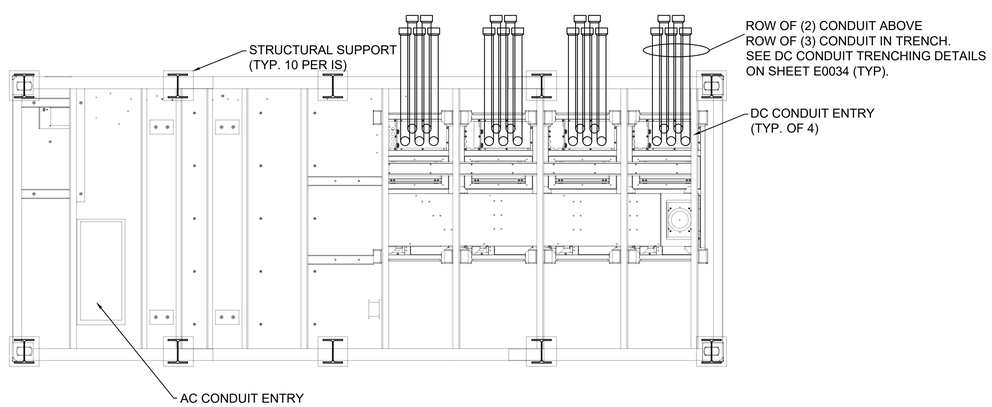
NOTES:

1. SEE CIVIL DRAWINGS FOR GRADING DETAILS AROUND SKID.
2. SEE STRUCTURAL DRAWINGS FOR SKID POST DETAILS.
3. SEE SKID MANUFACTURER DRAWINGS FOR EXACT CONDUIT LOCATIONS.
4. CONDUIT ENTRY POINTS TO BE SEALED WITH EXPANDING FOAM AT TOP ENDS.
5. CONNECT CABLE CONCENTRIC NEUTRALS, BUSHING DRAIN WIRES, ELBOW DRAIN WIRES, ARRESTER GROUND LEADS, AND FEEDER GROUND CONDUCTOR INDIVIDUALLY TO GROUNDING SYSTEM. ENSURE SWITCH IS CLOSED PRIOR TO ENERGIZATION.
6. ALLOW SLACK IN PRIMARY AND NEUTRALS TO ALLOW DISCONNECTING OF ELBOW AND MOUNTING ON PARKING STAND. DO NOT BEND MV CONDUCTORS LESS THAN 12 TIMES CABLE DIAMETER PER NEC 300.34.
7. MAINTAIN 10' CLEAR SPACE REQUIRED IN FRONT OF DOOR.
8. SEE SUNGROW DRAWING PACKAGE FOR INSTALLATION DETAILS.
9. SEE DRAWING 705-2317230200-DWG-E0034 FOR DC CONDUIT TRENCHING DETAILS.
10. SEE DRAWING 705-2317230200-DWG-E0024 FOR AC CONDUIT DETAILS.
11. STRUCTURAL SUPPORT LOCATIONS FOR INFORMATION ONLY. SEE DRAWING 705-2317230200-DWG-S0003 FOR STRUCTURAL SUPPORT DETAILS.



1 SUNGROW SG4400-MV-US TOP VIEW, EXAMPLE NORTH AND SOUTH CONDUIT APPROACH

N.T.S.



2 SUNGROW SG4400-MV-US TOP VIEW, EXAMPLE CONDUIT APPROACH (MAX NO. OF CONDUIT)

N.T.S.

PRELIMINARY DRAWING

NOT TO BE USED FOR CONSTRUCTION

TETRA TECH

DOCUMENT CONTROL NUMBER

705-2317230200-DWG-E0031-C SHT 2 OF 2

DWG. NO.	REFERENCE DRAWINGS	REFERENCE DRAWINGS

	REVISION DESCRIPTION	BY	DESIGN	CHECK	APPROVED	DATE
C	90% ISSUED FOR REVIEW	MA	MA	AA	AA	05/05/2023
B	60% ISSUED FOR REVIEW	MA	MA	AA	AA	03/23/2023
A	30% ISSUED FOR REVIEW	MA	MA	AA	AA	02/21/2023

SCALE: AS SHOWN		DATE
DESIGNED:	M.ACKER	05/05/2023
DRAWN:	A.MOLATORE	05/05/2023
CHECKED:	A.AGOPIAN	05/05/2023
APPROVED:	A.AGOPIAN	05/05/2023
CLIENT APP.:		

PCL CONSTRUCTION
2201 BRISTOL CIRCLE, SUITE 500
OAKVILLE, ONTARIO, L6H-0J8
PHONE: 905-276-7600

SITE OR AREA: CLEARVIEW SOLAR

TITLE: INVERTER CONDUIT DETAILS

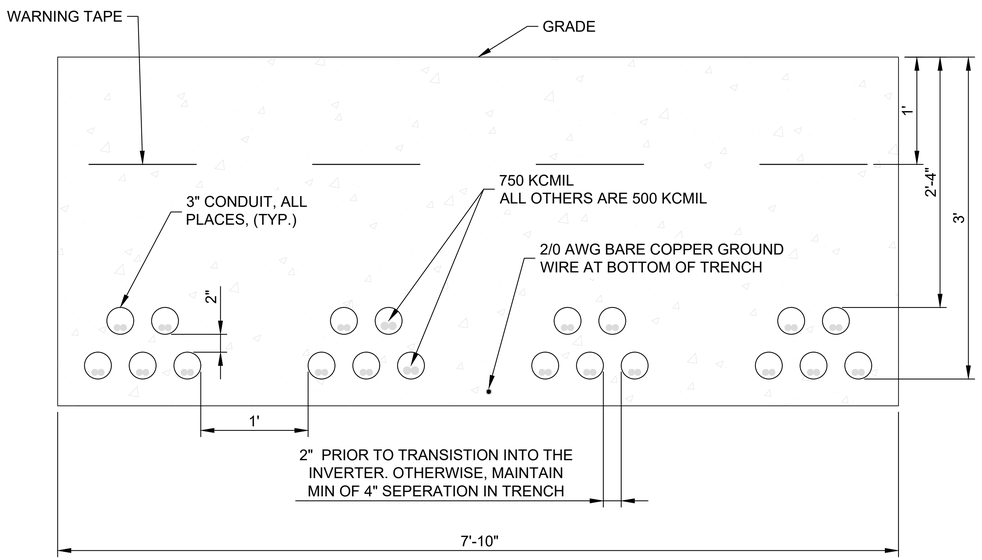
DRAWING NUMBER: 705-2317230200-DWG-E0031-C SHT 2 OF 2

REV:

5/4/2023 7:57:18 AM

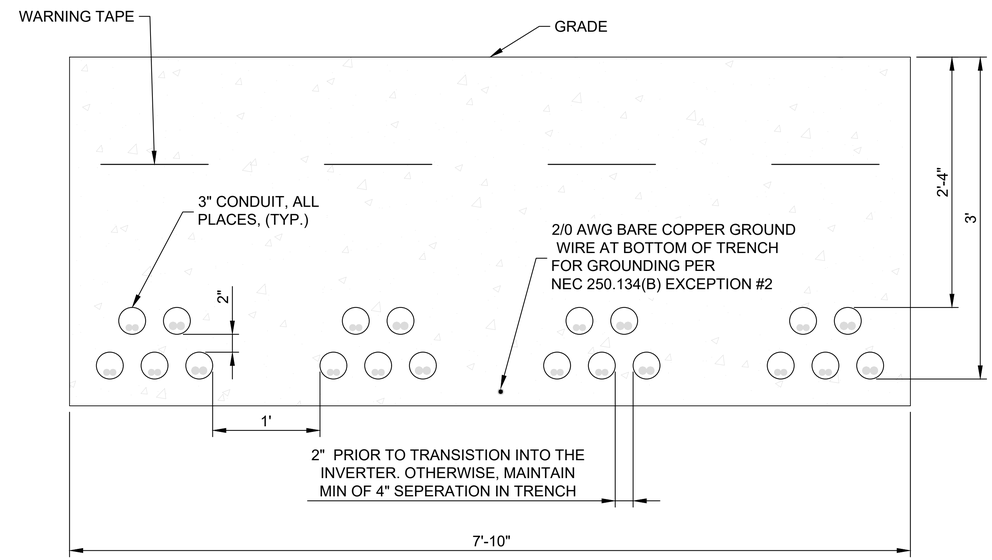
BURDIAK, TIM

C:\USERS\TIM.BURDIAK\TETRA TECH, INC\CLEARVIEW CAD SHARE – GENERAL\CAD FILES\DC ELECTRICAL\CAD\705-2317230200-DWG-E0031 INVERTER CONDUIT DETAILS



1 INVERTER TRENCH SECTION, 560W/565W MODULE WITH MIXED 750KCMIL AND 500KCMIL CONDUCTORS

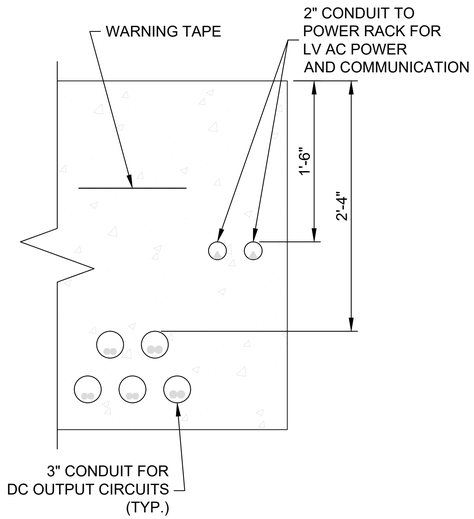
N.T.S.



2 INVERTER TRENCH SECTION, 560W/565W MODULE, ALL 750KCMIL CONDUCTORS

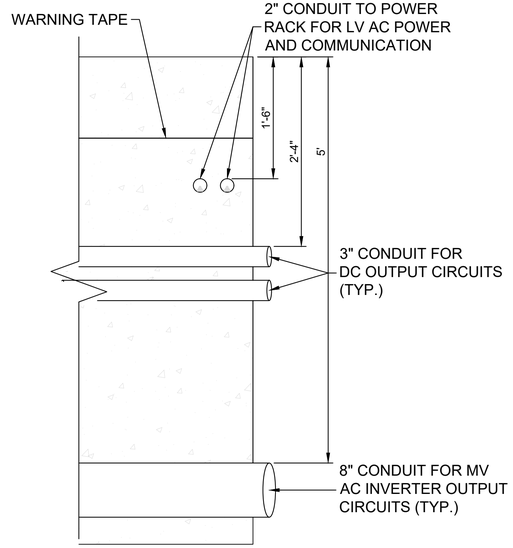
N.T.S.

CONDUCTORS AND CONDUIT KEY		
STRINGS PER COMBINER	≤18 STRINGS	≥19 STRINGS
CONDUCTOR SIZE	500 KCMIL	750 KCMIL
CONDUIT SIZE	3"	3"
APPROX. FILL (%)	20.91%	31.02%



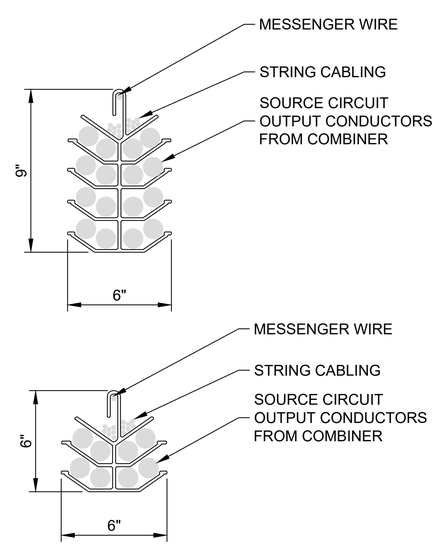
3 LOW VOLTAGE AND COMMUNICATION CONDUIT

N.T.S.



4 AC, DC, AND COMM CROSSING

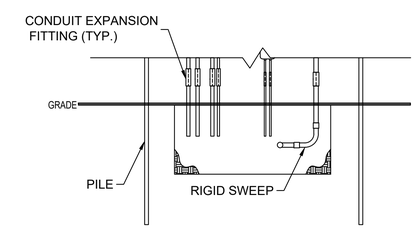
N.T.S.



NOTE: HANGERS SHOULD BE LOADED IN A BALANCED FASHION

5 AWM 555 AND 558 CABLE HANGER LOADING

N.T.S.



6 TYPICAL EXPANSION FITTING DETAIL

N.T.S.

PRELIMINARY DRAWING

NOT TO BE USED FOR CONSTRUCTION

TETRA TECH

DOCUMENT CONTROL NUMBER

705-231730200-E0034-B SHT 1 OF 1

DWG. NO.	REFERENCE DRAWINGS	REFERENCE DRAWINGS

	REVISION DESCRIPTION	BY	DESIGN	CHECK	APPROVED	DATE
B	90% ISSUED FOR REVIEW	MA	MA	AA	AA	05/05/2023
A	60% ISSUED FOR REVIEW	MA	MA	AA	AA	03/23/2023

SCALE: AS SHOWN		DATE
DESIGNED:	M.ACKER	05/05/2023
DRAWN:	A.MOLATORE	05/05/2023
CHECKED:	A.AGOPIAN	05/05/2023
APPROVED:	A.AGOPIAN	05/05/2023
CLIENT APP.:		

PCL CONSTRUCTION
2201 BRISTOL CIRCLE, SUITE 500
OAKVILLE, ONTARIO, L6H-0J8
PHONE: 905-276-7600

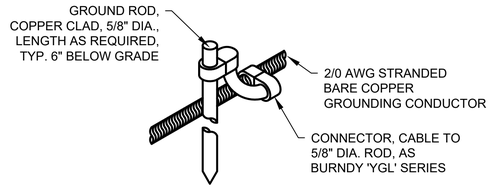
SITE OR AREA: CLEARVIEW SOLAR

TITLE: DC CABLE AND TRENCH SECTION ROUTING DETAILS

DRAWING NUMBER	REV
705-231730200-E0034-B SHT 1 OF 1	B

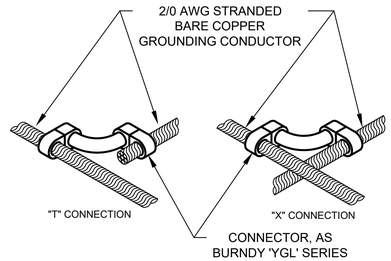
ACKER, MATT 5/3/2023 8:55:27 PM

C:\USERS\MATT.ACKER\TETRA TECH, INC\CLEARVIEW CAD SHARE - GENERAL\CAD FILES\DC ELECTRICAL\CAD\705-2317230200-DWG-E0034_TRENCHSECTIONS



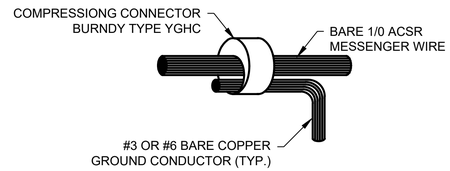
1 GROUND ROD ASSEMBLY

N.T.S.



2 GROUND CONDUCTOR BONDING

N.T.S.



3 GROUND CONNECTION TO MESSENGER

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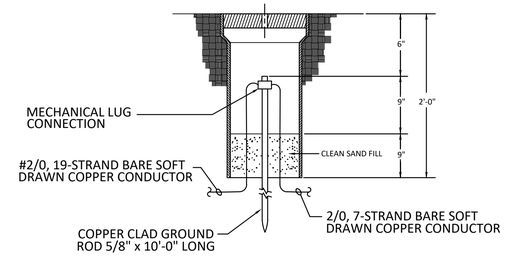
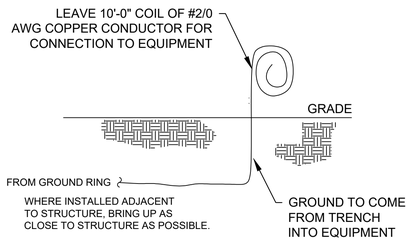


4 GROUND TEST WELL

N.T.S.



5 TYPICAL GROUND CONNECTION TO EQUIIPMENT

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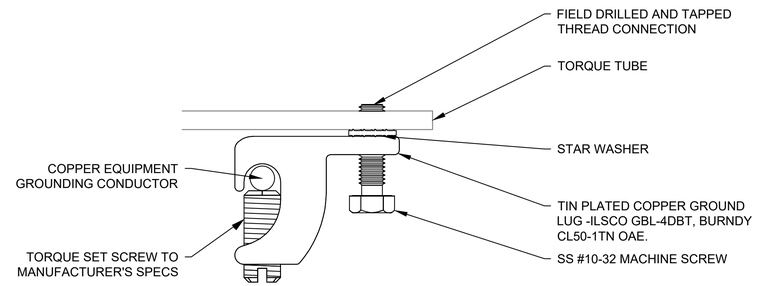

6 GROUNDING EQUIPMENT AND RACKING TO GROUNDING CONDUCTOR

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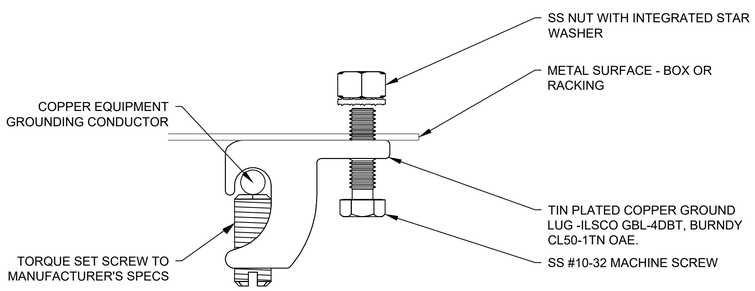

7 GROUNDING LAY IN LUG FOR EQUIPMENT GROUNDING CONDUCTOR

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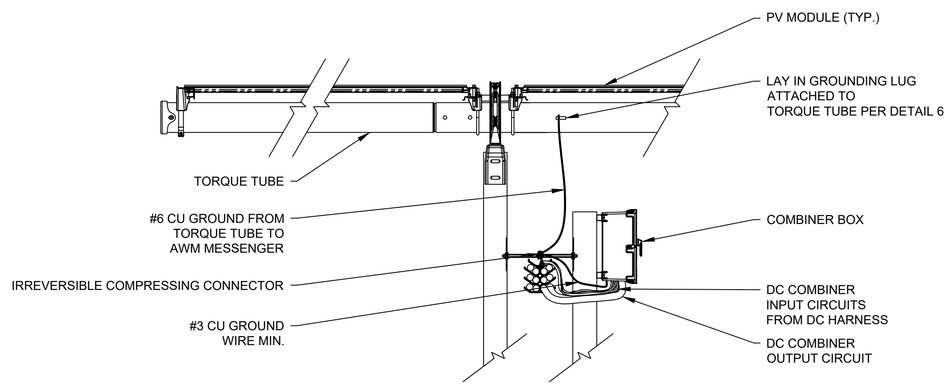


8 GROUNDING EQUIPMENT AND RACKING TO GROUNDING CONDUCTOR

N.T.S.

PRELIMINARY DRAWING

NOT TO BE USED FOR CONSTRUCTION

TETRA TECH

DOCUMENT CONTROL NUMBER

705-2317230200-DWG-E0035-B SHT 1 OF 1

DWG. NO.	REFERENCE DRAWINGS	REFERENCE DRAWINGS

	REVISION DESCRIPTION	BY	DESIGN	CHECK	APPROVED	DATE
B	90% ISSUED FOR REVIEW	MA	MA	AA	AA	05/05/2023
A	60% ISSUED FOR REVIEW	MA	MA	AA	AA	03/23/2023

SCALE: AS SHOWN		DATE
DESIGNED:	M.ACKER	05/05/2023
DRAWN:	A.MOLATORE	05/05/2023
CHECKED:	A.AGOPIAN	05/05/2023
APPROVED:	A.AGOPIAN	05/05/2023
CLIENT APP.:		

PCL CONSTRUCTION
2201 BRISTOL CIRCLE, SUITE 500
OAKVILLE, ONTARIO, L6H-0J8
PHONE: 905-276-7600

SITE OR AREA: CLEARVIEW SOLAR

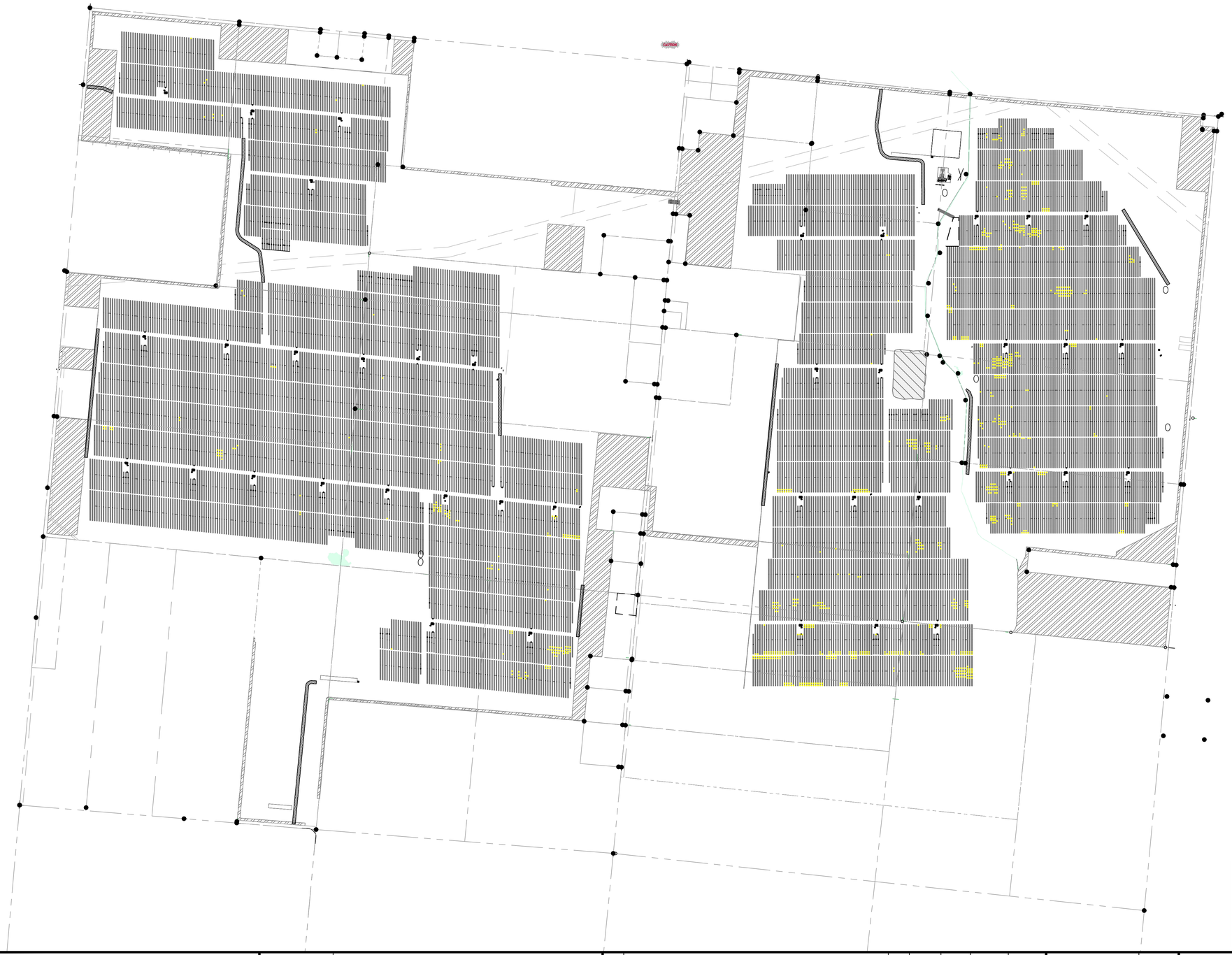
TITLE: GROUNDING DETAILS

DRAWING NUMBER	REV
705-2317230200-DWG-E0035 SHT 1 OF 1	B

5/4/2023 7:21:34 AM

BURDIAK, TIM

C:\USERS\TIM.BURDIAK\TETRA TECH, INC\CLEARVIEW CAD SHARE – GENERAL\CAD FILES\DC ELECTRICAL\CAD\705-2317230200-DWG-E0035 GROUNDING DETAILS

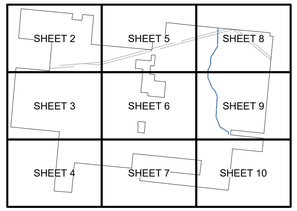


LEGEND

- PARCEL BOUNDARY
- SECTION LINE
- EASEMENT LINE
- EXISTING TREE LINE
- EXISTING DRAINAGE DITCH
- EXISTING WATER EDGE
- WETLAND
- EXISTING PAVED ROAD
- EXISTING GRAVEL ROAD
- MINIMAL (< 3") SPOT GRADING REQUIRED
- FOUND MONUMENT
- SET MONUMENT
- EXISTING CULVERT
- EXISTING CATCH BASIN
- EXISTING CATCH BASIN MANHOLE
- EXISTING CULVERT END SECTION
- EXISTING ELECTRIC BOX
- EXISTING TELEPHONE BOX
- CONSERVATION AREA
- TEMPORARY GRAVEL STAGING/ LAYDOWN
- NO SOLAR BUILD AREAS
- INVERTER PILES

N

500' 0' 500' 1000' 1500'
FEET 1"=500-0"



PRELIMINARY DRAWING

NOT TO BE USED FOR CONSTRUCTION

TETRA TECH

DOCUMENT CONTROL NUMBER
705-2317230200-DWG-S0002-C
SHEET 1 OF 10

DWG. NO.	REFERENCE DRAWINGS	REFERENCE DRAWINGS
4	clearview_1ft_dwg NSRS11-South_TT Surface.DWG	
3	0028621V-SURV_TT.DWG	
2	0028621V-PLANIMET.DWG	
1	CLEARVIEW SOLAR - SITE LAYOUT (144MWAC) - REV.7.DWG	

	REVISION DESCRIPTION	BY	DESIGN	CHECK	APPROVED	DATE
C	ISSUED FOR 90%	JRW	JRW	MFR	MFR	05/05/2023
B	60% REVIEW REVISIONS	JRW	JRW	MFR	MFR	04/11/2023
A	ISSUED FOR 60% REVIEW	JRW	JRW	MFR	MFR	03/17/2023

SCALE: AS SHOWN		DATE
DESIGNED:	J. WAKE	05/05/2023
DRAWN:	J. WAKE	05/05/2023
CHECKED:	M. ROBINSON	05/05/2023
APPROVED:	M. ROBINSON	05/05/2023
CLIENT APP.:		

PCL

PCL SOLAR CONSTRUCTORS USA
2322 WEST GRAND PKWY N, SUITE 200
KATY, TEXAS 77449
PHONE: (647) 401-8379

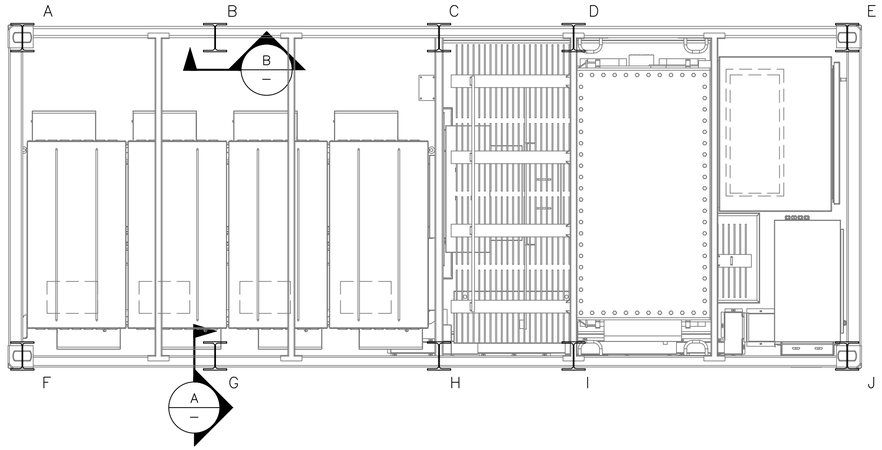
SITE OR AREA: CLEARVIEW SOLAR

TITLE: OVERALL STRUCTURAL SITE PLAN/FOUNDATION PLAN

DRAWING NUMBER	REV
705-2317230200-DWG-S0002 SHEET 1 OF 10	C

WAKE, JOHN 5/2/2023 8:45:47 AM

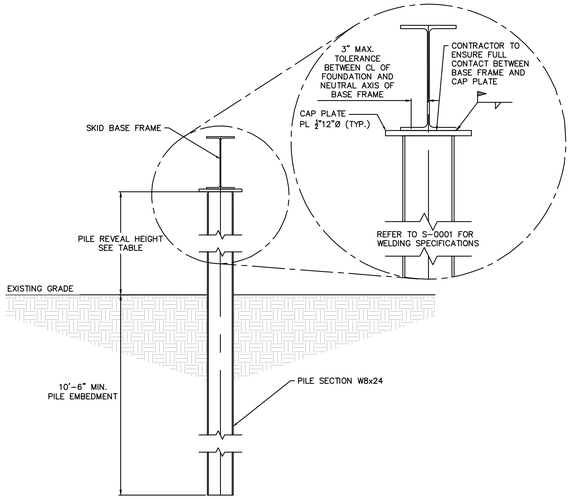
X:\PROJECTS\PWR\PCL CLEARVIEW\07 - STRUCTURAL DESIGN\CLEARVIEW S-0002 STRUCTUAL SITE PLAN



INVERTER/MV TRANSFORMER

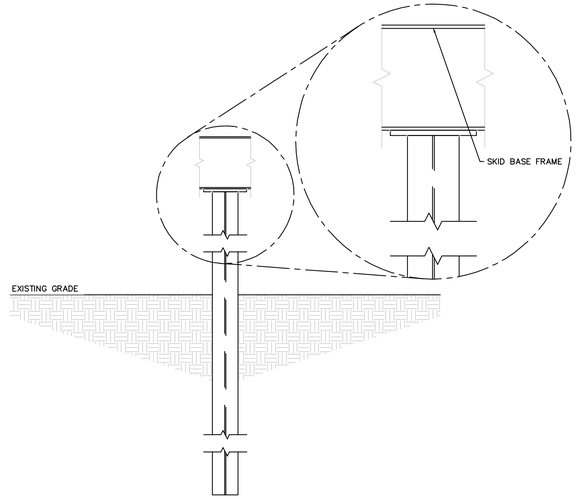
PLAN

SCALE: NTS



SECTION A

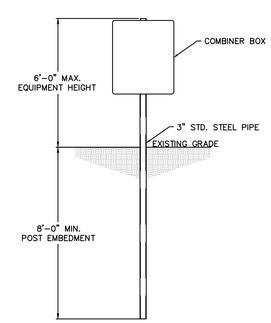
SCALE: NTS



SECTION B

SCALE: NTS

TABLE 1: INVERTER CENTROID COORDINATES		
INVERTER ID	NORTHING	EASTING
IS1	830768.63	1546569.84
IS2	830586.96	1547436.15
IS3	830510.51	1548307.84
IS4	829885.19	1548026.35
IS5	828332.20	1546353.60
IS6	828247.65	1547179.07
IS7	828176.81	1547870.68
IS8	828108.25	1548539.98
IS9	828107.57	1549091.06
IS10	828050.45	1549648.81
IS11	827065.45	1546175.12
IS12	826996.90	1546844.42
IS13	826935.20	1547446.79
IS14	826864.36	1548138.40
IS15	826798.09	1548785.39
IS16	826738.68	1549365.45
IS17	826681.55	1549923.18
IS18	826626.70	1550458.64
IS19	825459.96	1549234.98
IS20	825366.82	1550213.23
IS21	829339.10	1552927.64
IS22	829339.10	1553730.80
IS23	828007.71	1553070.73
IS24	827994.22	1553712.54
IS25	826726.17	1552914.56
IS26	826726.17	1553448.25
IS27	826726.17	1554095.26
IS28	825444.62	1552914.56
IS29	825444.62	1553671.37
IS30	825444.62	1554273.74
IS31	829533.62	1554673.57
IS32	829533.62	1555191.07
IS33	829533.62	1555770.67
IS34	828252.07	1554963.37
IS35	828252.07	1555563.67
IS36	828252.07	1556122.57
IS37	826970.52	1555004.77
IS38	826970.52	1555563.67
IS39	826970.52	1556184.67



COMBINER/P&C PANEL BOX

SUPPORT

SCALE: NTS

ACRONYMS/ABBREVIATIONS:

BB	BOTTOM MOST REINFORCEMENT	KSI	KIPS PER SQUARE INCH
BGS	BELOW GROUND SURFACE	NTS	NOT TO SCALE
C.C.	CONCRETE COVER	O.C.	ON CENTER
CONT	CONTINUOUS	PSF	POUNDS PER SQUARE FOOT
DIA.	DIAMETER	PSI	POUNDS PER SQUARE INCH
E.E.	EACH END	SP.	SPACE
EL.	ELEVATION	SQ.	SQUARE
E.O.S.	EDGE OF SLAB	SS	STAINLESS STEEL
EQ.	EQUAL	T&B	TOP AND BOTTOM
E.S.	EACH SIDE	TT	TOP MOST REINFORCEMENT
E.W.	EACH WAY	T.O.C.	TOP OF CONCRETE
FT	FEET	TYP	TYPICAL
GALV	GALVANIZED	UNO	UNLESS NOTED OTHERWISE
IN	INCHES	XFMR	TRANSFORMER
KIP	KILO-POUND		

NOTES:

1. REFER ELECTRICAL DRAWINGS FOR EQUIPMENT SPECIFICATIONS, ADDITIONAL INFORMATION AND DETAIL REGARDING THE EQUIPMENT RACKS.
2. REFER TO CIVIL AND ELECTRICAL DRAWINGS FOR THE EQUIPMENT RACK FOUNDATION LOCATIONS, ORIENTATION AND GRADING WITHIN THE SITE. CONFIRM WITH CIVIL AND ELECTRICAL DRAWINGS PRIOR TO INSTALLING FOUNDATIONS.
3. EQUIPMENT RACKS ARE DESIGNED FOR THE FOLLOWING EQUIPMENT LOADS AND DIMENSIONS:

   TBD

   UNIFORM LOAD OUTSIDE OF THE EQUIPMENT FOOTPRINT ALONG UNISTRUT TO SUPPORT CONDUIT = 10 PLF MAX

4. IF THE FINAL EQUIPMENT LOADS AND DIMENSIONS EXCEED THE VALUES SHOWN ABOVE, THE FOUNDATIONS SHOULD BE EVALUATED AND REVISED AS APPROPRIATE BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF OHIO.
5. REFER TO SHEET S-0001 FOR GENERAL NOTES, SPECIFICATIONS REGARDING EXCAVATION, BACKFILL AND COMPACTION REQUIREMENTS AND SPECIFICATIONS FOR CAST-IN-PLACE CONCRETE.
6. REFER TO S-0002 FOR STRUCTURAL STEEL PILE AND UNISTRUT FRAMING NOTES AND SPECIFICATIONS
7. REFER TO 705-2317230200-REP-S0003 FOR INVERTER PILE LOCATIONS AND REVEAL HEIGHTS.

PRELIMINARY DRAWING

NOT TO BE USED FOR CONSTRUCTION

TETRA TECH

DOCUMENT CONTROL NUMBER
705-2317230200-DWG-S0003-C

DWG. NO.	REFERENCE DRAWINGS	REFERENCE DRAWINGS

	REVISION DESCRIPTION	BY	DESIGN	CHECK	APPROVED	DATE
C	ISSUED FOR 90% REVIEW	JRW	JRW	MFR	MFR	05/05/2023
B	60% REVIEW REVISIONS	JRW	JRW	MFR	MFR	04/11/2023
A	ISSUED FOR 60% REVIEW	JRW	JRW	MFR	MFR	03/17/2023

SCALE: AS SHOWN		DATE
DESIGNED:	J. WAKE	05/05/2023
DRAWN:	J. WAKE	05/05/2023
CHECKED:	M. ROBINSON	05/05/2023
APPROVED:	M. ROBINSON	05/05/2023
CLIENT APP.:		

PCL SOLAR CONSTRUCTORS USA
2322 WEST GRAND PKWY N, SUITE 200
KATY, TEXAS 77449
PHONE: (647) 401-8379

SITE OR AREA: CLEARVIEW SOLAR

TITLE: STRUCTURAL SUPPORTS AND FOUNDATIONS

DRAWING NUMBER	REV
705-2317230200-DWG-S0003	C

WAKE, JOHN 4/25/2023 11:25:25 PM

X:\PROJECTS\PWR\PCL CLEARVIEW\07 - STRUCTURAL DESIGN\CLEARVIEW S-0003 STRUCTUAL SUPPORTS AND FOUNDATIONS

GENERAL NOTES

A. THE NOTES ON THIS SHEET AND THE STANDARD STRUCTURAL DETAILS ARE GENERAL AND APPLY TO THE ENTIRE PROJECT WHETHER SPECIFICALLY CALLED OUT OR NOT, EXCEPT WHERE THERE ARE SPECIFIC INDICATIONS TO THE CONTRARY ON STRUCTURAL SHEETS. IF THERE ARE QUESTIONS, THEY SHALL BE SUBMITTED TO THE STRUCTURAL ENGINEER AND ANSWERED IN WRITING PRIOR TO CONSTRUCTION.

B. THE FOUNDATION SUPPORT AND SOIL PROPERTIES FOR THIS DESIGN ARE BASED ON RECOMMENDATIONS AND/OR DATA PROVIDED IN THE GEOTECHNICAL ENGINEERING REPORT PREPARED BY OGA.

C. ALL CONCRETE WORK SHALL CONFORM TO ACI–318 (2014).

BUILDING AND DESIGN CODES

1. 2017 OHIO STATE BUILDING CODE, 2015 INTERNATIONAL BUILDING CODE.
2. ACI 318 (2014) BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE, AMERICAN CONCRETE INSTITUTE.
3. ASCE 7–10, MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES.
4. AISC 360–10, SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS.

STRUCTURAL DESIGN CRITERIA

1. APPLIES TO ALL STRUCTURES (UNO)	
a. FOUNDATION DEAD LOAD:	EQUIPMENT WEIGHT + SELF–WEIGHT
2. WIND:	
a. RISK CATEGORY:	I
b. BASIC WIND SPEED:	105 MPH
c. EXPOSURE:	C
3. SEISMIC:	
a. RISK CATEGORY:	I
b. IMPORTANCE FACTOR:	1.0
c. SPECTRAL RESPONSE ACCELERATION, S/s:	0.197g
d. SPECTRAL RESPONSE ACCELERATION, S/1:	0.071g
e. SITE CLASS:	D
f. SEISMIC DESIGN CATEGORY:	B
g. SPECTRAL RESPONSE COEFFICIENT, S/DS:	0.210g
h. SPECTRAL RESPONSE COEFFICIENT, S/D1:	0.114g
4. SNOW LOAD:	20 PSF

DESIGN PARAMETERS

1. MINIMUM 28–DAY CONCRETE COMPRESSIVE STRENGTH: 4,500 PSI
2. MINIMUM YIELD STRENGTH OF REINFORCING BAR: 60 KSI
3. ALLOWABLE SOIL BEARING CAPACITY: 2,500 PSF PER "SOIL ERT AND THERMAL CONDUCTIVITY TESTING SUMMARY CLEARVIEW SOLAR PROJECT" (HEREINAFTER "GEOTECHNICAL REPORT")
4. SUBGRADE MODULUS: 100 PCI PER GEOTECHNICAL REPORT
5. ANTICIPATED GROUNDWATER DEPTH: SEE GEOTECHNICAL REPORT
6. FROST DEPTH: 4 FEET

EXCAVATION, BACKFILL AND COMPACTION

PART 1 GENERAL

1.1 THIS SECTION SPECIFIES THE TECHNICAL AND CONSTRUCTION REQUIREMENTS FOR EXCAVATION, BACKFILL, COMPACTION AND GRADING FOR EQUIPMENT PAD FOUNDATIONS.

1.2 SUBMITTALS

A. BACKFILL: WHEN IMPORTED STRUCTURAL FILL IS USED FOR FOUNDATIONS, SUBMIT LABORATORY SOIL TEST RESULTS DOCUMENTING FILL PROPERTIES. THIS TEST DATA SHALL INCLUDE MOISTURE–DENSITY RELATIONSHIP AND PARTICLE SIZE ANALYSIS AND OTHER INFORMATION NECESSARY TO DEMONSTRATE COMPLIANCE WITH THE MATERIAL REQUIREMENTS.

B. PRODUCT DATA: PROVIDE PRODUCT DATA SHEETS AND SPECIFICATIONS FOR THE POLYSTYRENE INSULATION IF UTILIZED.

C. EXCAVATION PROTECTION PLAN: DESCRIBE SHEETING, AND BRACING MATERIALS AND INSTALLATION IF REQUIRED TO PROTECT EXCAVATIONS AND ADJACENT STRUCTURES AND PROPERTY INCLUDING STRUCTURAL CALCULATIONS TO SUPPORT PLAN FOR EXCAVATIONS GREATER THAN 4.0 FEET IN DEPTH. EXCAVATION PROTECTION PLAN SHALL COMPLY TO 29 CFR PART 1926, OSHA STANDARD AND BE SIGNED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF OHIO.

D. PROVIDE FIELD COMPACTION TEST REPORTS FOR THE SUBGRADE AND STRUCTURAL FILL PLACED BELOW AND ADJACENT TO THE FOUNDATION.

E. SUBGRADE INSPECTION REPORT FOR EACH EQUIPMENT FOUNDATION. A QUALIFIED THIRD–PARTY REPRESENTATIVE SHALL INSPECT AND PERFORM COMPACTION TESTING IN THE BASE OF EACH FOUNDATION EXCAVATION PRIOR TO PLACING ANY STRUCTURAL FILL. THE QUALIFIED THIRD–PARTY REPRESENTATIVE SHALL DOCUMENT WITH PHOTOS AND WRITTEN NARRATIVE THE TYPE AND CHARACTER OF THE EXPOSED EARTH AND TESTING RESULTS. THE REPORT SHOULD ASSESS THE ALLOWABLE BEARING CAPACITY AND VERIFY THAT IT MEETS OR EXCEEDS 2500 PSF. EACH INSPECTION REPORT SHALL BE SIGNED BY THE QUALIFIED THIRD–PARTY REPRESENTATIVE, PROFESSIONAL ENGINEER, AND PCL REPRESENTATIVE AND FORWARDED TO THE PROFESSIONAL ENGINEER FOR RECORD.

PART 2 PRODUCTS

2.1 STRUCTURAL FILL

A. THE IMPORTED STRUCTURAL FILL MATERIAL SHALL BE CLEAN DENSE GRADED AGGREGATE FREE OF CONTAMINANTS MEETING THE REQUIREMENTS OF THE STATE OF OHIO DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR DENSE GRADED CRUSHED STONE FOR SUB–BASE PER DIVISION III, SECTION M2.01.7.

2.2 STANDARD FILL

A. STANDARD FILL WILL CONSIST OF SATISFACTORY SOILS: ASTM D2487 SOIL CLASSIFICATION GROUPS GW, GP, GM, SW, SP, AND SM, OR A COMBINATION OF THESE GROUP SYMBOLS; FREE OF ROCK OR GRAVEL LARGER THAN 3 INCHES IN ANY DIMENSION, DEBRIS, WASTE, FROZEN MATERIALS, VEGETATION, AND OTHER DELETERIOUS MATTER. UNSATISFACTORY SOILS: ASTM D2487 SOIL CLASSIFICATION GROUPS GC, SC, ML, MH, CL, CH, OL, OH, AND PT, OR A COMBINATION OF THESE GROUP SYMBOLS. PROVIDE BORROW SOIL MATERIALS WHEN SUFFICIENT SATISFACTORY SOIL MATERIALS ARE NOT AVAILABLE FROM EXCAVATIONS.

2.3 TOP SOIL MATERIALS

A. STRIPPED SOIL DURING EXCAVATION SHALL BE STOCKPILED, SALVAGED AND REUSED.

PART 3 EXECUTION

3.1 PREPARATION

A. CONTACT LOCAL UTILITY LINE LOCATION SERVICE, IF AVAILABLE, BEFORE PERFORMING WORK.

B. IDENTIFY REQUIRED LINES, LEVELS, CONTOURS, AND DATUM.

3.2 CLEARING

A. REMOVE ALL VEGETATION INCLUDING TREES, STUMPS, ROOTS AND SHRUBS AS NECESSARY WITHIN FOUNDATION CONSTRUCTION AREAS.

B. STRIP EXISTING TOPSOIL TO A DEPTH SPECIFIED BY THE PCL REPRESENTATIVE. STOCKPILE FOR REUSE.

3.3 EXCAVATION

A. PROVIDE DEWATERING AS REQUIRED TO MAINTAIN GROUNDWATER LEVEL AT LEAST 1 FOOT BELOW THE BOTTOM OF EXCAVATION. NO SUMPS OR OTHER PUMPING WILL BE PERMITTED WITHIN THE FOUNDATION FOOTPRINT.

B. EXCAVATE SUBGRADE MATERIAL FROM THE REQUIRED AREAS TO THE LINES AND GRADES SHOWN IN THE DESIGN DRAWINGS.

C. SEE REQUIREMENTS IN EXCAVATION, BACKFILL AND COMPACTION, PART 1 GENERAL, PARAGRAPH 1.2 D and E.

D. REMOVE UNSUITABLE EXCAVATED MATERIALS FROM THE FOUNDATION FOOTPRINT AS DIRECTED BY THE PCL REPRESENTATIVE.

E. EXCAVATE AND REMOVE TOPSOIL WITHIN THE ZONE OF INFLUENCE OF SHALLOW FOUNDATIONS OR EQUIPMENT PADS, AS DEFINED BY A 1–HORIZONTAL TO 1–VERTICAL (1H:1V) LINE, SLOPING DOWNWARD AND OUTWARD FROM 1–FOOT OUTSIDE THE BOTTOM EDGE OF FOOTINGS/PADS.

F. WHERE PRACTICAL, FINAL EXCAVATION SHOULD BE UNDERTAKEN USING A SMOOTH–EDGED BUCKET TO LIMIT DISTURBANCE OF THE SUBGRADE.

G. EXCAVATION SHOULD BE CARRIED OUT IN SUCH A MANNER THAT THE GRADE THROUGHOUT THE WORK AREA IS KEPT DRAINED AT ALL TIMES.

3.4 STOCKPILING

A. STOCKPILE MATERIALS ON SITE AT LOCATIONS INDICATED BY THE OWNER.

3.5 CLEANUP AND RESTORATION

A. REMOVE STOCKPILE; LEAVE AREA IN CLEAN AND NEAT CONDITION, GRADE THE AREA AROUND THE FOUNDATIONS IN ACCORDANCE WITH CIVIL DESIGN DRAWINGS.

3.6 BACKFILLING

A. DO NOT BACKFILL OVER POROUS, WET, FROZEN, OR SPONGY SUBGRADE SURFACES.

B. ALL FILL MATERIAL PLACED ADJACENT TO AND SUPPORTING THE FOUNDATIONS SHALL BE STRUCTURAL FILL AS SHOWN ON THE FOUNDATION DETAILS.

C. PREPARE SUBGRADE AND BACKFILL IN ACCORDANCE WITH ALL RECOMMENDATIONS PROVIDED IN THE PROJECT GEOTECHNICAL INVESTIGATION REPORT.

D. PRIOR TO PLACING STRUCTURAL FILL, THOROUGHLY PROOF ROLL EXPOSED SUBGRADE WITH CONSTRUCTION EQUIPMENT AS DESCRIBED IN THE GEOTECHNICAL REPORT. WHERE PROOFROLLING IDENTIFIES AREAS THAT ARE UNSTABLE OR "PUMPING" SUBGRADE THOSE AREAS SHOULD BE REPAIRED PRIOR TO THE PLACEMENT OF ANY SUBSEQUENT ENGINEERED FILL OR OTHER CONSTRUCTION MATERIALS. METHODS OF STABILIZATION INCLUDE UNDERCUTTING, MOISTURE CONDITIONING, OR CHEMICAL STABILIZATION. THE SITUATION SHOULD BE DISCUSSED WITH THE GEOTECHNICAL ENGINEER TO DETERMINE THE APPROPRIATE PROCEDURE. TEST PITS MAY BE EXCAVATED TO EXPLORE THE SHALLOW SUBSURFACE MATERIALS TO HELP IN DETERMINING THE CAUSE OF THE OBSERVED UNSTABLE MATERIALS, AND TO ASSIST IN THE EVALUATION OF APPROPRIATE REMEDIAL ACTIONS TO STABILIZE THE SUBGRADE.

E. PROTECT THE EXPOSED SUBGRADE FROM FROST AT ALL TIMES DURING CONSTRUCTION.

F. MAINTAIN MOISTURE CONTENT OF BACKFILL MATERIALS WITHIN −1 TO +3 PERCENTAGE POINTS OF OPTIMUM TO ATTAIN REQUIRED COMPACTED DRY DENSITY.

G. PLACE STRUCTURAL FILL IN MAXIMUM OF 8 INCH LOOSE LIFTS. COMPACT EACH LIFT TO HAVE A MINIMUM 95 PERCENT OF MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D698.

H. FILL MATERIALS SHOULD NOT BE PLACED ON FROZEN SOILS, ON FROST–HEAVED SOILS, AND/OR ON EXCESSIVELY WET SOILS. BORROW FILL MATERIALS SHOULD NOT CONTAIN FROZEN MATERIALS AT THE TIME OF PLACEMENT, AND ALL FROZEN OR FROST–HEAVED SOILS SHOULD BE REMOVED PRIOR TO PLACEMENT OF ENGINEERED STRUCTURAL FILL OR OTHER FILL SOILS AND AGGREGATES. EXCESSIVELY WET SOILS OR AGGREGATES SHOULD BE SCARIFIED, AERATED, AND MOISTURE CONDITIONED.

I. REFER TO GEOTECHNICAL INVESTIGATION REPORT FOR ADDITIONAL INFORMATION.

3.7 TOLERANCE

A. SUBGRADE ELEVATION UPON EXCAVATION: PLUS 0 INCHES OR MINUS 2 INCHES FROM REQUIRED ELEVATION.

3.8 TESTING

A. ONE IN–PLACE DENSITY AND ONE MOISTURE TEST SHALL BE PERFORMED FOR EACH LIFT OF STRUCTURAL FILL.

B. IN–PLACE DENSITY TEST: ASTM D698, ASTM D2167, ASTM D6938

C. IN–PLACE MOISTURE TEST: ASTM D6938

D. MOISTURE DENSITY RELATIONSHIP: ASTM D698, ASTM D4718

E. PARTICLE SIZE ANALYSIS: ASTM D6913

CAST-IN-PLACE STRUCTURAL CONCRETE

PART 1 GENERAL

1.1 THIS SECTION SPECIFIES TECHNICAL AND CONSTRUCTION REQUIREMENTS FOR FORM WORK, CAST–IN–PLACE CONCRETE, AND REINFORCING STEEL.

1.2 QUALIFICATIONS

A. MANUFACTURER: COMPANY SPECIALIZING IN MANUFACTURING PRODUCTS SPECIFIED IN THIS SECTION WITH MINIMUM THREE YEARS DOCUMENTED EXPERIENCE.

1.3 SUBMITTALS

A. CONCRETE MIX DESIGN: SUBMIT 14 DAYS PRIOR TO PLACEMENT OF CONCRETE. SUBMIT SEPARATE MIX DESIGNS WHENEVER SPECIAL ADMIXTURES ARE REQUIRED.

B. PRODUCT DATA FOR ADMIXTURE, POZZOLAN, AND CURING MEMBRANE.

C. PRODUCT DATA FOR CONTROL JOINT BACKER ROD AND JOINT SEALANT.

D. COLD AND HOT WEATHER CONCRETE PLACEMENT AND PROTECTION PLAN.

E. REINFORCING STEEL FABRICATION AND PLACEMENT DRAWINGS.

F. EQUIPMENT FOUNDATION COORDINATED OPENINGS AND PENETRATIONS DRAWING.

G. CERTIFIED MILL REPORTS OF REINFORCING STEEL, CONFIRMING THE GRADE AND STRENGTH OF REINFORCING STEEL PROVIDED ON THE PROJECT.

H. BATCH TICKETS: SUBMIT COPIES OF THE BATCH TICKET FOR EACH LOAD OF CONCRETE.

I. CONCRETE FIELD TEST RESULTS: SUBMIT SLUMP, AIR CONTENT, AND TEMPERATURE TEST RESULTS FOR CONCRETE USED FOR THE FOUNDATIONS.

J. CONCRETE COMPRESSION TEST RESULTS: SUBMIT COMPRESSION TEST RESULTS FOR CONCRETE USED FOR THE FOUNDATION.

1.4 QUALITY ASSURANCE

A. PERFORM CONCRETE WORK IN ACCORDANCE WITH ACI 318 AND ACI 301.

B. REVIEW CONCRETE SUPPLIER BATCH PLANT TO ASSURE CAPABILITY OF BATCH PLANT TO PRODUCE CONCRETE MEETING THE REQUIREMENTS STATED IN THE SPECIFICATION.

PART 2 PRODUCTS

2.1 FORM MATERIALS

A. FORMS FOR EXPOSED FINISH CONCRETE: PROVIDE CONTINUOUS, STRAIGHT, SMOOTH EXPOSED SURFACES. FURNISH IN LARGEST PRACTICAL SIZES TO MINIMIZE NUMBER OF JOINTS. PROVIDE FORM MATERIAL WITH SUFFICIENT THICKNESS TO WITHSTAND PRESSURE OF NEWLY PLACED CONCRETE WITHOUT VISIBLE BOW OR DEFLECTION.

B. FORM COATINGS: PROVIDE COMMERCIAL FORMULATION FORM–COATING COMPOUNDS THAT WILL NOT BOND WITH, STAIN NOR ADVERSELY AFFECT CONCRETE SURFACES, AND WILL NOT IMPAIR SUBSEQUENT TREATMENTS.

2.2 REINFORCING MATERIALS

A. REINFORCING STEEL: ASTM 615, GRADE 60.

2.3 CONCRETE MATERIALS

A. PORTLAND CEMENT SHALL CONFORM TO ASTM C150, TYPE II.

B. COARSE AGGREGATE: COARSE AGGREGATE SHALL CONFORM TO ASTM C33. MAXIMUM COARSE AGGREGATE SIZE SHALL BE 1.5 INCHES AND SHALL CONSIST OF GRAVEL, CRUSHED GRAVEL OR STONE.

C. MIXING WATER: POTABLE WATER HAVING NO PRONOUNCED TASTE OR ODOR, AND CONTAINING NO DELETERIOUS MATERIALS SHALL BE USED FOR MIXING CONCRETE.

D. AIR–ENTRAINING AGENTS SHALL MEET THE REQUIREMENTS OF ASTM C260 AND SHALL NOT CONTAIN CHLORIDE.

E. HIGH RANGE WATER–REDUCING ADMIXTURE (SUPERPLASTICIZER) SHALL CONFORM TO ASTM C494, TYPE F.

F. WATER–REDUCING ADMIXTURES SHALL CONFORM TO ASTM C494, TYPE A AND CONTAIN NO MORE THAN 1% CHLORIDE IONS.

G. CALCIUM CHLORIDE SHALL NOT BE USED.

H. POZZOLANS (FLY ASH) SHALL CONFORM TO ASTM C618, CLASS F AND THE LOSS OF IGNITION (LOI) SHALL BE LESS THAN 6%. POZZOLANS SHALL BE LIMITED TO A MAXIMUM OF 25% OF CEMENTITOUS CONTENT.

I. FINE AGGREGATE: FINE AGGREGATE SHALL CONFORM TO ASTM C33. FINE AGGREGATE SHALL CONSIST OF NATURAL SAND, MANUFACTURED SAND OR A COMBINATION THEREOF.

J. CURING COMPOUND SHALL COMPLY WITH ASTM C309, TYPE I, CLASS A.

2.4 CONCRETE MIX DESIGN

A. CONCRETE MIX DESIGN SHALL BE PREPARED FOR EACH REQUIRED TYPE AND STRENGTH OF CONCRETE BY EITHER LABORATORY TRIAL BATCH, FIELD EXPERIENCE METHODS AS SPECIFIED IN ACI 318. THE MIX DESIGNS AND SUPPORTING DATA, SIGNED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF OHIO, SUBMITTED TO AND APPROVED BY THE FIELD ENGINEER PRIOR TO PLACING CONCRETE.

B. WATER/CEMENT RATIO (MAXIMUM BY WEIGHT): 0.45 MAX

C. ADMIXTURE TYPES AND QUANTITIES SHALL BE AS INDICATED IN CONCRETE MIX DESIGNS.

2.5 LABORATORY AND FIELD TESTING OF CONCRETE

A. COMPRESSIVE STRENGTH (28 DAY, ASTM C39): 4500 PSI

B. AGGREGATE SIZE (MAXIMUM, ASTM C33): 1.5 INCHES

C. ENTRAINED AIR (ASTM C231): 6 PERCENT (± 1.0 PERCENT)

D. SLUMP (ASTM C143): 4 INCHES ± 1 INCH

MAXIMUM SLUMP FOR CONCRETE USING A HIGH–RANGE WATER–REDUCER MAY BE INCREASED TO 6 INCHES.

2.6 CONTROL JOINT BACKER ROD AND SEALANT

A. PROVIDE NON–ABSORPTIVE NON–REACTIVE BACKER ROD TO FIT SNUG IN JOINT IN ACCORDANCE WITH ASTM D5249. PROVIDE MATERIAL THAT IS 25 PERCENT LARGER IN DIAMETER THAN THE NOMINAL WIDTH OF THE SAWCUT JOINT.

B. PROVIDE AN ASTM C920, Type M, Class 25, USE NT JOINT SEALANT.

PART 3 EXECUTION

3.1 CONCRETE FORMWORK

A. ALL FORMS SHALL BE STRAIGHT AND PLUMB, RIGID, AND MORTAR TIGHT. ALL FORMS SHALL BE BRACED, TIED AND SUPPORTED SUFFICIENTLY TO MAINTAIN THEIR REQUIRED POSITION DURING AND AFTER THE PLACEMENT OF THE CONCRETE. EARTH FORMS MAY BE USED IN CONSTRUCTING FOUNDATIONS WHEN SOIL AT THE SITE IS STIFF.

B. FORM TIES: USE FACTORY–FABRICATED, ADJUSTABLE–LENGTH REMOVABLE OR SNAPOFF METAL FORM TIES, DESIGNED TO PREVENT FORM DEFLECTION, AND TO PREVENT SPALLING CONCRETE SURFACE UPON REMOVAL UNLESS OTHERWISE INDICATED. PROVIDE TIES SO THAT PORTIONS REMAINING WITHIN CONCRETE AFTER REMOVAL WILL NOT BE WITHIN 1 INCH OF ANY EXPOSED CONCRETE SURFACE.

C. PROVIDE OPENINGS IN CONCRETE FORMWORK TO ACCOMMODATE THE INSTALLATION OF EMBEDDED CONDUIT.

D. TOLERANCES: CONSTRUCT FORMWORK WITHIN THE TOLERANCES SHOWN ON THE FORMWORK DRAWINGS.

E. PREPARATION OF FORM SURFACES: COAT CONTACT SURFACES OF FORMS WITH A FORM–COATING COMPOUND BEFORE REINFORCEMENT IS PLACED. DO NOT ALLOW FORM–COATING COMPOUND TO COME INTO CONTACT WITH REINFORCEMENT OR WITH CONCRETE SURFACES AGAINST WHICH FRESH CONCRETE WILL BE PLACED.

F. REMOVAL OF FORMS AND SUPPORTS: AFTER PLACING CONCRETE, FORMS SHALL REMAIN IN PLACE AFTER COMPLETION OF CONCRETE PLACEMENTS FOR ENOUGH TIME TO PREVENT CONCRETE DAMAGE DURING FORM REMOVAL.

G. INSPECT AND CHECK THE FORMWORK BEFORE THE REINFORCING STEEL IS PLACED TO CONFIRM THAT THE DIMENSIONS AND LOCATION OF THE CONCRETE FOUNDATIONS WILL CONFORM TO THE FOUNDATION DESIGN DRAWINGS.

3.2 PLACING REINFORCEMENT AND EMBEDDED ITEMS

A. PROVIDE BARS, WIRE FABRIC, WIRE TIES, SUPPORTS, AND OTHER DEVICES NECESSARY TO INSTALL AND SECURE REINFORCEMENT. REINFORCEMENT SHALL NOT HAVE SCALE, OIL, GREASE, CLAY, OR FOREIGN SUBSTANCES THAT WOULD REDUCE THE BOND. RUSTING OF REINFORCEMENT IS A BASIS OF REJECTION IF THE EFFECTIVE CROSS–SECTIONAL AREA OR THE NOMINAL WEIGHT PER UNIT LENGTH HAS BEEN REDUCED. REMOVE LOOSE RUST PRIOR TO PLACING STEEL. TACK WELDING IS PROHIBITED FOR ALL REINFORCEMENT SHOWN ON STRUCTURAL DRAWINGS.

B. ALL HOOKS IN REINFORCING STEEL SHALL BE STANDARD 90–DEGREE HOOKS.

C. FOR #5 AND SMALLER BARS, STANDARD 90–DEGREE STIRRUP HOOKS WITH A CONTINUOUS PERPENDICULAR BAR (#4 MINIMUM) INSTALLED INSIDE THE CORNER OF ALL HOOKED BARS MAY BE USED IN LIEU OF STANDARD 90 DEGREE HOOKS. THE PRIMARY SLAB REINFORCING MAY BE USED FOR THE CONTINUOUS PERPENDICULAR BARS.

D. PLACE REINFORCEMENT AND SECURE WITH GALVANIZED OR NON–CORRODIBLE CHAIRS, SPACERS, OR METAL HANGERS. FOR SUPPORTING REINFORCEMENT ON THE GROUND, USE CONCRETE OR OTHER NON–CORRODIBLE MATERIAL, HAVING A COMPRESSIVE STRENGTH EQUAL TO OR GREATER THAN THE CONCRETE BEING PLACED. ACCURATELY POSITION, SUPPORT AND SECURE REINFORCEMENT AGAINST MOVEMENT BY FORMWORK, CONSTRUCTION, OR CONCRETE PLACEMENT OPERATIONS.

E. PLACE REINFORCEMENT TO MEET MINIMUM REBAR COVER FOR REINFORCEMENT PROTECTION, SPACING AND PLACEMENT REQUIREMENTS SPECIFIED ON DESIGN DRAWINGS.

F. SPLICING: LOCATE REINFORCEMENT SPLICES AS INDICATED ON THE PLACEMENT DRAWINGS. REBAR SPLICE SHALL BE ALTERNATED TO PREVENT WEAK PLANES. SPLICES SHALL BE CLASS B TENSION LAP SPLICE LENGTHS CALCULATED IN ACCORDANCE WITH ACI 318.

G. EMBEDDED ITEMS:

1. MAKE PROVISIONS FOR CONDUIT PENETRATIONS SPECIFIED ON ELECTRICAL DRAWINGS.
2. DO NOT EMBED WOOD OR UNCOATED ALUMINUM IN CONCRETE.
3. SECURELY ANCHOR EMBEDDED ITEMS IN CORRECT LOCATION AND ALIGNMENT PRIOR TO PLACING CONCRETE.

H. EXAMINATION OF REINFORCEMENT: VERIFY REQUIREMENTS FOR CONCRETE COVER OVER REINFORCEMENT. VERIFY REINFORCEMENT AND OTHER ITEMS TO BE CAST INTO CONCRETE ARE ACCURATELY PLACED, POSITIONED SECURELY, AND WILL NOT INTERFERE WITH PLACING CONCRETE. NOTIFY THE PCL REPRESENTATIVE AFTER PLACEMENT OF REINFORCING STEEL IN FORMS, BUT PRIOR TO PLACING CONCRETE. SCHEDULE CONCRETE PLACEMENT TO PERMIT FORMWORK INSPECTION BY THE PCL REPRESENTATIVE BEFORE PLACING CONCRETE.

3.3 MIXING AND TRANSPORTING CONCRETE

A. HAND–MIXED CONCRETE SHALL NOT BE ALLOWED FOR ANY PORTION OF THE WORK.

B. CONCRETE SHALL BE DISCHARGED, WHEN THE AIR TEMPERATURE IS LESS THAN 85 DEGREES F, WITHIN ONE AND ONE–HALF HOURS FROM THE TIME DRY AGGREGATES ARE LOADED INTO THE TRUCK MIXER. FOR AIR TEMPERATURE ABOVE 85 DEGREES F, PLACE CONCRETE WITHIN 60 MINUTES FROM THE TIME AGGREGATES ARE LOADED.

C. IF CONCRETE MIX DESIGN CONTAINS SET RETARDING ADMIXTURE, THE LIMIT FOR PLACING CONCRETE MAY REMAIN AT 90 MINUTES PROVIDED SLUMP REQUIREMENTS CAN BE MET.

D. FURNISH BATCH TICKET TO THE FIELD ENGINEER WITH EACH BATCH OF CONCRETE BEFORE UNLOADING AT THE SITE. THE BATCH TICKET SHALL CONTAIN THE FOLLOWING INFORMATION CONCERNING THE CONCRETE:

1. NAME OF READY–MIX CONCRETE COMPANY
2. SERIAL NUMBER OF TICKET
3. DATE
4. TRUCK NUMBER
5. NAME OF PURCHASER
6. AMOUNT OF CONCRETE IN CUBIC YARDS
7. MAXIMUM SIZE OF AGGREGATE
8. INGREDIENTS CERTIFIED AS BEING PREVIOUSLY APPROVED
9. SIGNATURE OF PRODUCER'S REPRESENTATIVE
10. TIME THE BATCH WAS PLACED IN THE TRUCK

E. AVOID SEGREGATING THE CONCRETE MIX DURING DISCHARGE AT THE LOCATION OF PLACEMENT.

F. TRANSPORT CONCRETE FROM THE BATCH PLANT TO THE PROJECT SITE AS SOON AS POSSIBLE TO AVOID DELAYS AND DISPOSAL OF UNSUITABLE CONCRETE.

G. CLEAN TRANSPORTING EQUIPMENT BEFORE EACH BATCH. DO NOT USE ALUMINUM PIPE OR CHUTES.

H. READY–MIX CONCRETE SHALL BE IN ACCORDANCE WITH ACI 301 AND ASTM C94.

I. REJECT CONCRETE FROM A TRUCK HAS GONE THROUGH MORE THAN 300 REVOLUTIONS.

3.4 PLACING CONCRETE

A. NOTIFY PCL REPRESENTATIVE A MINIMUM 24 HOURS PRIOR TO COMMENCEMENT OF CONCRETE OPERATIONS.

B. PRE–PLACEMENT INSPECTION: PCL REPRESENTATIVE SHALL INSPECT THE COMPLETED FORMWORK, REINFORCING STEEL, AND ITEMS TO BE EMBEDDED PRIOR TO CONCRETE PLACEMENT. HOWEVER, THIS DOES NOT RELEASE THE CONTRACTOR FROM RESPONSIBILITY FOR ACCEPTABLE AND SATISFACTORILY COMPLETED WORK.

C. PLACE CONCRETE AS SOON AS PRACTICAL AFTER THE FORMS AND THE REINFORCEMENT HAVE BEEN INSPECTED AND APPROVED. DO NOT PLACE CONCRETE WHEN WEATHER CONDITIONS PREVENT PROPER PLACEMENT, CONSOLIDATION AND CURING; IN UNCOVERED AREAS DURING PERIODS OF PRECIPITATION; OR IN STANDING WATER. PRIOR TO PLACING CONCRETE, REMOVE DIRT, CONSTRUCTION DEBRIS, WATER, SNOW, AND ICE FROM WITHIN THE FORMS. DEPOSIT CONCRETE AS CLOSE AS PRACTICABLE TO THE FINAL POSITION IN THE FORMS. DO NOT EXCEED A FREE VERTICAL DROP OF 5 FEET FROM THE POINT OF DISCHARGE.

D. CONSOLIDATION: CONSOLIDATE CONCRETE IN ACCORDANCE WITH ACI 301. CONSOLIDATE CONCRETE FOUNDATION WITH HIGH FREQUENCY, INTERNAL, MECHANICAL VIBRATING EQUIPMENT SUPPLEMENTED BY HAND SPADING AND TAMPING. OPERATE VIBRATORS WITH VIBRATORY ELEMENT SUBMERGED IN THE CONCRETE, WITH A MINIMUM FREQUENCY OF NOT LESS THAN 6000 IMPULSES PER MINUTE WHEN SUBMERGED. DO NOT USE VIBRATORS TO TRANSPORT THE CONCRETE IN THE FORMS. INSERT AND WITHDRAW VIBRATORS AT A SPACING RECOMMENDED BY THE MANUFACTURER. PENETRATE THE PREVIOUSLY PLACED LIFT WITH THE VIBRATOR WHEN MORE THAN ONE LIFT IS REQUIRED. PLACE CONCRETE IN 18 INCHES MAXIMUM VERTICAL LIFTS. EXTERNAL VIBRATORS MAY BE USED ON THE EXTERIOR SURFACE OF THE FORMS WHEN INTERNAL VIBRATORS DO NOT PROVIDE ADEQUATE CONSOLIDATION OF THE CONCRETE.

E. MAINTAIN RECORDS OF CONCRETE PLACEMENT. RECORD DATE, LOCATION, QUANTITY, AIR TEMPERATURE, AND TEST SAMPLES TAKEN. ALSO KEEP DUPLICATE RECORDS.

F. DO NOT INTERRUPT SUCCESSIVE PLACEMENT TO PREVENT COLD JOINTS FROM FORMING.

3.5 FINISH OF FORMED SURFACES

A. DEFECTS: REPAIR FORMED SURFACES BY REMOVING MINOR HONEYCOMBS, PITS GREATER THAN 1 SQUARE INCH SURFACE AREA OR ¼ INCH MAXIMUM DEPTH. PROVIDE EDGES PERPENDICULAR TO THE SURFACE AND PATCH WITH NONSHRINK GROUT. PATCH TIE HOLES AND DEFECTS WHEN THE FORMS ARE REMOVED. CONCRETE WITH EXTENSIVE HONEYCOMB INCLUDING EXPOSED STEEL REINFORCEMENT, COLD JOINTS, ENTRAPPED DEBRIS, SEPARATED AGGREGATE, OR OTHER DEFECTS, WHICH AFFECT THE SERVICEABILITY OR STRUCTURAL STRENGTH, WILL BE REJECTED, UNLESS CORRECTION OF DEFECTS IS APPROVED BY THE FIELD ENGINEER. OBTAIN APPROVAL OF CORRECTIVE ACTION PRIOR TO REPAIR. EXPOSED SURFACES SHALL BE UNIFORM IN APPEARANCE AND FINISHED TO A SMOOTH FORM FINISH UNLESS OTHERWISE SPECIFIED.

B. ROUGH FORM FINISH: PROVIDE AS–CAST ROUGH FORM FINISH TO FORMED CONCRETE SURFACES THAT ARE TO BE CONCEALED IN FINISH WORK OR BY OTHER CONSTRUCTION, UNLESS OTHERWISE INDICATED.

C. SMOOTH FORM FINISH: PROVIDE AS–CAST SMOOTH FORM FINISH FOR FORMED CONCRETE SURFACES THAT ARE EXPOSED TO VIEW. PRODUCE SMOOTH FORM FINISH BY SELECTING FORM MATERIAL TO IMPART A SMOOTH, HARD, UNIFORM TEXTURE AND ARRANGING THEM ORDERLY AND SYMMETRICALLY WITH A MINIMUM OF SEAMS. REPAIR AND PATCH DEFECTIVE AREAS WITH FINS OR OTHER PROJECTIONS COMPLETELY REMOVED AND SMOOTHED.

3.6 FOUNDATION TOP FINISH

A. PLACE, CONSOLIDATE, AND IMMEDIATELY STRIKE OFF CONCRETE TO OBTAIN PROPER CONTOUR, GRADE, AND ELEVATION BEFORE BLEEDWATER APPEARS. PERMIT CONCRETE TO ATTAIN A SET SUFFICIENT FOR FLOATING AND SUPPORTING THE WEIGHT OF THE FINISHER AND EQUIPMENT. IF BLEEDWATER IS PRESENT PRIOR TO FLOATING THE SURFACE, DRAG THE EXCESS WATER OFF OR REMOVE BY ABSORPTION WITH POROUS MATERIALS. DO NOT USE DRY CEMENT TO ABSORB BLEEDWATER.

B. TROWEL FINISH: APPLY TROWEL FINISH TO TOP SURFACE OF THE FOUNDATION, UNLESS OTHERWISE INDICATED, IN THE DEIGN DRAWINGS. AFTER FLOATING, BEGIN FIRST TROWEL OPERATION USING POWER TROWEL OR USING MANUAL LABOR. BEGIN FINAL TROWELING WHEN SURFACE PRODUCES RINGING SOUND AS TROWEL IS MOVED OVER SURFACE. CONSOLIDATE CONCRETE SURFACE BY FINAL HAND TROWELING OPERATION, FREE OF TROWEL MARKS, UNIFORM IN TEXTURE AND APPEARANCE. AFTER TROWELING OPERATION, USE SOFT–BRISTLED PUSH BROOM OVER THE FRESHLY TROWELED SURFACE TO OBTAIN A NON–SLIP SURFACE.

3.7 CURING AND PROTECTION

A. CURE AND PROTECT CONCRETE FROM DAMAGING ACTIONS BY SUN, RAIN, WIND, FLOWING WATER, MECHANICAL DAMAGE AND PREMATURE DRYING FOR NOT LESS THAN SEVEN CONSECUTIVE DAYS AFTER PLACEMENT IN ACCORDANCE WITH ACI 301. BEGIN CURING FORMED SURFACES IMMEDIATELY FOLLOWING FORM REMOVAL. AVOID DAMAGE TO CONCRETE FROM VIBRATION CREATED BY ANY ACTIVITY RESULTING IN GROUND VIBRATIONS. DO NOT ALLOW CONCRETE TO DRY OUT FROM TIME OF PLACEMENT UNTIL THE EXPIRATION OF THE SPECIFIED CURING PERIOD.

B. IF FORMS ARE REMOVED PRIOR TO THE EXPIRATION OF THE CURING PERIOD, PROVIDE ANOTHER CURING PROCEDURE SPECIFIED HEREIN FOR THE REMAINING PORTION OF THE CURING PERIOD FOR EXPOSED SURFACES AFTER REMOVAL OF FORM. PROVIDE MOIST CURING FOR THOSE AREAS RECEIVING LIQUID CHEMICAL SEALER–HARDENER OR EPOXY COATING.

C. MOIST CURING: COVER CONCRETE SURFACES WITH MOISTURE–RETAINING COVER FOR CURING PERIOD. EXPOSED HORIZONTAL CONCRETE SURFACES MAY BE COVERED WITH SAND OR OTHER APPROVED MATERIAL AND KEPT WET FOR THE REQUIRED PERIOD. KEEP WOOD FORMS SUFFICIENTLY WET AT ALL TIMES TO PREVENT THE FORMS FROM SEPARATING AT THE JOINTS AND THE CONCRETE FROM DRYING.

D. MEMBRANE CURING: CONCRETE SURFACES TO RECEIVE MEMBRANE CURING SHALL BE TREATED WITH A CURING COMPOUND AS SPECIFIED OR OTHERWISE APPROVED. APPLY THE CURING COMPOUND IN STRICT ACCORDANCE WITH THE DIRECTIONS OF THE MANUFACTURER OF THE COMPOUND.

E. COLD WEATHER: PROTECT CONCRETE BY PROVIDING ADEQUATE COVER AND HEATING SOURCE TO MAINTAIN CONCRETE TEMPERATURE SPECIFIED IN ACI 306.1 OR AS APPROVED BY THE PCL REPRESENTATIVE.

F. HOT WEATHER: KEEP THE CONCRETE SURFACES BELOW 85 DEGREES F FOR THE CURING PERIOD. PROVIDE WINDBREAKS, SHADING, FOG SPRAYING, SPRINKLING, PONDING, OR WET COVERING, AS REQUIRED, IN ACI 305 OR AS APPROVED BY THE PCL REPRESENTATIVE TO PREVENT MOISTURE LOSS DURING CURING PERIOD.

PRELIMINARY
DRAWING

NOT TO BE
USED FOR
CONSTRUCTION

TETRA TECH

DOCUMENT CONTROL NUMBER
705-2317230200-DWG-S0001-B
SHEET 1 OF 2

DWG. NO.	REFERENCE DRAWINGS	DWG. NO.	REFERENCE DRAWINGS

	REVISION DESCRIPTION	BY	DESIGN	CHECK	APPROVED	DATE
B	ISSUED FOR 90% REVIEW	JRW	JRW	MFR	MFR	05/05/2023
A	ISSUED FOR 60% REVIEW	JRW	JRW	MFR	MFR	03/17/2023

SCALE: AS SHOWN		DATE
DESIGNED:	J. WAKE	05/05/2023
DRAWN:	J. WAKE	05/05/2023
CHECKED:	M. ROBINSON	05/05/2023
APPROVED:	M. ROBINSON	05/05/2023
CLIENT APP.:		

PCL

PCL SOLAR CONSTRUCTORS USA
2322 WEST GRAND PKWY N, SUITE 200
KATY, TEXAS 77449
PHONE: (647) 401-8379

SITE OR AREA
CLEARVIEW SOLAR

TITLE
OVERALL STRUCTURAL SITE
STRUCTURAL NOTES

DRAWING NUMBER	REV
705-2317230200-DWG-S0001 SHEET 1 OF 2	B

3.8 CONTROL JOINTS

A. JOINTS MUST BE 1/8–INCH WIDE AND FORMED BY INSERTING HAND–PRESSED FIBERBOARD STRIP INTO FRESH CONCRETE UNTIL TOP SURFACE OF STRIP IS FLUSH WITH SLAB SURFACE. AFTER CONCRETE HAS CURED FOR AT LEAST 7 DAYS, THE CONTRACTOR MUST REMOVE INSERTS AND CLEAN GROOVE OF FOREIGN MATTER AND LOOSE PARTICLES.GROOVE THEN MUST BE PREPARED FOR JOINT SEALANT BY SAW CUTTING THE JOINT TO THE WIDTH AND DEPTH REQUIRED FOR THE SEALANT AND BACKER ROD. THOROUGHLY CLEAN, IMMEDIATELY FOLLOWING THE SAWING OPERATION, THE JOINT OPENING USING A WATER JET TO REMOVE ALL SAW CUTTINGS AND DEBRIS.

B. ONCE DRY, SEAL JOINTS IMMEDIATELY FOLLOWING THE PLACEMENT OF THE BACKER ROD. INSTALL JOINT SEALANT IN ACCORDANCE WITH MANUFACTURER INSTRUCTIONS AND SPECIFICATIONS. OPEN JOINTS, THAT CANNOT BE SEALED UNDER THE CONDITIONS SPECIFIED, OR WHEN RAIN INTERRUPTS SEALING OPERATIONS SHALL BE RECLEANED AND ALLOWED TO DRY PRIOR TO INSTALLING THE SEALANT.

3.9 PATCHING

A. NOTIFY THE PCL REPRESENTATIVE TO INSPECT CONCRETE SURFACES IMMEDIATELY UPON REMOVAL OF FORMS.

B. EXCESSIVE HONEYCOMB OR EMBEDDED DEBRIS IN CONCRETE IS NOT ACCEPTABLE. NOTIFY THE PCL REPRESENTATIVE UPON DISCOVERY.

C. PATCH IMPERFECTIONS AS DIRECTED BY THE PCL REPRESENTATIVE.

3.10 TESTING

A. PROVIDE THE NECESSARY TESTING AND MONITORING SERVICES NEEDED TO CONTROL OR MONITOR THE PRODUCTION, TRANSPORTATION, PLACEMENT, PROTECTION, CURING OF THE CONCRETE. SAMPLING AND TESTING FOR QUALITY CONTROL DURING PLACEMENT SHALL INCLUDE THE FOLLOWING:

1. SAMPLING OF FRESH CONCRETE: OBTAIN CONCRETE SAMPLES FOR TESTING IN ACCORDANCE WITH ASTM C172.
2. SLUMP: TEST THE SLUMP OF THE SAMPLED CONCRETE IN ACCORDANCE WITH ASTM C143. THE MAXIMUM SLUMP MAY BE INCREASED AS SPECIFIED WITH THE ADDITION OF AN APPROVED ADMIXTURE PROVIDED THAT THE WATER–CEMENT RATIO IS NOT EXCEEDED. PERFORM TESTS AT COMMENCEMENT OF CONCRETE PLACEMENT, WHEN TEST CYLINDERS ARE MADE, AND FOR EACH BATCH (MINIMUM) OR EVERY 150 CUBIC YARDS (MAXIMUM) OF CONCRETE.
3. AIR CONTENT: TEST AIR CONTENT OF THE SAMPLED CONCRETE IN ACCORDANCE WITH ASTM C231. TEST CONCRETE FOR AIR CONTENT AT THE SAME FREQUENCY AS SPECIFIED FOR SLUMP TESTS.
4. CONCRETE TEMPERATURE: TEST WHEN AIR TEMPERATURE IS BELOW 40 DEGREES F OR WHEN ABOVE 80 DEGREES F. TEST CONCRETE DELIVERED AND WHILE IN THE FORMS DURING CURING PERIOD.
5. COMPRESSION TEST SPECIMENS: MAKE FIVE TEST SIX INCH DIAMETER CYLINDERS FOR EACH SET OF TESTS IN ACCORDANCE WITH ASTM C31. TAKE PRECAUTIONS TO PREVENT EVAPORATION AND LOSS OF WATER FROM THE SPECIMEN. LABORATORY SHALL PERFORM COMPRESSION TESTING OF CONCRETE CYLINDERS IN ACCORDANCE WITH ASTM C39. TEST TWO CYLINDERS AT 7 DAYS, TWO CYLINDERS AT 28 DAYS, AND HOLD ONE CYLINDER IN RESERVE. SAMPLES FOR STRENGTH TESTS SHALL BE TAKEN FOR EACH FOUNDATION OR 100 CUBIC YARDS OR FRACTION THEREOF, OF EACH CONCRETE CLASS PLACED. STRENGTH LEVEL OF CONCRETE SHALL BE CONSIDERED SATISFACTORY IF BOTH THE FOLLOWING REQUIREMENTS ARE MET:
   a. NO INDIVIDUAL TEST RESULT IS 500 PSI LESS THAN THE 7–DAY OR 28–DAY STRENGTH AS APPLICABLE.
   b. THE AVERAGE OF THE COMPRESSIVE TESTS EQUALS OR EXCEEDS THE 7–DAY OR 28–DAY STRENGTH AS APPLICABLE.
6. IN THE EVENT OF UNSATISFACTORY COMPRESSIVE TEST RESULTS, NOTIFY A THIRD–PARTY REPRESENTATIVE FOR RESOLUTION.

3.11 DEFECTIVE CONCRETE

A. DEFECTIVE CONCRETE: CONCRETE NOT CONFORMING TO REQUIRED DETAILS, DIMENSIONS, TOLERANCES OR SPECIFIED REQUIREMENTS.

B. REPAIR OR REPLACEMENT OF DEFECTIVE CONCRETE WILL BE DETERMINED BY A THIRD–PARTY REPRESENTATIVE.

3.12 TOLERANCE

A. PLACE CONCRETE IN ACCORDANCE WITH THE FOLLOWING DIMENSIONAL TOLERANCES.

1. REINFORCING PLAN SPACING: PLUS OR MINUS 2 INCHES.
2. REINFORCING VERTICAL SPACING: PLUS OR MINUS 1 INCH.
3. CONCRETE CLEAR COVER: MINUS 0 INCHES, PLUS 1 INCH.
4. FOOTING PLAN DIMENSIONS: MINUS 0 INCHES, PLUS 2 INCHES.
5. FOOTING THICKNESS: MINUS 0 INCHES, PLUS 2 INCHES.
6. FOUNDATION DEVIATION FROM LEVEL: 1/16 INCH IN 4 FEET.

UNISTRUT FRAMING

PART 1 GENERAL

1.1 THIS SECTION SPECIFIES THE TECHNICAL AND CONSTRUCTION REQUIREMENTS FOR THE UNISTRUT (SLOTTED CHANNEL) FRAMING TO SUPPORT PILE MOUNTED ELECTRICAL EQUIPMENT.

1.2 SUBMITTALS

SUBMIT THE FOLLOWING SUBMITTALS TO THE ENGINEER OF RECORD FOR REVIEW AND ACCEPTANCE:

A. ASSEMBLY SHOP DRAWINGS NECESSARY TO INSTALL THE STRUT SYSTEM IN COMPLIANCE WITH THE CONTRACT DRAWINGS.

B. MANUFACTURERS PRODUCT DATA SHEETS

C. MANUFACTURER QUALIFICATIONS

1.3 QUALITY ASSURANCE

A. SELECT A MANUFACTURER WITH AT LEAST 10 YEARS EXPERIENCE IN MANUFACTURING STRUT SYSTEMS.

B. THE MANUFACTURER MUST CERTIFY IN WRITING ALL COMPONENTS SUPPLIED HAVE BEEN PRODUCED IN ACCORDANCE WITH AN ESTABLISHED QUALITY ASSURANCE PROGRAMS.

C. MEET THE REQUIREMENTS OF THE FOLLOWING STANDARDS:

1. FEDERAL, STATE AND LOCAL CODES
2. AMERICAN IRON AND STEEL INSTITUTE (AISI) SPECIFICATION FOR THE DESIGN OF COLDFORMED STEEL STRUCTURAL MEMBERS 2001 EDITION
3. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)
4. METAL FRAMING MANUFACTURER'S ASSOCIATION (MFMA)

PART 2 PRODUCTS

2.1 UNISTRUT AND ACCESSORIES

A. PROVIDE UNISTRUT OR APPROVED EQUAL STRUT SYSTEM AND COMPONENTS.

B. PROVIDE GALVANIZED UNISTRUT MEMBERS, BRACKETS, ACCESSORIES, BOLTS, AND NUTS TO PREVENT CORROSION.

2.2 STEEL POST

A. PROVIDE 3" DIAMETER SCHEDULE 40 (STANDARD) PIPE. HOT DIP GALVANIZE PIPE PER ASTM A123.

2.3 STEEL PLATE

A. PROVIDE ASTM A36 STEEL PLATE. HOT DIP GALVANIZE PIPE PER ASTM A123.

PART 3 EXECUTION

3.1 ALL MATERIAL IS TO BE DELIVERED TO THE WORK SITE IN ORIGINAL FACTORY PACKAGING TO AVOID DAMAGE TO THE FINISH.

3.2 UPON DELIVERY TO THE WORK SITE, PROTECT ALL COMPONENTS FROM THE ELEMENTS BY A SHELTER OR OTHER COVERING.

3.3 INSPECT THE WORK AREA PRIOR TO INSTALLATION. IF WORK AREA CONDITIONS ARE UNSATISFACTORY, INSTALLATION SHALL NOT PROCEED UNTIL SATISFACTORY CORRECTIONS ARE COMPLETED.

3.4 INSTALLATION

A. INSTALL BY A FULLY TRAINED MANUFACTURER AUTHORIZED INSTALLER.

B. SET STRUT SYSTEM COMPONENTS INTO FINAL POSITION TRUE TO LINE, LEVEL AND PLUMB, IN ACCORDANCE WITH APPROVED DRAWINGS.

C. ANCHOR MATERIAL FIRMLY IN PLACE, AND TIGHTEN ALL CONNECTIONS TO THEIR RECOMMENDED TORQUES.

3.5 CLEANUP

A. UPON COMPLETION OF THIS SECTION OF WORK, REMOVE ALL PROTECTIVE WRAPS AND DEBRIS. REPAIR ANY DAMAGE DUE TO INSTALLATION.

3.6 PROTECTION

A. DURING INSTALLATION AND UPON COMPLETION, PROTECT THE WORK FROM DAMAGE.

SUBMITTAL REQUIREMENTS

1. THIS SECTION SPECIFIES THE REQUIREMENTS FOR SUBMITTALS LISTED IN THE EXCAVATION, BACKFILL AND COMPACTION, CAST–IN–PLACE STRUCTURAL CONCRETE AND UNISTRUT FRAMING SECTIONS.
2. SUBMIT ONE ELECTRONIC COPY OF THE SUBMITTALS SPECIFIED TO THE ENGINEER OF RECORD.
3. THE ENGINEER OF RECORD WILL REVIEW THE SUBMITTALS FOR CONFORMANCE AND COMPLIANCE WITH THE DESIGN DRAWINGS AND TECHNICAL SPECIFICATIONS.

DEFINITIONS

1. THIRD–PARTY REPRESENTATIVE – REPRESENTATIVE OF THE CLIENT OR OWNER
2. ENGINEER OF RECORD – PROFESSIONAL ENGINEER WHO HAS SIGNED AND SEALED THE DESIGN DRAWINGS
3. PCL REPRESENTATIVE – EMPLOYEE OF PCL
4. GEOTECHNICAL ENGINEER – PROFESSIONAL ENGINEER LICENSED IN THE STATE OF OHIO COMPETENT IN THE PRACTICES OF GEOTECHNICAL ENGINEERING.

STRUCTURAL STEEL PILES

PART 1 GENERAL

1.1 THIS SECTION SPECIFIES THE TECHNICAL AND CONSTRUCTION REQUIREMENTS FOR THE STRUCTURAL STEEL PILES TO SUPPORT THE PV SUPPORT STRUCTURE, CAB SYSTEM AND AUXILIARY ELECTRICAL EQUIPMENT.

1.2 PERFORM ALL WELDING IN ACCORDANCE WITH THE AMERICAN WELDING SOCIETY (AWS) "STRUCTURAL STEEL WELDING CODE", ANSI/AWS D1.1–LATEST EDITION AND AISC REQUIREMENTS; REPLACE OR REPAIR STRUCTURAL STEEL THAT IS DAMAGED DURING WELDING IN A MANNER THAT IS ACCEPTABLE TO THE ENGINEER OF RECORD AND SKID MANUFACTURER.

1.3 SHOP WELDING TO BE DONE IN AN APPROVED FABRICATORS SHOP PER OHIO 2017 CONSTRUCTION CODE, CHAPTER 17.

1.4 WELDERS ARE TO HAVE CURRENT EVIDENCE OF PASSING THE APPROPRIATE AWS QUALIFICATION TESTS. THE ENGINEER OF RECORD AND AES REPRESENTATIVE MAY REQUEST SUCH DOCUMENTATION AT ANY TIME DURING THE PROJECT.

1.5 DO NOT USE GAS CUTTING TORCHES TO CORRECT FABRICATION ERRORS WITHOUT APPROVAL OF THE ENGINEER OF RECORD.

1.6 PROVIDE CORROSION PROTECTION COATING FOR ALL STRUCTURAL STEEL (INCLUDING BOLTS AND OTHER HARDWARE).

1.7 FABRICATION AND ERECTION SHALL COMPLY WITH AISC SPECIFICATIONS, LATEST EDITION.

1.8 VERIFY ALL DIMENSIONS WITH CIVIL AND ELECTRICAL DRAWINGS, COORDINATE ANY CONFLICTS BEFORE PROCEEDING.

1.9 SOLAR TRACKING SYSTEM AND ALL OF ITS COMPONENTS INCLUDING ATTACHMENT TO PILES TO BE DESIGNED AND PROVIDED BY GAMECHANGE. BOLT HOLES IN PV SUPPORT PILES TO BE COORDINATED BY CONTRACTOR WITH GAMECHANGE DESIGN DOCUMENTS, AS NECESSARY.

1.10 SUBMITTALS

SUBMIT THE FOLLOWING SUBMITTALS TO THE ENGINEER OF RECORD FOR REVIEW AND ACCEPTANCE PRIOR TO CONSTRUCTION:

A. SHOP DRAWINGS FOR W–SHAPES: DRAWING FOR EACH TYPICAL PILE TO INDICATE SECTION SIZE, LENGTH, COATING, BOLT HOLES, SHOP CONNECTIONS, AND QUANTITY.

B. W–SHAPE MILL CERTIFICATES

C. PILE INSTALLATION PLAN (TO INCLUDE PILE DRIVING EQUIPMENT)

D. PILE TESTING REPORTS

E. PRODUCT DATA FOR REPAIR PAINT FOR HOT–DIPPED GALVANIZED SURFACES.

F. PILE DRIVING REPORT

G. FABRICATOR QUALIFICATIONS

H. WELDER QUALIFICATIONS

1.11 QUALITY ASSURANCE

A. PILES MUST BE FABRICATED BY AN AISC CERTIFIED STRUCTURAL STEEL FABRICATOR, IN ACCORDANCE WITH AISC 207, CATEGORY BU. SUBMIT AISC STRUCTURAL STEEL FABRICATOR QUALITY CERTIFICATION

PART 2 PRODUCTS

2.1 W–SHAPES

A. PROVIDE WIDE FLANGE (W) SHAPES, FOR DRIVEN PILES, CONFORMING TO ASTM A992 WITH A YIELD STRENGTH (Fy) OF 50 KSI. HOT–DIP GALVANIZE ALL PILES PER ASTM A123. (MINIMUM 3.3 MILS COATING THICKNESS)

2.2 STEEL PLATE

A. PROVIDE STEEL PLATE CONFORMING TO ASTM A36 WITH A YIELD STRENGTH (Fy) OF 36 KSI. HOT–DIPGALVANIZE ALL PLATE PER ASTM A123. (MINIMUM 3.3 MILS COATING THICKNESS)

2.3 BOLTS

A. PROVIDE BOLTS CONFORMING TO ASTM A325, UNLESS NOTED OTHERWISE. HOT–DIP GALVANIZE ALL BOLTS, WASHERS AND NUTS PER ASTM A325 AND A123.

2.4 WELDING ELECTRODEA.PROVIDE AWS A5.1 OR A5.5, E70XX WELDING ELECTRODE.

2.5 REPAIR PAINT FOR HOT DIPPED GALVANIZED SURFACES

A. PROVIDE ORGANIC ZINC REPAIR PAINT COMPLYING WITH THE REQUIREMENTS OF ASTM A780. GALVANIZING REPAIR PAINT IS TO CONTAIN 95% ZINC BY WEIGHT. APPLY THE GALVANIZING REPAIR PAINT NO LESS THAN THE COATING THICKNESS REQUIRED BY ASTM A123 OR A153 AS APPLICABLE.

2.6 PILE DRIVING HAMMERS

A. PROVIDE IMPACT OR VIBRATORY TYPE PILE DRIVING HAMMERS WITH A MINIMUM ENERGY OF 1000 JOULES, SUCH AS A VERMEER PD10 OR EQUIVALENT. SELECT THE PROPOSED PILE DRIVING EQUIPMENT, INCLUDING HAMMERS, CAP BLOCK, CUSHION AND OTHER REQUIRED ITEMS, AND SUBMIT COMPLETE DESCRIPTIONS OF THE PROPOSED EQUIPMENT AND PROPOSED DRIVING RESISTANCE CRITERIA IN THE PILE INSTALLATION PLAN.

PART 3 EXECUTION

3.1 SUBMIT PILE INSTALLATION PLAN INCLUDING INFORMATION ON THE TYPE OF EQUIPMENT (INCLUDING VERIFICATION OF THE SPECIFIED HAMMER ENERGY REQUIRED) PROPOSED TO BE USED, PROPOSED METHODS OF OPERATION, TEST PILE AND PRODUCTION PILE DRIVING PLANS INCLUDING PROPOSED SEQUENCE OF DRIVING, AND DETAILS OF ALL PILE DRIVING EQUIPMENT AND ACCESSORIES. USE THE SAME TYPE AND SIZE EQUIPMENT AS FOR THE TEST PILES.

3.2 TEST PILE DRIVING

A. TEST PILE DRIVING SHALL BE COMPLETED USING THE SAME TYPE AND ENERGY HAMMER TO BE USED IN PRODUCTION PILE DRIVING.

B. DIAL GAGES AND LOAD CELLS SHALL BE CALIBRATED AND CERTIFICATES OF CALIBRATION INCLUDED WITH THE TEST PILE PLAN AS PART OF THE PILE INSTALLATION PLAN SUBMITTAL.

C. TEST PILES SHALL BE OF THE SAME SIZE, AND TYPE, INCLUDING PROTECTIVE COATINGS AS THE PILES SPECIFIED ON THE STRUCTURAL DRAWINGS.

D. TEST PILES MAY BE USED AS PRODUCTION PILES IF THEY MEET THE LOAD TEST REQUIREMENTS WITHOUT FAILURE OR PERMANENT DEFORMATION.

E. TESTING SHALL BE CONDUCTED IN THE PRESENCE OF THE ENGINEER AND DURING THE ENTIRE TIME PILES ARE INITIALLY DRIVEN OR REDRIVEN AND DURING PILE RESTRIKE TESTING.

F. TEST PILES OF EACH TYPE SHALL BE DRIVEN TO THE SPECIFIED MINIMUM DEPTH AND TESTED IN EACH MOTOR BLOCK FOR VERIFICATION OF LATERAL AND AXIAL CAPACITY (TABLE 1/PV–C.11.02) PRIOR TO INSTALLATION OF PRODUCTION PILES. IN EACH MOTOR BLOCK CONDUCT THE MINIMUM AT REPRESENTATIVE LOCATIONS: 1. PILE AXIAL TENSILE CAPACITY IN ACCORDANCE WITH ASTM D3689, PROCEDURE A: MINIMUM 3 PILES OF EACH TYPE PER MOTOR BLOCK. LOAD INCREMENTS MAY BE UP TO 10% OF THE TEST LOAD PROVIDED IN TABLE 1.2. LATERAL LOAD CAPACITY IN ACCORDANCE WITH ASTM D3966: MINIMUM 3 PILES FOR EACH PILE TYPE PER MOTOR BLOCK. USE FIVE (5) EQUAL LOADING INCREMENTS FOR THE TEST LOAD PROVIDED IN TABLE 1.

G. LOAD INCREMENTS SHOULD BE CONDUCTED IN GENERAL ACCORDANCE WITH THE REFERENCED ASTM PROCEDURES. HOLD EACH LOAD INCREMENT FOR A MINIMUM OF ONE (1) MINUTE AND THE LAST INCREMENT (MAX LOAD) FOR A MINIMUM OF FOUR (4) MINUTES.

H. CONDUCT TEST PILES AT LEAST 200 FEET APART.

I. PERFORM AXIAL TESTING PRIOR TO LATERAL TESTING.

J. LATERAL LOADS TO BE RESISTED BY THE STRONG AXIS OF THE PILE FOR THE TEST.

K. RECORD PILE DEFLECTIONS AT EACH LOAD INCREMENT.

L. UNLOAD THE PILE AND ALLOW THE PILE TO "REBOUND" AFTER LOAD DEFLECTION IS RECORDED.

M. TEST EACH PILE TO THE LOAD CAPACITY INDICATED IN TABLE 1 AND VERIFY DEFLECTIONS UNDERREQUIRED LOADS ARE LESS THAN:1. TENSILE: 0.25 IN.2. LATERAL: 0.5 IN. AT GROUND SURFACE; 3 IN. AT THE TOP OF PILE G.RECORD ENERGY AND PILE DRIVING RESISTANCE FOR EACH TEST PILES DURING DRIVING.1. FOR RAPID IMPACT AND VIBRATORY HAMMERS, RECORD HAMMER ENERGY AND DRIVE TIME PERFOOT2. FOR NORMAL IMPACT HAMMERS, RECORD HAMMER ENERGY AND BLOWS PER FOOT.3. DEFINE MINIMUM REFUSAL RESISTANCE FOR LAST FOOT OF PENETRATION.4. PROVIDE PILE TESTING REPORTS IN ACCORDANCE WITH THE ASTM D3689 AND ASTM D3966.3.3 INSTALL EACH PILE AS ONE (1) CONTINUOUS MEMBER.3.4 DO NOT BEGIN PILE INSTALLATION UNTIL THE EARTHWORK IN THE AREA WHERE PILES ARE TO BEINSTALLED HAS BEEN COMPLETED.

3.5 PILE PLACEMENT TOLERANCES:

A. REFER TO GAMECHANGE INSTALLATION MANUAL.

3.6 COMPLETE NECESSARY EXCAVATION AND FURNISH LINES AND LEVELS AS REQUIRED TO INSTALL PILES AT THEIR INDICATED LOCATIONS.

3.7 ACCURATELY LOCATE AND INSTALL PILES BY SUCH METHODS AND EQUIPMENT SO AS NOT TO IMPAIR THE PILE STRENGTH OR DAMAGE PILES OR ADJACENT CONSTRUCTION. PILE REFUSAL MAY BEEN COUNTERED IN WHICH CASE PRE–DRILLING AND BACKFILLING PILE HOLES WITH CONCRETE MAY BE REQUIRED TO THE MINIMUM EMBEDMENT DEPTH SHOWN ON E/PV–C.11.04. COORDINATE WITH ENGINEER OF RECORD IF REFUSAL IS ENCOUNTERED TO CONFIRM THE CORRECTIVE ACTIONS AND CONCRETE SPECIFICATIONS. SUBMIT MIX DESIGN FOR REVIEW.

3.8 INSTALL PILES TO THE MINIMUM DEPTH INDICATED ON THE DRAWINGS AND THE MINIMUM DRIVING RESISTANCE ESTABLISHED BASED ON TEST PILING. RECORD DRIVING RESISTANCE FOR EACH PILE.

3.9 EACH PILE IS TO BE FREE FROM DEFECTS AND DAMAGE DUE TO CONSTRUCTION, FABRICATION,DELIVERY, INSTALLATION OR OTHER CAUSES.

3.10 DAMAGED PILES INCLUDE BUT ARE NOT NECESSARILY LIMITED TO PILES BENT, BUCKLED,CRACKED, WITH FABRICATION TOLERANCES BEYOND THOSE INDICATED ABOVE OR WITH ANY OTHER DEFECT AS DETERMINED BY THE ENGINEER OF RECORD THAT WOULD WEAKEN THE PILE.

3.11 REPAIR ALL DAMAGED CORROSION PROTECTION COATINGS IN ACCORDANCE WITH COATING MANUFACTURER RECOMMENDATIONS FOR REPAIR MATERIAL SPECIFIED IN PART 2 FOR REPAIR OF HOT DIPPED GALVANIZED SURFACES.

3.12 FIELD COAT ALL FIELD WELDS INSTALLED ON SHOP COATED STRUCTURAL STEEL WITH THE SAME COATING SYSTEM IN ACCORDANCE WITH THE REPAIR MATERIAL SPECIFIED IN PART 2 FOR REPAIR OF HOT DIPPED GALVANIZED

3.13 PROVIDE THE ENGINEER WITH A COPY OF A PILE DRIVING REPORT. KEEP A COMPLETE AND ACCURATE RECORD OF EACH PILE DRIVEN. INDICATE THE:

A. DATE DRIVEN,

B. PILE LOCATION AND NUMBER,

C. DEPTH DRIVEN,

D. DEVIATIONS FROM PILE LOCATION,

E. CROSS SECTION SHAPE AND DIMENSIONS, ORIGINAL LENGTH, GROUND ELEVATION, TIP ELEVATION, CUT–OFF ELEVATIONS (IF NECESSARY), VERTICAL ALIGNMENT,

F. NUMBER OF BLOWS REQUIRED FOR EACH FOOT OF PENETRATION AND NUMBER OF BLOWS FOR THE LAST 6 INCHES OF PENETRATION FOR IMPACT HAMMERS AND DRIVE TIME FOR EACH FOOT OF PENETRATION FOR RAPID IMPACT AND VIBRATORY HAMMERS.

G. INCLUDE IN THE RECORD THE BEGINNING AND ENDING TIMES OF EACH OPERATION DURING DRIVING OF PILE,

H. TYPE AND SIZE OF HAMMER USED, RATE OF OPERATION, STROKE OR EQUIVALENT STROKE FOR DIESEL HAMMER, TYPE OF DRIVING HELMET, AND TYPE AND DIMENSION OF HAMMER CUSHION (CAP BLOCK) AND PILE CUSHION USED.

I. RECORD RETAP DATA AND UNUSUAL OCCURRENCES DURING PILE DRIVING SUCH AS REDRIVING, HEAVING, WEAVING, OBSTRUCTIONS, AND ANY DRIVING INTERRUPTIONS.

J. PROVIDE A DESCRIPTION OF PILES THAT WERE REJECTED (PILE NUMBER, LOCATION, REASON FOR REJECTION). PILES MAY BE REJECTED IF THEY DO NOT MEET THE REQUIRED DRIVING RESISTANCE, DO NOT ACHIEVE THE MINIMUM EMBEDMENT, ARE DAMAGED DUE TO INSTALLATION OR OTHER REASON, OR ARE INSTALLED WITH INCORRECT LOCATION OR ORIENTATION.

3.14 DRIVE PILES INTO NATIVE SOIL OR COMPACTED FINISHED GRADE WHERE CUT OR FILL IS REQUIRED. ALL EARTHWORK SHALL BE COMPLETED PRIOR TO INSTALLATION OF ANY PILE FOUNDATION. DO NOT PRE–DRILL WITHOUT WRITTEN APPROVAL FROM THE OWNER AND ENGINEER OF RECORD.

3.15 BRING TO THE ATTENTION OF THE ENGINEER OF RECORD ALL PILES THAT ARE DRIVEN INTO THE GROUND AT A RATE THAT THE PILE DRIVING OPERATOR BELIEVES IS FASTER THAN WHAT IS EXPECTED BASED ON PREVIOUS PILES FOR THIS PROJECT. PERFORM TESTING OF THESE PILES UNDER THE DIRECTION AND DISCRETION OF THE ENGINEER OF RECORD AT THAT TIME.

3.16 ALL PILES ARE TO BE INSTALLED VERTICALLY UNLESS OTHERWISE SPECIFIED.

3.17 PROVIDE PILE INSPECTION PER INSPECTION TABLE 2/PV–C.11.02.

PRELIMINARY DRAWING

NOT TO BE USED FOR CONSTRUCTION

TETRA TECH

DOCUMENT CONTROL NUMBER
705-2317230200-DWG-S0001-B
SHEET 2 OF 2

DWG. NO.	REFERENCE DRAWINGS	REFERENCE DRAWINGS		REVISION DESCRIPTION	BY	DESIGN	CHECK	APPROVED	DATE
			B	ISSUED FOR 90% REVIEW	JRW	JRW	MFR	MFR	05/05/2023
			A	ISSUED FOR 60% REVIEW	JRW	JRW	MFR	MFR	03/17/2023

SCALE: AS SHOWN		DATE
DESIGNED:	J. WAKE	05/05/2023
DRAWN:	J. WAKE	05/05/2023
CHECKED:	M. ROBINSON	05/05/2023
APPROVED:	M. ROBINSON	05/05/2023
CLIENT APP.:		

PCL

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KATY, TEXAS 77449
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SITE OR AREA: CLEARVIEW SOLAR

TITLE: STRUCTURAL NOTES FOUNDATION PLAN

DRAWING NUMBER	REV
705-2317230200-DWG-S0001 SHEET 2 OF 2	B

WAKE, JOHN 4/26/2023 10:14:01 PM

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