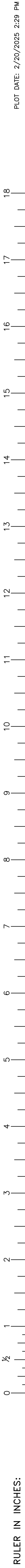
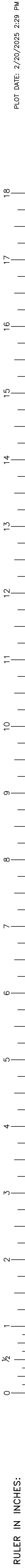


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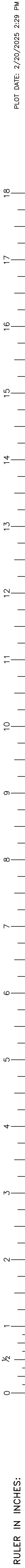
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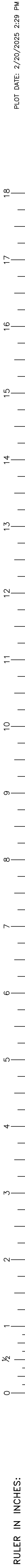
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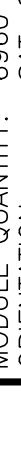
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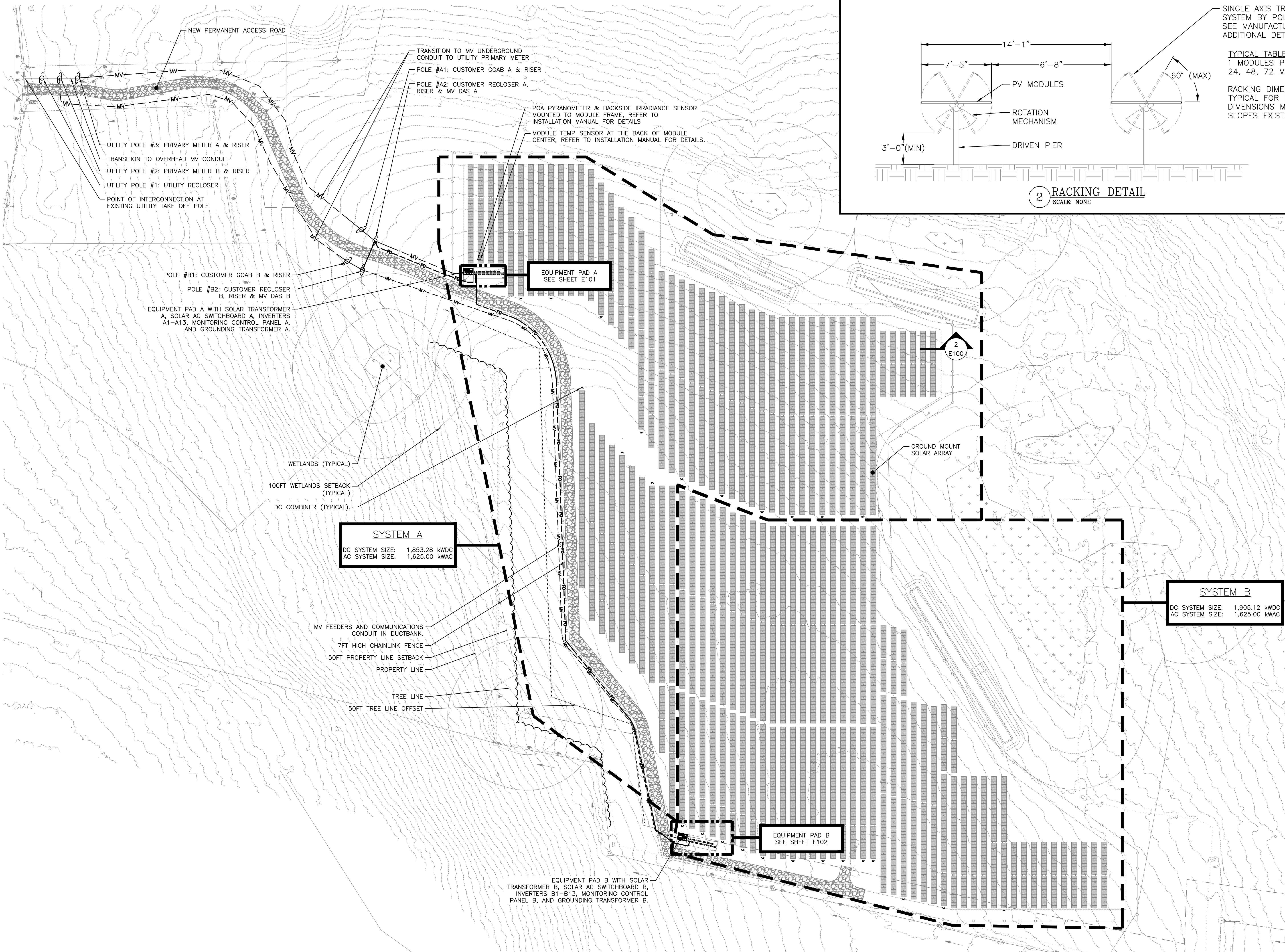
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RULER IN INCHES: 

RULER IN INCHES: 

DRAWING #	G001
PROJECT	SOLAR GROUND MOUNT SYSTEM AT WINCHESTER 41.939445, -73.069261 WINCHESTER, CT 06098
DC SYSTEM SIZE:	3.758 400 kWDC
AC SYSTEM SIZE:	HELIXE HSPE 540W
MODULE TYPE:	HELIXE HSPE 540W
MODULE QUANTITY:	6960
ORIENTATION:	SAT, 0° AZIMUTH
PAGE SIZE	36" x 24"
PROJECT #	05705
DEVELOPER	GREENSKIES 127 WASHINGTON AVENUE NORTH HAVEN, CT 06473 WWW.GREENSKIES.COM  Greenskies a Clean Focus company
ENGINEER	 PUREPOWER ENGINEERING 111 RIVER STREET, HOBOKEN, NJ 07030 RICHARD A. IVINS CT LICENSE No. 0292282
DATE	02/21/2025
REVISION DESCRIPTION	PERMIT SET - REV 1
DATE	07/12/2024
REVISION DESCRIPTION	PERMIT SET
DATE	03/26/2024
REVISION DESCRIPTION	CONCEPTUAL DESIGN (REV 6)
DATE	03/14/2024
REVISION DESCRIPTION	CONCEPTUAL DESIGN (REV 5)

PLOT DATE: 2/20/2025 2:29 PM
RULER IN INCHES: 0 1/2 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18



1 OVERALL ELECTRICAL PLAN
SCALE: 1" = 60'

DRAWING TITLE
OVERALL ELECTRICAL PLAN

DRAWING #
E100

PROJECT
SOLAR GROUND MOUNT SYSTEM AT WINCHESTER
41.939445, -73.069261
WINCHESTER, CT 06098

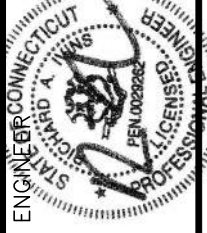
DC SYSTEM SIZE: 3,758.400 kWDC
AC SYSTEM SIZE: 3,250.000 KWAC
MODULE TYPE: HELIENE HSPE 540W
MODULE QUANTITY: 6960
ORIENTATION: SAT, 0° AZIMUTH

PAGE SIZE
36" x 24"

PROJECT #
05705

DEVELOPER
Greenskies
a Clean Focus company

GREENSKIES
127 WASHINGTON AVENUE
NORTH HAVEN, CT 06473
WWW.GREENSKIES.COM



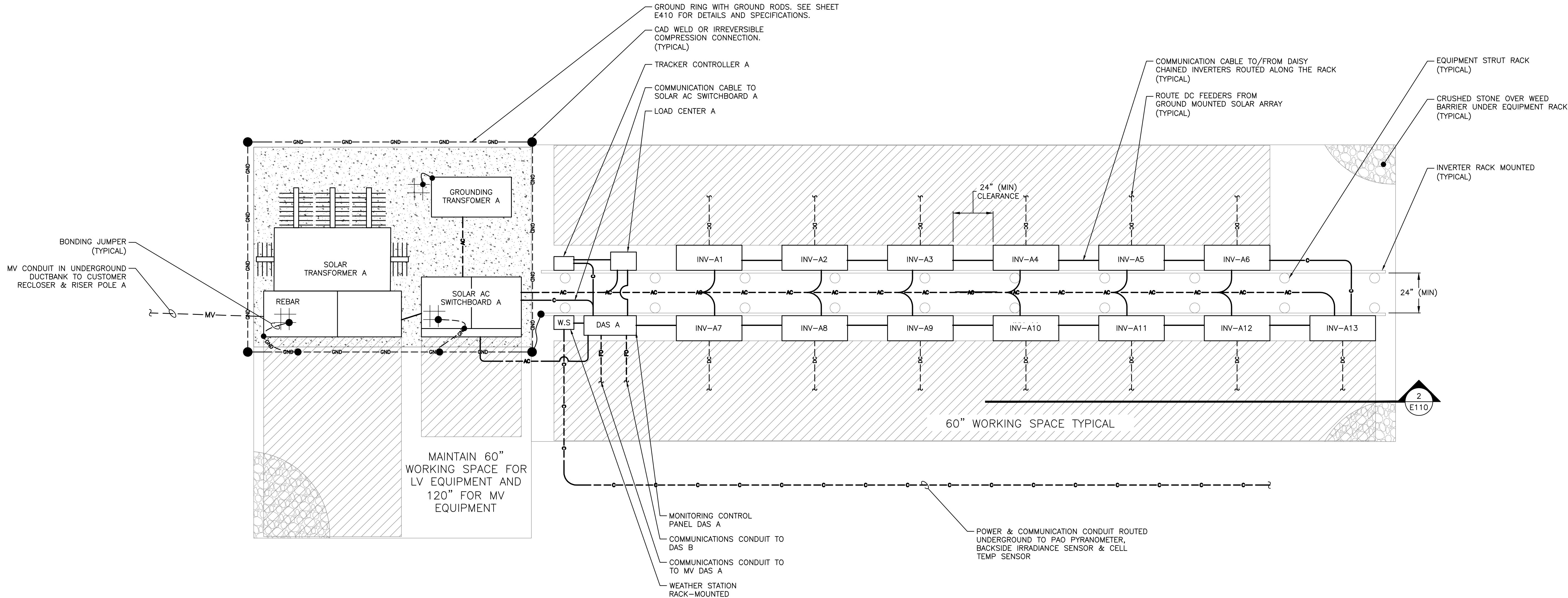
ENGINEER
PUREPOWER
ENGINEERING
111 W. PUREPOWER CON
RICHARD A. NIMS
CT LICENSE No. 0029262



DATE	REVISION DESCRIPTION	PM	ENG	CHK
02/21/2025	PERMIT SET - REV 1	SK	SF	RI
07/12/2024	PERMIT SET	SK	SF	RI
03/26/2024	CONCEPTUAL DESIGN (REV 6)	SK	SK	RI
03/14/2024	CONCEPTUAL DESIGN (REV 5)	SK	SK	RI

RULER IN INCHES: 0 1/2 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

PLOT DATE: 2/20/2025 2:53 PM



1 ELECTRICAL AREA PLAN - SYSTEM A
SCALE: 3/8" = 1'-0"



DRAWING TITLE
ELECTRICAL AREA PLAN -
SYSTEM A

DRAWING #
E101

PROJECT
SOLAR GROUND MOUNT SYSTEM AT
WINCHESTER
41.939445, -73.069261
WINCHESTER, CT 06098

DC SYSTEM SIZE: 3,758,400 kWDC
AC SYSTEM SIZE: 3,250,000 kWAC
MODULE TYPE: HELIENE HSPE 540W
MODULE QUANTITY: 6960
ORIENTATION: SAT, 0° AZIMUTH

PAGE SIZE
36" x 24"
PROJECT #
05705

DEVELOPER

Greenskies
a Clean Focus company

GREENSKIES
127 WASHINGTON AVENUE
NORTH HAVEN, CT 06473
WWW.GREENSKIES.COM

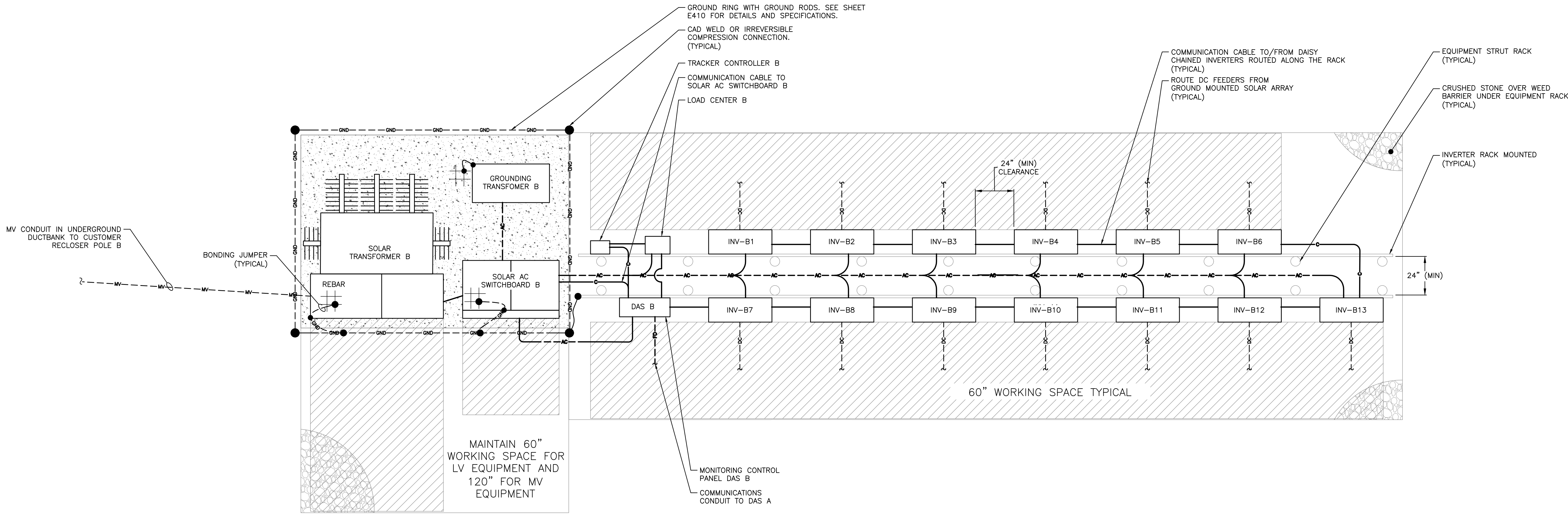


PUREPOWER
ENGINEERING
111 WASHINGTON AVENUE
NORTH HAVEN, CT 06473
WWW.PUREPOWER.COM
RICHARD A. MINIS
CT LICENSE No. 0029262

DATE	REVISION DESCRIPTION	PM	ENG	CHK
02/21/2025	PERMIT SET - REV 1	SK	SF	RI
07/12/2024	PERMIT SET	SK	SF	RI
03/26/2024	CONCEPTUAL DESIGN (REV 6)	SK	SK	RI
03/14/2024	CONCEPTUAL DESIGN (REV 5)	SK	SK	RI

RULER IN INCHES: 0 1/2 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

PLOT DATE: 2/20/2025 2:29 PM



1 ELECTRICAL AREA PLAN - SYSTEM B
SCALE: 3/8" = 1'-0"



PROJECT	SOLAR GROUND MOUNT SYSTEM AT WINCHESTER 41.939445, -73.069261 WINCHESTER, CT 06098	DC SYSTEM SIZE: 3,758,400 kWDC AC SYSTEM SIZE: 3,250,000 kWAC MODULE TYPE: HELIENE HSPE 540W MODULE QUANTITY: 6960 ORIENTATION: SAT, 0° AZIMUTH	PAGE SIZE 36" x 24" PROJECT # 05705	DEVELOPER Greenskies a Clean Focus company 127 WASHINGTON AVENUE NORTH HAVEN, CT 06473 WWW.GREENSKIES.COM	ENGINTEERING 111 PARK STREET WINCHESTER, CT 06098 WWW.PUREPOWER.COM RICHARD A. MINIS CT LICENSE No. 0029262	REVISION DESCRIPTION	DATE	DATE	DATE
						PERMIT SET - REV 1	02/21/2025	02/21/2025	02/21/2025
						PERMIT SET	07/12/2024	07/12/2024	07/12/2024
						CONCEPTUAL DESIGN (REV 6)	03/26/2024	03/26/2024	03/26/2024
CONCEPTUAL DESIGN (REV 5)	03/14/2024	03/14/2024	03/14/2024	PM	ENG	CHK	SK	SF	RI

1 TYPICAL EQUIPMENT RACKING ELEVATION - SIDE VIEW
SCALE: NONE

2 TYPICAL EQUIPMENT RACKING ELEVATION - FRONT VIEW
SCALE: 1/2" = 1'-0"

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

RULER IN INCHES:

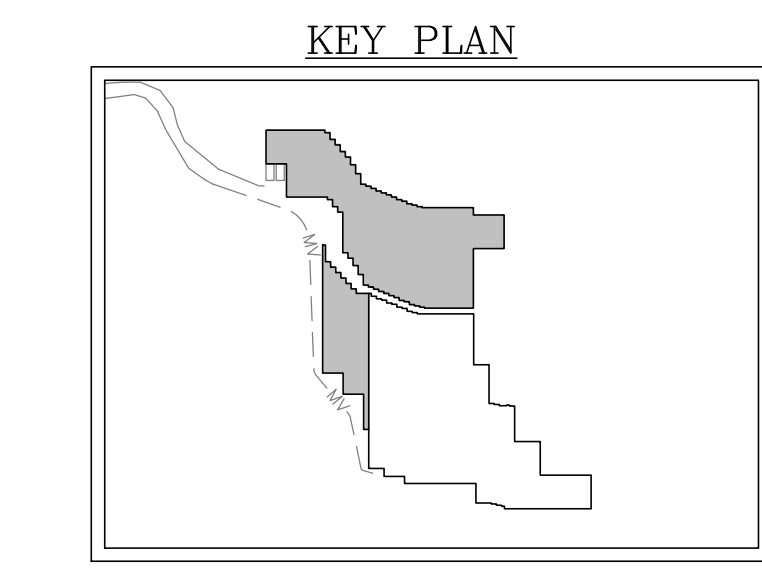
PLOT DATE: 2/20/2025 2:50 PM



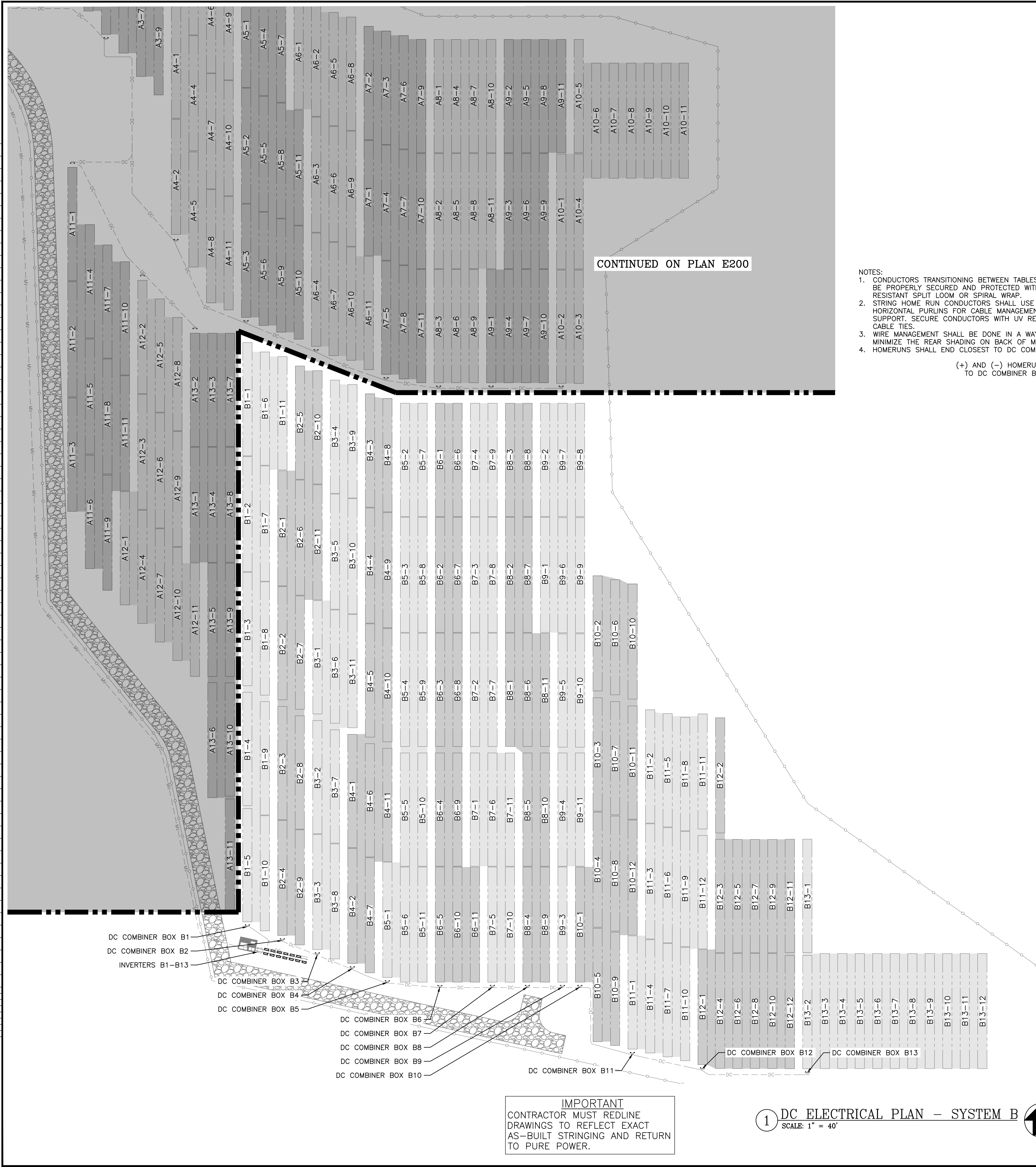
CONDUIT FILL TABLE (PVMWIRE, 2000VDC MAX)		
MAXIMUM NUMBER OF CU #10 PV WIRES (WITH ALLOWANCE FOR AN ADDITIONAL GROUND WIRE)		
CONDUIT TRADE SIZE	CONDUIT LENGTH 24" OR LESS (60% FILL)	CONDUIT LENGTH OVER 24" (40% FILL W/ CONDITIONS OF USE)
3/4"	3	2
1"	5	3
1.25"	9	6
1.5"	13	9
2"	23	9
2.5"	33	9
3"	52	9
3.5"	70	9
4"	91	9

TABLE ASSUMING: PVC CONDUIT AND CU #10 PV WIRE WITH 0.28in O.D., 1 TEMP. DERATE
PV SOURCE CIRCUIT (SIMULATED) WITH 16.56A OUTPUT, 1 IN PARALLEL, AND 25A FUSES

STRING SUMMARY - SYSTEM A		
INVERTER NAME	MODULES PER STRING	STRING QUANTITY
A1	24	11
A2	24	11
A3	24	11
A4	24	11
A5	24	11
A6	24	11
A7	24	11
A8	24	11
A9	24	11
A10	24	11
A11	24	11
A12	24	11
A13	24	11



PLOT DATE: 2/20/2025 2:30 PM
RULER IN INCHES: 0 1/2 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

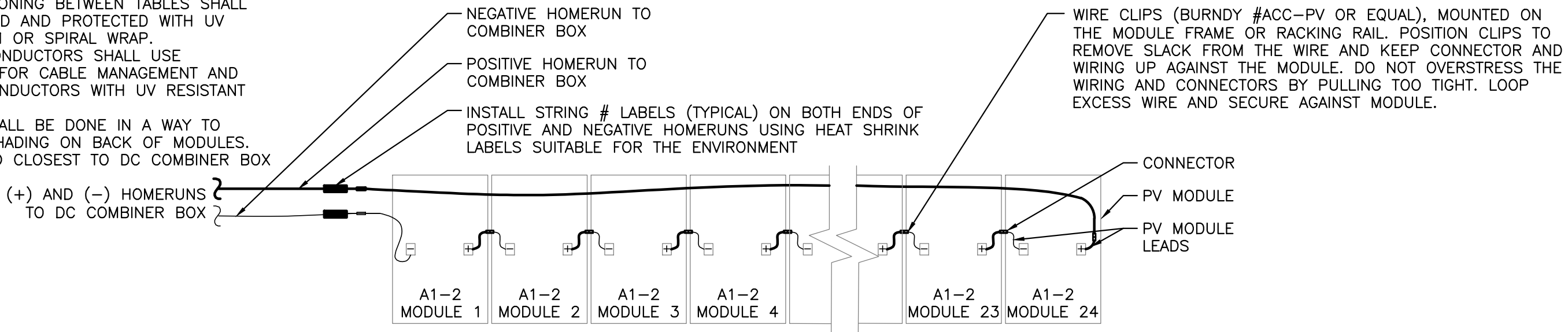


STRING SUMMARY – SYSTEM B		
INVERTER NAME	MODULES PER STRING	STRING QUANTITY
B1	24	11
B2	24	11
B3	24	11
B4	24	11
B5	24	11
B6	24	11
B7	24	11
B8	24	11
B9	24	11
B10	24	12
B11	24	12
B12	24	12
B13	24	12

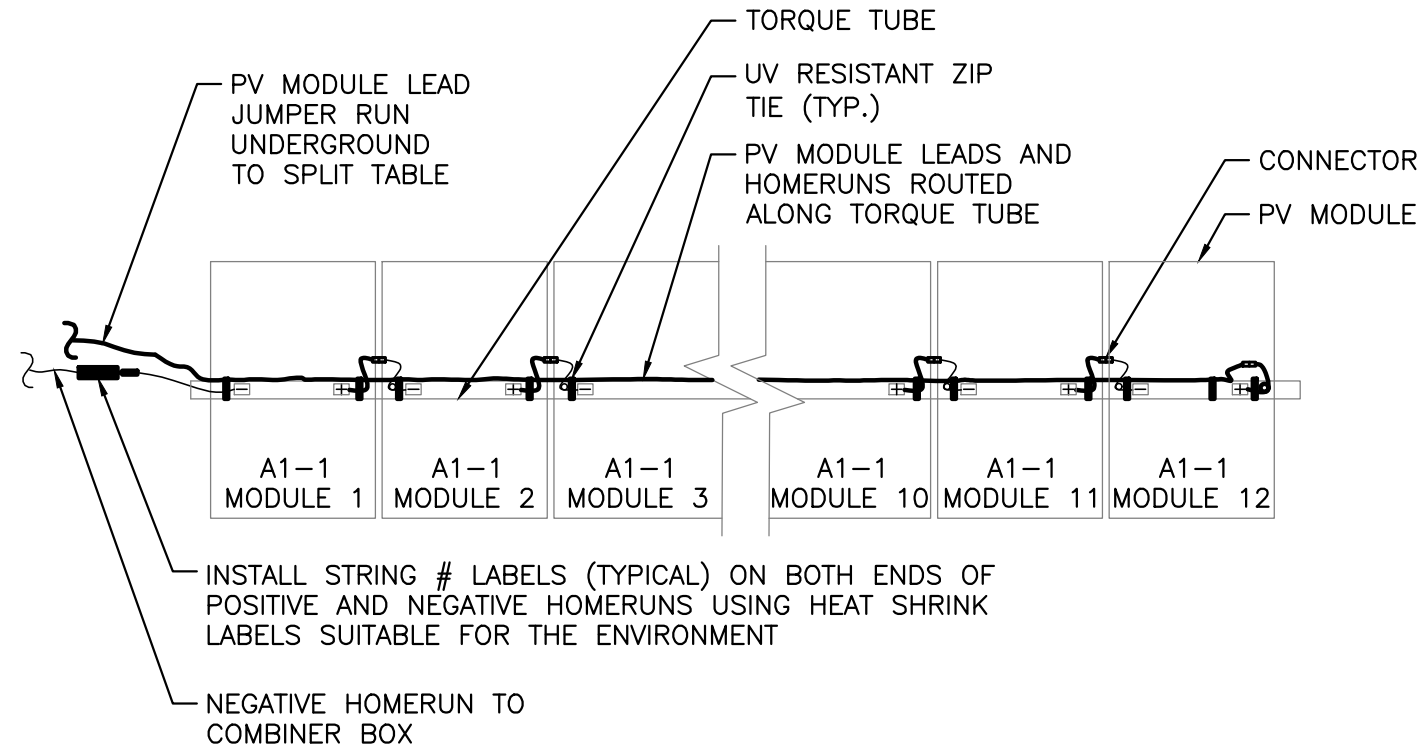
CONDUIT FILL TABLE (PVMWIRE, 2000VDC MAX)		
MAXIMUM NUMBER OF CU #10 PV WIRES. (WITH ALLOWANCE FOR AN ADDITIONAL GROUND WIRE)		
CONDUIT TRADE SIZE	CONDUIT LENGTH 24" OR LESS (60% FILL)	CONDUIT LENGTH OVER 24" (40% FILL – W/ CONDITIONS OF USE)
3/4"	3	2
1"	5	3
1.25"	9	6
1.5"	13	9
2"	23	9
2.5"	33	9
3"	52	9
3.5"	70	9
4"	91	9

TABLE ASSUMING: PVC CONDUIT AND CU #10 PV WIRE WITH 0.28in O.D., 1 TEMP. DERATE
PV SOURCE CIRCUIT (SIMULATED) WITH 16.56A OUTPUT, 1 IN PARALLEL, AND 25A FUSES

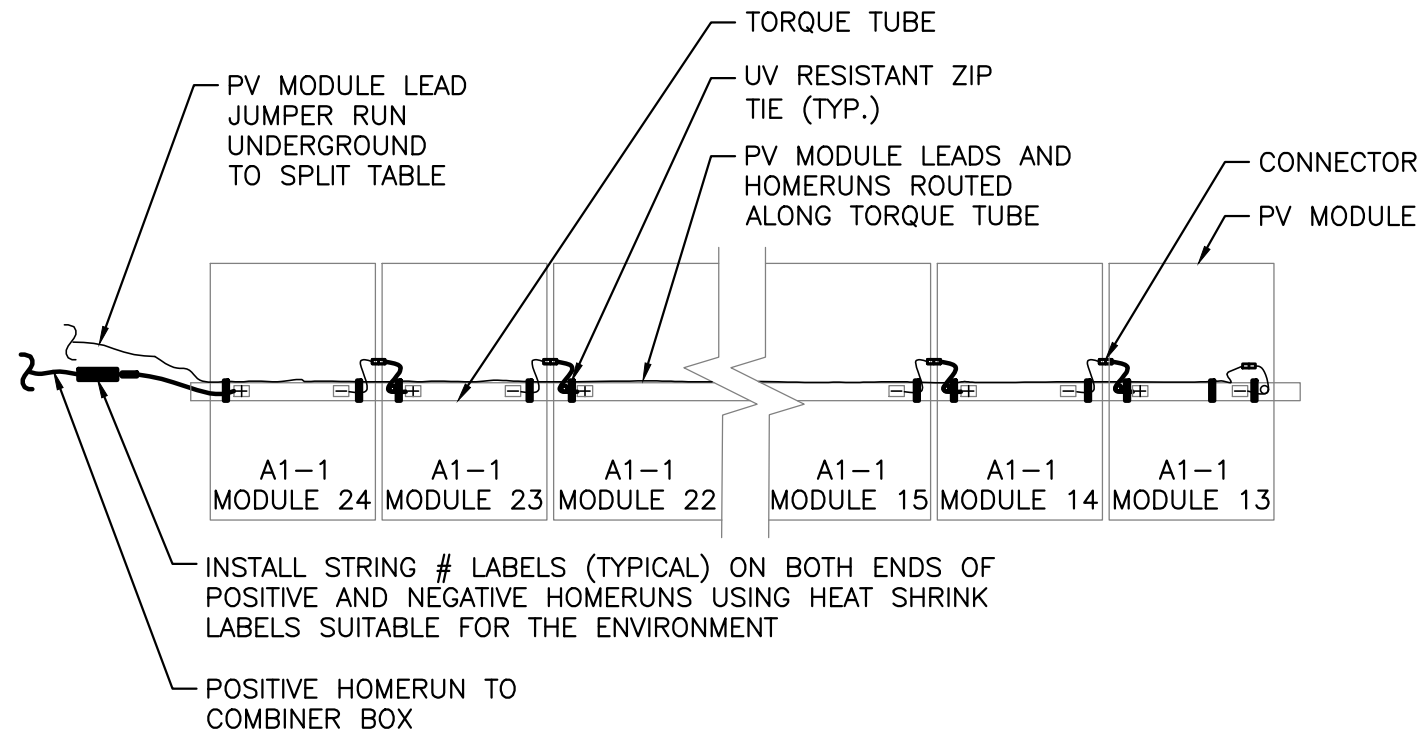
- NOTES:
- CONDUCTORS TRANSITIONING BETWEEN TABLES SHALL BE PROPERLY SECURED AND PROTECTED WITH UV RESISTANT SPLIT LOOM OR SPIRAL WRAP.
 - STRING HOME RUN CONDUCTORS SHALL USE HORIZONTAL PURLINS FOR CABLE MANAGEMENT AND SUPPORT. SECURE CONDUCTORS WITH UV RESISTANT CABLE TIES.
 - WIRE MANAGEMENT SHALL BE DONE IN A WAY TO MINIMIZE THE REAR SHADING ON BACK OF MODULES.
 - HOMERUNS SHALL END CLOSEST TO DC COMBINER BOX



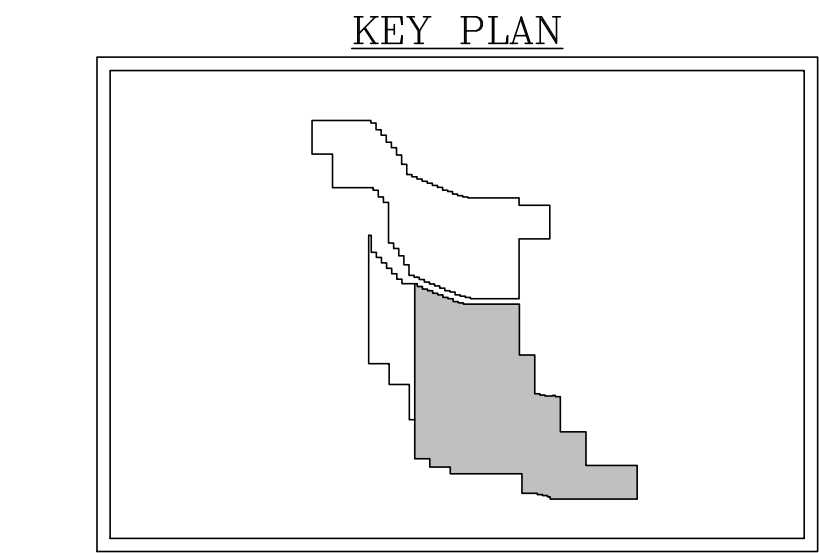
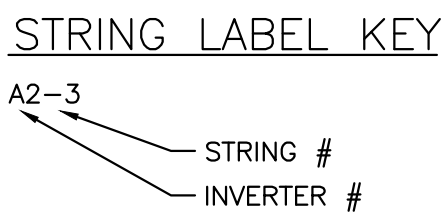
1 FULL TABLE INTERMODULE WIRING DETAIL
SCALE: NONE



2 SPLIT TABLE 1 – WIRING DETAIL (CONTINUOUS STRINGING)
SCALE: NONE



3 SPLIT TABLE 2 – WIRING DETAIL (CONTINUOUS STRINGING)
SCALE: NONE



1 DC ELECTRICAL PLAN – SYSTEM B
SCALE: 1" = 40'



DRAWING TITLE
DC ELECTRICAL PLAN – SYSTEM B

DATE: 02/21/2025
REVISION DESCRIPTION: PERMIT SET – REV 1
PERMIT SET

DATE: 07/12/2024
REVISION DESCRIPTION: PERMIT SET
PERMIT SET

DATE: 03/26/2024
REVISION DESCRIPTION: CONCEPTUAL DESIGN (REV 6)
CONCEPTUAL DESIGN (REV 6)

DATE: 03/14/2024
REVISION DESCRIPTION: CONCEPTUAL DESIGN (REV 5)
CONCEPTUAL DESIGN (REV 5)

PURE POWER ENGINEERING
111 W. MAIN ST., SUITE 100
WINCHESTER, CT 06098
WWW.PUREPOWERENGINEERING.COM
CT LICENSE No. 0029262

GREENSKIES
127 WASHINGTON AVENUE
NORTH HAVEN, CT 06473
WWW.GREENSKIES.COM
a CleanFocus company

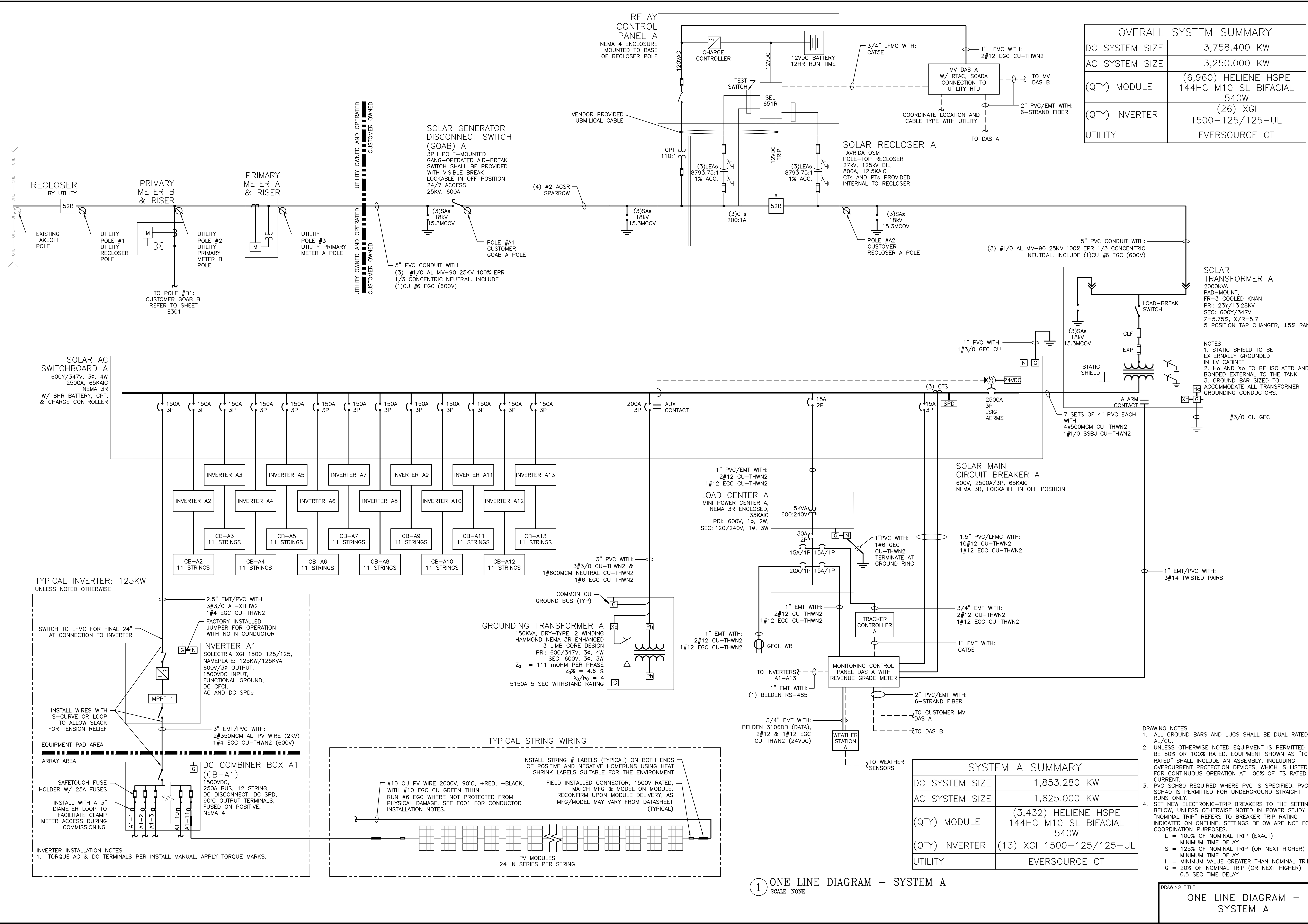
DEVELOPER: GREENSKIES
PAGE SIZE: 36" x 24"
PROJECT #: 05705

DC SYSTEM SIZE: 3,758,400 KWDC
AC SYSTEM SIZE: 3,250,000 KWAC
MODULE TYPE: HELIENE HSPE 540W
MODULE QUANTITY: 6960
ORIENTATION: SAT, 0° AZIMUTH

PROJECT: SOLAR GROUND MOUNT SYSTEM AT WINCHESTER
41.939445, -73.069261
WINCHESTER, CT 06098

DRAWING #: E202

18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
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2
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0
1/2
RULER IN INCHES:
PLOT DATE: 2/20/2025 2:30 PM



REVISION DESCRIPTION	
02/21/2025	PERMIT SET - REV 1
07/12/2024	PERMIT SET
03/26/2024	CONCEPTUAL DESIGN (REV 6)
03/14/2024	CONCEPTUAL DESIGN (REV 5)

DATE	DATE	DATE	DATE
02/21/2025	07/12/2024	03/26/2024	03/14/2024

PUREPOWER ENGINEERING
111 WASHINGTON AVENUE, SUITE 100
NORTH HAVEN, CT 06473
WWW.PUREPOWERENGINEERING.COM
CT LICENSE No. 0029262

GREENSKIES
127 WASHINGTON AVENUE
NORTH HAVEN, CT 06473
WWW.GREENSKIES.COM
a Clean Focus company

DEVELOPER
Greenskies

PAGE SIZE
36" x 24"

PROJECT #
05705

DC SYSTEM SIZE:
3,758.400 KWDC

AC SYSTEM SIZE:
3,250.000 KWAC

MODULE TYPE:
HELIENE HSPE 540W

MODULE QUANTITY:
6960

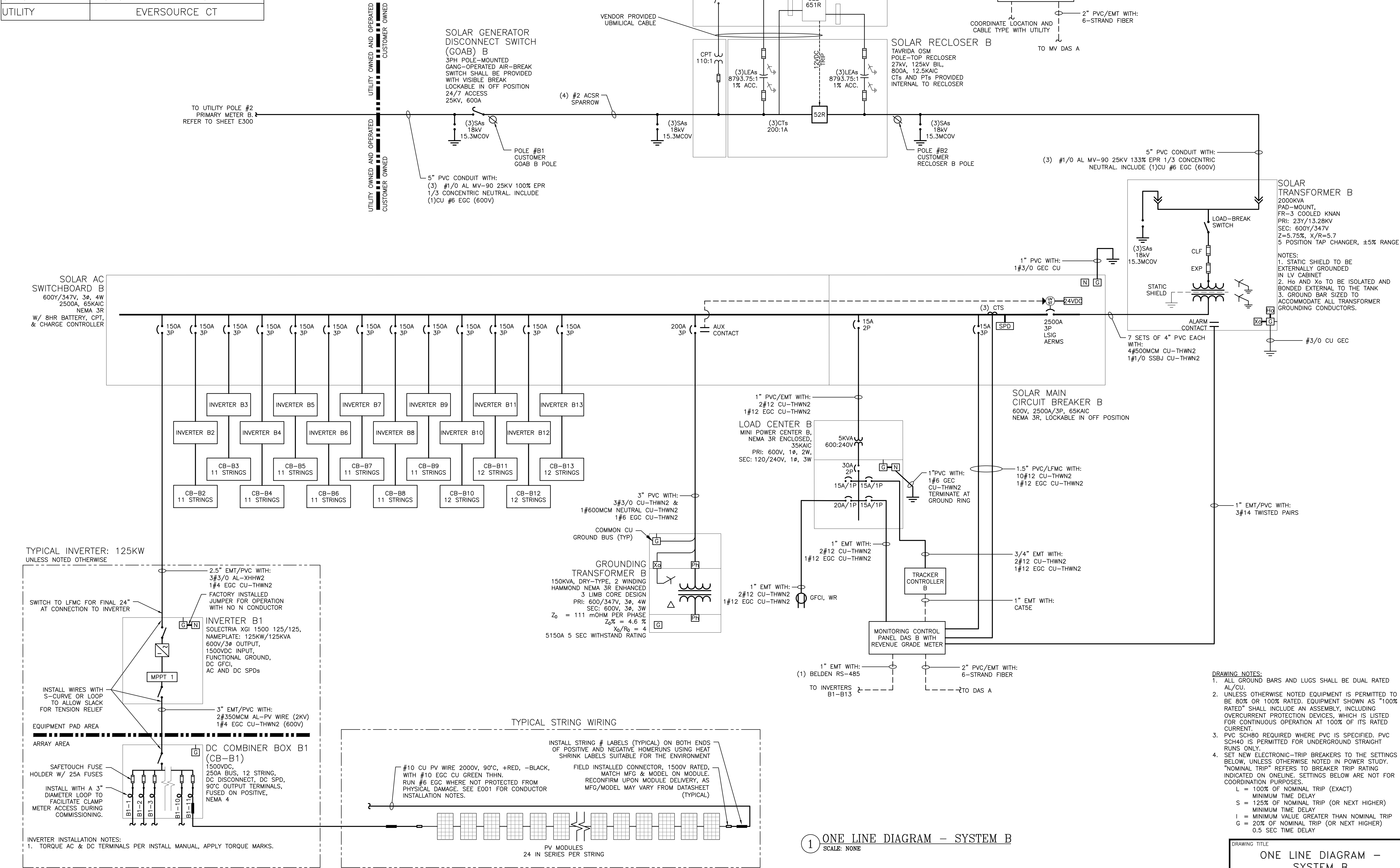
ORIENTATION:
SAT, 0° AZIMUTH

PROJECT
SOLAR GROUND MOUNT SYSTEM AT WINCHESTER

DRAWING #
E300

PLT DATE: 2/20/2025 4:16 PM
RULER IN INCHES: 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 1/2 0

SYSTEM B SUMMARY	
DC SYSTEM SIZE	1,905.120 KW
AC SYSTEM SIZE	1,625.000 KW
(QTY) MODULE	(3,528) HELIENE HSPE 144HC M10 SL BIFACIAL 540W
(QTY) INVERTER	(13) XGI 1500-125/125-UL
UTILITY	EVERSOURCE CT



1 ONE LINE DIAGRAM - SYSTEM B
SCALE: NONE

PROJECT	SOLAR GROUND MOUNT SYSTEM AT WINCHESTER	DC SYSTEM SIZE: 1,905.120 KWDC AC SYSTEM SIZE: 1,625.000 KWAC MODULE TYPE: HELIENE HSPE 540W MODULE QUANTITY: 3,528 ORIENTATION: SAT, 0° AZIMUTH	PAGE SIZE: 36" x 24" PROJECT # 05705	DEVELOPER: Greenskies 127 WASHINGTON AVENUE NORTH HAVEN, CT 06473 WWW.GREENSKIES.COM a Clean Focus company	ENGINEER: RICHARD A. WINIS 111 PUREPOWER COURT NORTH HAVEN, CT 06473 WWW.PUREPOWER.COM CT LICENSE No. 0029262	REVISION DESCRIPTION	DATE	DATE	DATE
						PERMIT SET - REV 1	02/21/2025	02/21/2025	02/21/2025
						PERMIT SET	07/12/2024	07/12/2024	07/12/2024
						CONCEPTUAL DESIGN (REV 6)	03/26/2024	03/26/2024	03/26/2024
CONCEPTUAL DESIGN (REV 5)	03/14/2024	03/14/2024	03/14/2024						

RULER IN INCHES: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

PLOT DATE: 2/20/2025 2:50 PM

SEL 651R RELAY										
SETTINGS ARE PRELIMINARY PENDING UTILITY APPROVAL AND NOT INTENDED FOR CONSTRUCTION										
DG System Base AC Size = 2000KVA			50.2A BASE PRIMARY USED FOR 50/51 ELEMENTS			*Total Clear Time = 3 Cycle Breaker Plus Delay (Time Dial or DEF Time)				
0.25A BASE SECONDARY 50/51P,G,N,Q						13279.06V BASE PRIMARY USED FOR 27/59 ELEMENTS				
P,G,N,Q CT RATIO FACTOR = 200						1.51V BASE SECONDARY USED FOR 27/59 ELEMENTS				
P CT Minimum Rating = 200:1 1B0.5 C50 RF = 1 @ 30C						LEA RATIO FACTOR = 8793.75				
ANSI ELEMENT #	Unit	Pickup (Secondary)	Real (Primary)	Level	Def. Time Delay (s)	Time Dial	Total Clear Time (s)*	Total Clear Time (cyc)*	Curve	Description
27-1	L-N Volt	1.33	11685.57	0.8800	2.95	—	3.00	180.00	—	Slow UV
27-2	L-N Volt	0.76	6639.53	0.5000	1.05	—	1.10	66.00	—	Fast UV
59-1	L-N Volt	1.66	14606.96	1.1000	1.95	—	2.00	120.00	—	Slow OV
59-2	L-N Volt	1.81	15934.87	1.2000	0.11	—	0.16	9.60	—	Fast OV
79-UV	L-N Volt	1.43	12615.10	0.9500	299.95	—	300.00	18000.00	—	Min Permissive Close Voltage
79-OV	L-N Volt	1.59	13943.01	1.0500	299.95	—	300.00	18000.00	—	Max Permissive Close Voltage
59N	3V0 L-N Volt	0.26	2257.44	0.1700	1.95	—	2.00	120.00	—	Zero Sequence Overvolt
81U-1	Hz	58.50	58.50	0.9750	299.95	—	300.00	18000.00	—	Slow UF
81U-2	Hz	56.50	56.50	0.9417	0.11	—	0.16	9.60	—	Fast UF
81O-1	Hz	61.20	61.20	1.0200	299.95	—	300.00	18000.00	—	Slow OF
81O-2	Hz	62.00	62.00	1.0333	0.11	—	0.16	9.60	—	Fast OF
79-UF	Hz	59.50	59.50	0.9917	299.95	—	300.00	18000.00	—	Min Permissive Close Frequency
79-OF	Hz	60.50	60.50	1.0083	299.95	—	300.00	18000.00	—	Max Permissive Close Frequency
51P	A	0.31	62.76	1.2500	—	3	5.83 @2X	349.54 @2X	U4	Time Phase OC
51G	A	0.05	10.04	0.2000	—	2	3.9 @2X	234.02 @2X	U4	Timed Ground OC
74	—	—	—	—	0.05	—	0.05	3.00	—	Relay Alarm

TYPICAL FOR SYSTEM A & B

1 RELAY SETTINGS
SCALE: NONE

Table I: DER response (shall trip) to abnormal frequencies-Category I, Category II and Category III

Shall Trip Function	Required Settings		Comparison to default IEEE td. 1547-2018 for Category I II, III		
	Frequency (Hz)	Clearing Time(s)*	Frequency	Clearing Time (s)	Within Ranges of Allowable settings?
OF2	62.0	0.16	Identical	Identical	Yes
OF1	61.2	300.0	Identical	Identical	Yes
UF1	58.5	300.0	Identical	Identical	Yes
UF2	56.5	0.16	Identical	Identical	Yes

* ALL DER device trip times shall account for relay/inverter processing times as prescribed by IEEE 1547-2018. In no instance may relay and/or inverter settings trip faster than permitted by IEEE 1547-2018.

Table II: Frequency ride-through requirements for DER of abnormal operating performance-Category I, Category II, and Category III

Frequency Range (Hz)	Operating Mode	Comparison to IEEE Std. 1547-2018 for Category I, II, III
f > 62.0	No ride-through requirements apply to this range	Identical
61.2 < f ≤ 61.8	Mandatory Operation	Identical
58.8 ≤ f ≤ 61.2	Continuous Operation	Identical
57.0 ≤ f < 58.8	Mandatory Operation	Identical
f < 57.0	No ride-through requirements apply to this range	Identical

Table IV: Certified inverter response (shall trip) to abnormal voltages -Category III

Shall Trip Function	Required Settings		Comparison to default IEEE Std. 1547-2018 (as amended by IEEE-1547a-2020) for Category III		
	Voltage (p.u. of nominal voltage)	Clearing Time(s)*	Voltage	Clearing Time (s)	Within ranges of allowable settings?
OV2	1.20	0.16	Identical	Identical	Yes
OV1	1.10	2.0	Identical	Much shorter (default is 13 s)	Yes
UV1	0.88	3.0	Identical	Much shorter (default is 21 s)	Yes
UV2	0.50	1.1	Identical	Shorter (default is 2 s)	Yes

* ALL DER device trip times shall account for relay/inverter processing times as prescribed by IEEE 1547-2018. In no instance may relay and/or inverter settings trip faster than permitted by IEEE 1547-2018.

Table V: Voltage ride-through requirements for certified inverter abnormal operating performance-Category III

Voltage Range (p.u.)	Operating Mode/ Response	Comparison to IEEE Std. 1547-2018 for Category III
V > 1.20	Cease to Energize	Identical
1.10 < V ≤ 1.20	Momentary Cessation	Identical
0.88 ≤ V ≤ 1.10	Continuous Operation	Identical
0.5 ≤ V < 0.88	Mandatory Operation	Identical
V < 0.50	Momentary Cessation	Identical

INVERTER UL1741-SB Compliant						
ANSI ELEMENT #	Pickup	Real	Level	Delay (sec)	Curve	Description
27-1	304.84	528V	88.0%	3.00		Slow UV
27-2	173.21	300V	50.0%	1.10		Fast UV
59-1	381.05	660V	110.0%	2.00		Slow OV
59-2	415.69	720V	120.0%	0.16		Fast OV
81U-1	58.50	58.5Hz	97.5%	300.00		Slow UF
81U-2	56.50	56.5Hz	94.2%	0.16		Fast UF
81O-1	61.20	61.2Hz	102.0%	300.00		Slow OF
81O-2	62.00	62Hz	103.3%	0.16		Fast OF
PF Set Point		1.00				Power Factor Control
Var Control		OFF				Reactive Power Control
Ramp Rate		1MW/min				dkw / dt
Freq Control		OFF				Speed Control

2 INVERTER SETTINGS
SCALE: NONE

PROJECT

SOLAR GROUND MOUNT SYSTEM AT
WINCHESTER
41.939445, -73.069261
WINCHESTER, CT 06098

DC SYSTEM SIZE: 3,758,400 kWDC
AC SYSTEM SIZE: 3,250,000 KWAC
MODULE TYPE: HELIENE HSPE 540W
MODULE QUANTITY: 6960
ORIENTATION: SAT, 0° AZIMUTH

DEVELOPER
Greenskies
a Clean Focus company

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NORTH HAVEN, CT 06473
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ENGINEER
RICHARD A. WINIS
111 PUREPOWER COURT
NORTH HAVEN, CT 06473
WWW.PUREPOWER.COM
CT LICENSE No. 0029682

REGISTERED PROFESSIONAL ENGINEER
RICHARD A. WINIS
0029682

PUREPOWER
ENGINEERING
111 PUREPOWER COURT
NORTH HAVEN, CT 06473
WWW.PUREPOWER.COM

REVISION DESCRIPTION
DATE
02/21/2025
07/12/2024
03/26/2024
03/14/2024

PM ENG CHK
SK SF RI
SK SF RI
SK SF RI
SK SF RI

PERMIT SET - REV 1
PERMIT SET
CONCEPTUAL DESIGN (REV 6)
CONCEPTUAL DESIGN (REV 5)

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
RULER IN INCHES:
PLOT DATE: 2/20/2025 2:50 PM

AC CIRCUIT CALCULATIONS – SYSTEM A																			
EQUIPMENT SUPPLIED	FED FROM	VOLTAGE	FULL LOAD AMPS 'FLA'	FLA x 1.25	OCPD SIZE [A]	CONDUIT TYPE	CONDUIT SIZE	GROUND SIZE	CONDUCTORS PER PHASE	PHASE CONDUCTOR SIZE	NEUTRAL CONDUCTOR SIZE	75° AMPACITY	90° AMPACITY	90° AMPACITY WITH C.O.U.	C.O.U. DERATE AMBIENT TEMP	C.O.U. DERATE CONDUIT FILL	FEEDER LENGTH (FEET)	SEGMENT VOLTAGE DROP AT FLA	TOTAL VOLTAGE DROP AT FLA
SOLAR AC SWITCHBOARD A	SOLAR TRANSFORMER A	600	1560.0	1950	2500	PVC	4"	CU #1/0 SSBJ	7	CU 500MCM	CU 500MCM	2660	3010	3010	1.00	1.00	5	0.01%	0.01%
INVERTER A1	SOLAR AC SWITCHBOARD A	600	120.0	150	150	EMT/PVC	2.5"	CU #4	1	AL #3/0	NONE	155	175	175	1.00	1.00	5	0.02%	0.03%
INVERTER A2	SOLAR AC SWITCHBOARD A	600	120.0	150	150	EMT/PVC	2.5"	CU #4	1	AL #3/0	NONE	155	175	175	1.00	1.00	10	0.05%	0.05%
INVERTER A3	SOLAR AC SWITCHBOARD A	600	120.0	150	150	EMT/PVC	2.5"	CU #4	1	AL #3/0	NONE	155	175	175	1.00	1.00	15	0.07%	0.08%
INVERTER A4	SOLAR AC SWITCHBOARD A	600	120.0	150	150	EMT/PVC	2.5"	CU #4	1	AL #3/0	NONE	155	175	175	1.00	1.00	20	0.09%	0.10%
INVERTER A5	SOLAR AC SWITCHBOARD A	600	120.0	150	150	EMT/PVC	2.5"	CU #4	1	AL #3/0	NONE	155	175	175	1.00	1.00	25	0.11%	0.12%
INVERTER A6	SOLAR AC SWITCHBOARD A	600	120.0	150	150	EMT/PVC	2.5"	CU #4	1	AL #3/0	NONE	155	175	175	1.00	1.00	25	0.11%	0.12%
INVERTER A7	SOLAR AC SWITCHBOARD A	600	120.0	150	150	EMT/PVC	2.5"	CU #4	1	AL #3/0	NONE	155	175	175	1.00	1.00	30	0.14%	0.14%
INVERTER A8	SOLAR AC SWITCHBOARD A	600	120.0	150	150	EMT/PVC	2.5"	CU #4	1	AL #3/0	NONE	155	175	175	1.00	1.00	10	0.05%	0.05%
INVERTER A9	SOLAR AC SWITCHBOARD A	600	120.0	150	150	EMT/PVC	2.5"	CU #4	1	AL #3/0	NONE	155	175	175	1.00	1.00	15	0.07%	0.08%
INVERTER A10	SOLAR AC SWITCHBOARD A	600	120.0	150	150	EMT/PVC	2.5"	CU #4	1	AL #3/0	NONE	155	175	175	1.00	1.00	20	0.09%	0.10%
INVERTER A11	SOLAR AC SWITCHBOARD A	600	120.0	150	150	EMT/PVC	2.5"	CU #4	1	AL #3/0	NONE	155	175	175	1.00	1.00	25	0.11%	0.12%
INVERTER A12	SOLAR AC SWITCHBOARD A	600	120.0	150	150	EMT/PVC	2.5"	CU #4	1	AL #3/0	NONE	155	175	175	1.00	1.00	28	0.13%	0.14%
INVERTER A13	SOLAR AC SWITCHBOARD A	600	120.0	150	150	EMT/PVC	2.5"	CU #4	1	AL #3/0	NONE	155	175	175	1.00	1.00	30	0.14%	0.14%

AVERAGE AC VOLTAGE DROP FROM POI TO INVERTERS: 0.10%

AC CIRCUIT CALCULATIONS – SYSTEM B																			
EQUIPMENT SUPPLIED	FED FROM	VOLTAGE	FULL LOAD AMPS 'FLA'	FLA x 1.25	OCPD SIZE [A]	CONDUIT TYPE	CONDUIT SIZE	GROUND SIZE	CONDUCTORS PER PHASE	PHASE CONDUCTOR SIZE	NEUTRAL CONDUCTOR SIZE	75° AMPACITY	90° AMPACITY	90° AMPACITY WITH C.O.U.	C.O.U. DERATE AMBIENT TEMP	C.O.U. DERATE CONDUIT FILL	FEEDER LENGTH (FEET)	SEGMENT VOLTAGE DROP AT FLA	TOTAL VOLTAGE DROP AT FLA
SOLAR AC SWITCHBOARD B	SOLAR TRANSFORMER B	600	1560.0	1950	2500	PVC	4"	CU #1/0 SSBJ	7	CU 500MCM	CU 500MCM	2660	3010	3010	1.00	1.00	5	0.01%	0.01%
INVERTER B1	SOLAR AC SWITCHBOARD B	600	120.0	150	150	EMT/PVC	2.5"	CU #4	1	AL #3/0	NONE	155	175	175	1.00	1.00	5	0.02%	0.03%
INVERTER B2	SOLAR AC SWITCHBOARD B	600	120.0	150	150	EMT/PVC	2.5"	CU #4	1	AL #3/0	NONE	155	175	175	1.00	1.00	10	0.05%	0.05%
INVERTER B3	SOLAR AC SWITCHBOARD B	600	120.0	150	150	EMT/PVC	2.5"	CU #4	1	AL #3/0	NONE	155	175	175	1.00	1.00	15	0.07%	0.08%
INVERTER B4	SOLAR AC SWITCHBOARD B	600	120.0	150	150	EMT/PVC	2.5"	CU #4	1	AL #3/0	NONE	155	175	175	1.00	1.00	20	0.09%	0.10%
INVERTER B5	SOLAR AC SWITCHBOARD B	600	120.0	150	150	EMT/PVC	2.5"	CU #4	1	AL #3/0	NONE	155	175	175	1.00	1.00	25	0.11%	0.12%
INVERTER B6	SOLAR AC SWITCHBOARD B	600	120.0	150	150	EMT/PVC	2.5"	CU #4	1	AL #3/0	NONE	155	175	175	1.00	1.00	25	0.11%	0.12%
INVERTER B7	SOLAR AC SWITCHBOARD B	600	120.0	150	150	EMT/PVC	2.5"	CU #4	1	AL #3/0	NONE	155	175	175	1.00	1.00	30	0.14%	0.14%
INVERTER B8	SOLAR AC SWITCHBOARD B	600	120.0	150	150	EMT/PVC	2.5"	CU #4	1	AL #3/0	NONE	155	175	175	1.00	1.00	10	0.05%	0.05%
INVERTER B9	SOLAR AC SWITCHBOARD B	600	120.0	150	150	EMT/PVC	2.5"	CU #4	1	AL #3/0	NONE	155	175	175	1.00	1.00	15	0.07%	0.08%
INVERTER B10	SOLAR AC SWITCHBOARD B	600	120.0	150	150	EMT/PVC	2.5"	CU #4	1	AL #3/0	NONE	155	175	175	1.00	1.00	20	0.09%	0.10%
INVERTER B11	SOLAR AC SWITCHBOARD B	600	120.0	150	150	EMT/PVC	2.5"	CU #4	1	AL #3/0	NONE	155	175	175	1.00	1.00	25	0.11%	0.12%
INVERTER B12	SOLAR AC SWITCHBOARD B	600	120.0	150	150	EMT/PVC	2.5"	CU #4	1	AL #3/0	NONE	155	175	175	1.00	1.00	28	0.13%	0.14%
INVERTER B13	SOLAR AC SWITCHBOARD B	600	120.0	150	150	EMT/PVC	2.5"	CU #4	1	AL #3/0	NONE	155	175	175	1.00	1.00	30	0.14%	0.14%

AVERAGE AC VOLTAGE DROP FROM POI TO INVERTERS: 0.10%

MV FEEDER CALCULATIONS (23KV)																						
EQUIPMENT SUPPLIED	FED FROM	CIRCUIT ROUTING	# OF TRANSFORMERS	APPARENT POWER [KVA]	FEEDER LENGTH [FT]	FULL LOAD AMPS 'FLA' [A]	OCPD TYPE	OCPD TRIP RATING [A]	OCPD TRIP % OF FLA	CONDUCTOR MATERIAL	CONDUCTOR SIZE	TABLE REFERENCE	TEMPERATURE ADJUSTMENT	CONDUCTOR AMPACITY [A]	CHECK CONDUCTOR AMPACITY > FLA?	CHECK OCPD RATING > FLA x 1.25?	CHECK OCPD COMPLIANT WITH 240.101(A)?	SEGMENT VOLTAGE DROP AT FLA	TOTAL VOLTAGE DROP AT FLA	PVC CONDUIT SIZE	ADDITIONAL GROUND CABLE	FULL CONDUCTOR SPEC
UTILITY PRIMARY METER A	POI	OVERHEAD ACSR	2	2,000	75	50.2	RECLOSER	75	150%	AL	#2 ACSR	MFGR DATA SHEET	1.00	184	PASS	PASS	PASS	0.01%	0.01%	N/A	NONE	(4) #2 ACSR SPARROW
UTILITY PRIMARY METER B	POI	OVERHEAD ACSR	2	2,000	50	50.2	RECLOSER	75	150%	AL	#2 ACSR	MFGR DATA SHEET	1.00	184	PASS	PASS	PASS	0.01%	0.01%	N/A	NONE	(4) #2 ACSR SPARROW
CUSTOMER GOAB A	UTILTY PRIMARY METER A	UNDERGROUND IN CONDUIT	2	2,000	515	50.2	RECLOSER	75	150%	AL	#1/0	311.60(C)(78)	1.00	155	PASS	PASS	PASS	0.04%	0.05%	5"	CU #6	(3) #1/0 AL MV–90 25KV 133% EPR 1/3 CONCENTRIC NEUTRAL. INCLUDE (1)CU #6 EGC (600V)
CUSTOMER GOAB B	UTILITY PRIMARY METER B	UNDERGROUND IN CONDUIT	1	2,000	560	50.2	RECLOSER	75	150%	AL	#1/0	311.60(C)(78)	1.00	155	PASS	PASS	PASS	0.04%	0.05%	5"	CU #6	(3) #1/0 AL MV–90 25KV 133% EPR 1/3 CONCENTRIC NEUTRAL. INCLUDE (1)CU #6 EGC (600V)
CUSTOMER RECLOSER A	CUSTOMER GOAB A	OVERHEAD ACSR	1	2,000	25	50.2	RECLOSER	75	150%	AL	#2 ACSR	MFGR DATA SHEET	1.00	184	PASS	PASS	PASS	0.00%	0.05%	N/A	NONE	(4) #2 ACSR SPARROW
CUSTOMER RECLOSER B	CUSTOMER GOAB B	OVERHEAD ACSR	1	2,000	25	50.2	RECLOSER	75	150%	AL	#2 ACSR	MFGR DATA SHEET	1.00	184	PASS	PASS	PASS	0.00%	0.05%	N/A	NONE	(4) #2 ACSR SPARROW
SOLAR TRANSFORMER B	CUSTOMER RECLOSER A	UNDERGROUND IN CONDUIT	1	2,000	150	50.2	RECLOSER	75	150%	AL	#1/0	311.60(C)(78)	1.00	155	PASS	PASS	PASS	0.01%	0.06%	5"	CU #6	(3) #1/0 AL MV–90 25KV 133% EPR 1/3 CONCENTRIC NEUTRAL. INCLUDE (1)CU #6 EGC (600V)
SOLAR TRANSFORMER B	CUSTOMER RECLOSER B	UNDERGROUND IN CONDUIT	1	2,000	1,125	50.2	RECLOSER	75	150%	AL	#1/0	311.60(C)(78)	1.00	155	PASS	PASS	PASS	0.09%	0.14%	5"	CU #6	(3) #1/0 AL MV–90 25KV 133% EPR 1/3 CONCENTRIC NEUTRAL. INCLUDE (1)CU #6 EGC (600V)

MODULE SPECIFICATIONS	
MAKE/MODEL	HELIENE HSPE 144HC M10 SL BFG
POWER [W]	540
ISC [A]	13.50
IMP [A]	12.77
VOC [V]	50.22
VMP [V]	42.32
β VOC [%/degC]	–0.280%
SITE CLIMATE CRITERIA	
ASHRAE HIGH [°C]	30
ASHRAE LOW [°C]	–19.4
STRING SPECIFICATIONS AT STC	
MODULES/STRING	24
POWER [W]	12960
STRING ISC [A]	13.50
STRING IMP [A]	12.77
STRING VMP [V]	1015.68
STRING MAX VOLTAGE CALCULATION	
VOC TEMP ADJUSTMENT @ –19.4 °C	1.12
VOC @ –19.4 °C [V]	56.46
MAX STRING VOC [V]	1355.1

SAM SIMULATED VALUES	
MAXIMUM CURRENT [A]	16.56
MAXIMUM VOLTAGE [V]	1289.6
THE STRING MAX CURRENT IS CALCULATED BY SYSTEM ADVISOR MODEL SIMULATION PROGRAM PROVIDED BY THE NATIONAL RENEWABLE ENERGY LABORATORY, REFERENCE SAND 2004–3535, PHOTOVOLTAIC ARRAY PERFORMANCE MODEL, AS ALLOWABLE BY NEC 690.8(A)(1)(2). THE CALCULATED CURRENT IS 98.1% OF THE VALUE USING 690.8(A)(1)(1).	

DC STRING WIRING CALCULATION – CONDUIT	
STRING IMAX SIMULATED [A]	16.56
MAX CONTINUOUS FAULT CURRENT FROM PARALLEL SOURCES [AMPS]	16.56
1.25x MAX CONTINUOUS FAULT CURRENT [AMPS]	20.70
MAX # OF WIRES PER CONDUIT	9
DERATE FOR # OF CONDUCTORS IN A CONDUIT	0.7
MAX AMBIENT TEMPERATURE	30
TEMPERATURE DERATE	1.00
WIRE GAUGE	CU #10
75 DEG AMPACITY WITHOUT COU ADJUSTMENT [AMPS]	35
IS 75 DEG AMPACITY WITHOUT COU ADJUSTMENT >= 1.25x MAX CIRCUIT CURRENT?	YES. COMPLIES WITH 690.8(B)(1)
90DEG AMPACITY WITH COU ADJUSTMENT [AMPS]	28
IS 90DEG AMPACITY WITH COU ADJUSTMENT >= 1.0x MAX CIRCUIT CURREN?	YES. COMPLIES WITH 690.8(B)(2)
PV SOURCE CIRCUIT (SIMULATED) FUSE RATING [AMPS]	25
AVAILABLE FAULT CURRENT FROM ALL PARALLEL SOURCES [AMPS]	16.56
IS FUSE RATING >= 1.25x MAX CIRCUIT CURRENT?	YES. COMPLIES WITH 690.9(B)

DRAWING NOTES:
1. DISTANCES ARE ESTIMATES GENERATED FOR ENGINEER'S CALCULATIONS. CONTRACTOR IS RESPONSIBLE FOR OWN MEASUREMENTS AND TAKEOFFS.

DRAWING TITLE
SCHEDULES & CALCULATIONS

PM ENG CHK
SK SF RI
SK SF RI
SK SF RI
SK SF RI

REVISION DESCRIPTION
PERMIT SET – REV 1
PERMIT SET
CONCEPTUAL DESIGN (REV 6)
CONCEPTUAL DESIGN (REV 5)

DATE
02/21/2025
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OFFICE OF THE REGISTERED PROFESSIONAL ENGINEER
REGISTERED PROFESSIONAL ENGINEER
RICHARD A. WINS
0029262

DEVELOPER
Greenskies
a Clean Focus company

PAGE SIZE
36" x 24"

PROJECT #
05705

DC SYSTEM SIZE: 3,758,400 KWDC
AC SYSTEM SIZE: 3,250,000 KWAC
MODULE TYPE: HELIENE HSPE 540W
MODULE QUANTITY: 6960
ORIENTATION: SAT, 0° AZIMUTH

SOLAR GROUND MOUNT SYSTEM AT
WINCHESTER
41.939445, –73.069261
WINCHESTER, CT 06098

RULER IN INCHES: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

PLOT DATE: 2/20/2025 2:50 PM

DC FEEDER CALCULATIONS																															
CIRCUIT DESCRIPTION									CONDUCTOR CHECK PER 690.8(B)(1)			CONDUCTOR CHECK PER 690.8(B)(2)					TERMINAL CHECK			OCPD CHECK								VOLTAGE DROP CALCS			
COMBINER BOX	QTY OF STRINGS	OPERATING VOLTAGE Vmp [V]	STRING MAXIMUM CURRENT (SAM SIMULATED Imax) [A]	FEEDER MAX CURRENT (Imax) [A]	CONDUCTORS PER POLE	CONDUCTOR SIZE	GROUND SIZE	OCPD SIZE [A]	90° AMPACITY [A]	FEEDER CONTINUOUS CURRENT (Imax x 1.25)	PASS?	C.O.U. DERATE FOR AMBIENT TEMPERATURE	C.O.U. DERATE FOR NUMBER OF CURRENT-CARRYING CONDUCTORS	90° AMPACITY WITH C.O.U. ADJUSTMENT [A]	FEEDER MAX CURRENT (Imax) [A]	PASS?	75° AMPACITY [A]	FEEDER CONTINUOUS CURRENT (Imax x 1.25)	PASS?	90° AMPACITY WITH C.O.U. ADJUSTMENT [A]	75° AMPACITY [A]	MAX ALLOWABLE OCPD [A]	PASS?	STRING OPERATING CURRENT (STRING Imp) [A]	FEEDER OPERATING CURRENT [A]	FEEDER LENGTH (ONE WAY) [FT]	FEEDER VOLTAGE DROP				
CB-A1	11	1016	16.56	182	1	AL 350MCM	CU #4	250	280	228	PASS	1	1	280	182	PASS	250	228	PASS	280	250	250	PASS	12.77	140	95	0.16%				
CB-A2	11	1016	16.56	182	1	AL 350MCM	CU #4	250	280	228	PASS	1	1	280	182	PASS	250	228	PASS	280	250	250	PASS	12.77	140	135	0.23%				
CB-A3	11	1016	16.56	182	1	AL 350MCM	CU #4	250	280	228	PASS	1	1	280	182	PASS	250	228	PASS	280	250	250	PASS	12.77	140	210	0.35%				
CB-A4	11	1016	16.56	182	1	AL 350MCM	CU #4	250	280	228	PASS	1	1	280	182	PASS	250	228	PASS	280	250	250	PASS	12.77	140	400	0.67%				
CB-A5	11	1016	16.56	182	1	AL 350MCM	CU #4	250	280	228	PASS	1	1	280	182	PASS	250	228	PASS	280	250	250	PASS	12.77	140	490	0.82%				
CB-A6	11	1016	16.56	182	1	AL 350MCM	CU #4	250	280	228	PASS	1	1	280	182	PASS	250	228	PASS	280	250	250	PASS	12.77	140	545	0.91%				
CB-A7	11	1016	16.56	182	1	AL 350MCM	CU #4	250	280	228	PASS	1	1	280	182	PASS	250	228	PASS	280	250	250	PASS	12.77	140	630	1.05%				
CB-A8	11	1016	16.56	182	1	AL 350MCM	CU #4	250	280	228	PASS	1	1	280	182	PASS	250	228	PASS	280	250	250	PASS	12.77	140	670	1.12%				
CB-A9	11	1016	16.56	182	1	AL 350MCM	CU #4	250	280	228	PASS	1	1	280	182	PASS	250	228	PASS	280	250	250	PASS	12.77	140	705	1.18%				
CB-A10	11	1016	16.56	182	1	AL 350MCM	CU #4	250	280	228	PASS	1	1	280	182	PASS	250	228	PASS	280	250	250	PASS	12.77	140	755	1.26%				
CB-A11	11	1016	16.56	182	1	AL 350MCM	CU #4	250	280	228	PASS	1	1	280	182	PASS	250	228	PASS	280	250	250	PASS	12.77	140	360	0.60%				
CB-A12	11	1016	16.56	182	1	AL 350MCM	CU #4	250	280	228	PASS	1	1	280	182	PASS	250	228	PASS	280	250	250	PASS	12.77	140	465	0.78%				
CB-A13	11	1016	16.56	182	1	AL 350MCM	CU #4	250	280	228	PASS	1	1	280	182	PASS	250	228	PASS	280	250	250	PASS	12.77	140	515	0.86%				
CB-B1	11	1016	16.56	182	1	AL 350MCM	CU #4	250	280	228	PASS	1	1	280	182	PASS	250	228	PASS	280	250	250	PASS	12.77	140	30	0.05%				
CB-B2	11	1016	16.56	182	1	AL 350MCM	CU #4	250	280	228	PASS	1	1	280	182	PASS	250	228	PASS	280	250	250	PASS	12.77	140	25	0.04%				
CB-B3	11	1016	16.56	182	1	AL 350MCM	CU #4	250	280	228	PASS	1	1	280	182	PASS	250	228	PASS	280	250	250	PASS	12.77	140	60	0.10%				
CB-B4	11	1016	16.56	182	1	AL 350MCM	CU #4	250	280	228	PASS	1	1	280	182	PASS	250	228	PASS	280	250	250	PASS	12.77	140	95	0.16%				
CB-B5	11	1016	16.56	182	1	AL 350MCM	CU #4	250	280	228	PASS	1	1	280	182	PASS	250	228	PASS	280	250	250	PASS	12.77	140	135	0.23%				
CB-B6	11	1016	16.56	182	1	AL 350MCM	CU #4	250	280	228	PASS	1	1	280	182	PASS	250	228	PASS	280	250	250	PASS	12.77	140	180	0.30%				
CB-B7	11	1016	16.56	182	1	AL 350MCM	CU #4	250	280	228	PASS	1	1	280	182	PASS	250	228	PASS	280	250	250	PASS	12.77	140	200	0.33%				
CB-B8	11	1016	16.56	182	1	AL 350MCM	CU #4	250	280	228	PASS	1	1	280	182	PASS	250	228	PASS	280	250	250	PASS	12.77	140	235	0.39%				
CB-B9	11	1016	16.56	182	1	AL 350MCM	CU #4	250	280	228	PASS	1	1	280	182	PASS	250	228	PASS	280	250	250	PASS	12.77	140	270	0.45%				
CB-B10	12	1016	16.56	199	1	AL 350MCM	CU #4	250	280	248	PASS	1	1	280	199	PASS	250	248	PASS	280	250	250	PASS	12.77	153	285	0.52%				
CB-B11	12	1016	16.56	199	1	AL 350MCM	CU #4	250	280	248	PASS	1	1	280	199	PASS	250	248	PASS	280	250	250	PASS	12.77	153	380	0.69%				
CB-B12	12	1016	16.56	199	1	AL 350MCM	CU #4	250	280	248	PASS	1	1	280	199	PASS	250	248	PASS	280	250	250	PASS	12.77	153	445	0.81%				
CB-B13	12	1016	16.56	199	1	AL 350MCM	CU #4	250	280	248	PASS	1	1	280	199	PASS	250	248	PASS	280	250	250	PASS	12.77	153	535	0.98%				

AVERAGE DC VOLTAGE DROP FROM COMBINER BOXES TO INVERTERS: 0.76%
MAX VOLTAGE DROP: 0.77%

AVERAGE DC VOLTAGE DROP FROM COMBINER BOXES TO INVERTERS: 0.31%
MAX VOLTAGE DROP: 0.39%

STRING VOLTAGE DROP CALCULATIONS – SYSTEM A			MAX TOTAL VOLTAGE DROP	2.34%
			AVERAGE TOTAL VOLTAGE DROP	1.30%
STRING NUMBER	STRING WIRE GAUGE	TOTAL STRING DISTANCE [FT]	STRING VOLTAGE DROP	TOTAL VOLTAGE DROP
A1–1	#10AWG–CU	135	0.44%	0.60%
A1–2	#10AWG–CU	215	0.70%	0.86%
A1–3	#10AWG–CU	200	0.65%	0.81%
A1–4	#10AWG–CU	110	0.36%	0.52%
A1–5	#10AWG–CU	185	0.60%	0.76%
A1–6	#10AWG–CU	175	0.57%	0.73%
A1–7	#10AWG–CU	65	0.21%	0.37%
A1–8	#10AWG–CU	160	0.52%	0.68%
A1–9	#10AWG–CU	50	0.16%	0.32%
A1–10	#10AWG–CU	145	0.47%	0.63%
A1–11	#10AWG–CU	65	0.21%	0.37%
A2–1	#10AWG–CU	175	0.57%	0.79%
A2–2	#10AWG–CU	65	0.21%	0.44%
A2–3	#10AWG–CU	160	0.52%	0.74%
A2–4	#10AWG–CU	50	0.16%	0.39%
A2–5	#10AWG–CU	145	0.47%	0.70%
A2–6	#10AWG–CU	65	0.21%	0.44%
A2–7	#10AWG–CU	160	0.52%	0.74%
A2–8	#10AWG–CU	80	0.26%	0.49%
A2–9	#10AWG–CU	175	0.57%	0.79%
A2–10	#10AWG–CU	95	0.31%	0.53%
A2–11	#10AWG–CU	185	0.60%	0.83%
A3–1	#10AWG–CU	85	0.28%	0.63%
A3–2	#10AWG–CU	175	0.57%	0.92%
A3–3	#10AWG–CU	50	0.16%	0.51%
A3–4	#10AWG–CU	145	0.47%	0.82%
A3–5	#10AWG–CU	50	0.16%	0.51%
A3–6	#10AWG–CU	145	0.47%	0.82%
A3–7	#10AWG–CU	45	0.15%	0.50%
A3–8	#10AWG–CU	140	0.45%	0.81%
A3–9	#10AWG–CU	45	0.15%	0.50%
A3–10	#10AWG–CU	140	0.45%	0.81%
A3–11	#10AWG–CU	130	0.42%	0.77%
A4–1	#10AWG–CU	145	0.47%	1.14%
A4–2	#10AWG–CU	50	0.16%	0.83%
A4–3	#10AWG–CU	225	0.73%	1.40%
A4–4	#10AWG–CU	135	0.44%	1.11%
A4–5	#10AWG–CU	40	0.13%	0.80%
A4–6	#10AWG–CU	210	0.68%	1.35%
A4–7	#10AWG–CU	120	0.39%	1.06%
A4–8	#10AWG–CU	35	0.11%	0.78%
A4–9	#10AWG–CU	220	0.71%	1.38%
A4–10	#10AWG–CU	125	0.41%	1.07%
A4–11	#10AWG–CU	55	0.18%	0.85%
A5–1	#10AWG–CU	235	0.76%	1.58%
A5–2	#10AWG–CU	145	0.47%	1.29%
A5–3	#10AWG–CU	50	0.16%	0.98%
A5–4	#10AWG–CU	245	0.79%	1.61%
A5–5	#10AWG–CU	150	0.49%	1.31%
A5–6	#10AWG–CU	60	0.19%	1.01%
A5–7	#10AWG–CU	255	0.83%	1.65%
A5–8	#10AWG–CU	160	0.52%	1.34%
A5–9	#10AWG–CU	65	0.21%	1.03%
A5–10	#10AWG–CU	75	0.24%	1.06%
A5–11	#10AWG–CU	170	0.55%	1.37%
A6–1	#10AWG–CU	255	0.83%	1.74%
A6–2	#10AWG–CU	235	0.76%	1.67%
A6–3	#10AWG–CU	145	0.47%	1.38%
A6–4	#10AWG–CU	50	0.16%	1.07%
A6–5	#10AWG–CU	245	0.79%	1.71%
A6–6	#10AWG–CU	150	0.49%	1.40%
A6–7	#10AWG–CU	55	0.18%	1.09%
A6–8	#10AWG–CU	255	0.83%	1.74%
A6–9	#10AWG–CU	160	0.52%	1.43%
A6–10	#10AWG–CU	70	0.23%	1.14%
A6–11	#10AWG–CU	75	0.24%	1.16%
A7–1	#10AWG–CU	160	0.52%	1.57%
A7–2	#10AWG–CU	255	0.83%	1.88%
A7–3	#10AWG–CU	235	0.76%	1.82%
A7–4	#10AWG–CU	145	0.47%	1.52%
A7–5	#10AWG–CU	50	0.16%	1.22%
A7–6	#10AWG–CU	245	0.79%	1.85%
A7–7	#10AWG–CU	155	0.50%	1.56%
A7–8	#10AWG–CU	60	0.19%	1.25%
A7–9	#10AWG–CU	260	0.84%	1.90%
A7–10	#10AWG–CU	165	0.54%	1.59%
A7–11	#10AWG–CU	75	0.24%	1.30%

STRING VOLTAGE DROP CALCULATIONS – SYSTEM A			MAX TOTAL VOLTAGE DROP	2.34%
			AVERAGE TOTAL VOLTAGE DROP	1.30%
STRING NUMBER	STRING WIRE GAUGE	TOTAL STRING DISTANCE [FT]	STRING VOLTAGE DROP	TOTAL VOLTAGE DROP
A8–1	#10AWG–CU	235	0.76%	1.88%
A8–2	#10AWG–CU	145	0.47%	1.59%
A8–3	#10AWG–CU	50	0.16%	1.28%
A8–4	#10AWG–CU	250	0.81%	1.93%
A8–5	#10AWG–CU	160	0.52%	1.64%
A8–6	#10AWG–CU	65	0.21%	1.33%
A8–7	#10AWG–CU	265	0.86%	1.98%
A8–8	#10AWG–CU	175	0.57%	1.69%
A8–9	#10AWG–CU	80	0.26%	1.38%
A8–10	#10AWG–CU	280	0.91%	2.03%
A8–11	#10AWG–CU	185	0.60%	1.72%
A9–1	#10AWG–CU	50	0.16%	1.34%
A9–2	#10AWG–CU	250	0.81%	1.99%
A9–3	#10AWG–CU	160	0.52%	1.70%
A9–4	#10AWG–CU	65	0.21%	1.39%
A9–5	#10AWG–CU	265	0.86%	2.04%
A9–6	#10AWG–CU	175	0.57%	1.75%
A9–7	#10AWG–CU	80	0.26%	1.44%
A9–8	#10AWG–CU	280	0.91%	2.09%
A9–9	#10AWG–CU	185	0.60%	1.78%
A9–10	#10AWG–CU	95	0.31%	1.49%
A9–11	#10AWG–CU	295	0.96%	2.14%
A10–1	#10AWG–CU	145	0.47%	1.73%
A10–2	#10AWG–CU	50	0.16%	1.43%
A10–3	#10AWG–CU	65	0.21%	1.47%
A10–4	#10AWG–CU	160	0.52%	1.78%
A10–5	#10AWG–CU	250	0.81%	2.07%
A10–6	#10AWG–CU	245	0.79%	2.06%
A10–7	#10AWG–CU	260	0.84%	2.11%
A10–8	#10AWG–CU	275	0.89%	2.16%
A10–9	#10AWG–CU	290	0.94%	2.20%
A10–10	#10AWG–CU	300	0.97%	2.24%
A10–11	#10AWG–CU	315	1.02%	2.29%
A11–1	#10AWG–CU	55	0.18%	0.78%
A11–2	#10AWG–CU	145	0.47%	1.07%
A11–3	#10AWG–CU	240	0.78%	1.38%
A11–4	#10AWG–CU	115	0.37%	0.98%
A11–5	#10AWG–CU	205	0.66%	1.27%
A11–6	#10AWG–CU	300	0.97%	1.58%
A11–7	#10AWG–CU	140	0.45%	1.06%
A11–8	#10AWG–CU	235	0.76%	1.36%
A11–9	#10AWG–CU	330	1.07%	1.67%
A11–10	#10AWG–CU	170	0.55%	1.15%
A11–11	#10AWG–CU	265	0.86%	1.46%
A12–1	#10AWG–CU	240	0.78%	1.56%
A12–2	#10AWG–CU	50	0.16%	0.94%
A12–3	#10AWG–CU	145	0.47%	1.25%
A12–4	#10AWG–CU	240	0.78%	1.56%
A12–5	#10AWG–CU	80	0.26%	1.04%
A12–6	#10AWG–CU	175	0.57%	1.35%
A12–7	#10AWG–CU	270	0.88%	1.65%
A12–8	#10AWG–CU	110	0.36%	1.13%
A12–9	#10AWG–CU	205	0.66%	1.44%
A12–10	#10AWG–CU	295	0.96%	1.74%
A12–11	#10AWG–CU	325	1.05%	1.83%
A13–1	#10AWG–CU	145	0.47%	1.33%
A13–2	#10AWG–CU	50	0.16%	1.02%
A13–3	#10AWG–CU	65	0.21%	1.07%
A13–4	#10AWG–CU	160	0.52%	1.38%
A13–5	#10AWG–CU	255	0.83%	1.69%
A13–6	#10AWG–CU	350	1.14%	2.00%
A13–7	#10AWG–CU	80	0.26%	1.12%
A13–8	#10AWG–CU	175	0.57%	1.43%
A13–9	#10AWG–CU	265	0.86%	1.72%
A13–10	#10AWG–CU	365	1.18%	2.05%
A13–11	#10AWG–CU	455	1.48%	2.34%

PROJECT

SOLAR GROUND MOUNT SYSTEM AT
WINCHESTER
41.939445, -73.069261
WINCHESTER, CT 06098

DC SYSTEM SIZE: 3,758.400 kWDC
AC SYSTEM SIZE: 3,250.000 kWAC
MODULE TYPE: HELIENE HSPE 540W
MODULE QUANTITY: 6960
ORIENTATION: SAT, 0° AZIMUTH

PAGE SIZE

36" x 24"

PROJECT #

05705

DEVELOPER

Greenskies

a Clean Focus company

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ENDORSEMENT

PUREPOWER

ENGINEERING

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RICHARD A. NIMS
CT LICENSE No. 0029262

REVISION DESCRIPTION

DATE

02/21/2025

07/12/2024

03/12/2024

03/14/2024

PERMIT SET – REV 1

PERMIT SET

CONCEPTUAL DESIGN (REV 6)

CONCEPTUAL DESIGN (REV 5)

PM

ENG

CHK

SK

SF

RI

SK

SF

RI

SK

SF

RI

SK

SF

RI

STRING VOLTAGE DROP CALCULATIONS – SYSTEM B			MAX TOTAL VOLTAGE DROP	1.88%
			AVERAGE TOTAL VOLTAGE DROP	1.11%
STRING NUMBER	STRING WIRE GAUGE	TOTAL STRING DISTANCE [FT]	STRING VOLTAGE DROP	TOTAL VOLTAGE DROP
B1–1	#10AWG–CU	430	1.39%	1.45%
B1–2	#10AWG–CU	335	1.09%	1.14%
B1–3	#10AWG–CU	240	0.78%	0.83%
B1–4	#10AWG–CU	145	0.47%	0.52%
B1–5	#10AWG–CU	50	0.16%	0.21%
B1–6	#10AWG–CU	435	1.41%	1.46%
B1–7	#10AWG–CU	340	1.10%	1.15%
B1–8	#10AWG–CU	250	0.81%	0.86%
B1–9	#10AWG–CU	150	0.49%	0.54%
B1–10	#10AWG–CU	60	0.19%	0.24%
B1–11	#10AWG–CU	445	1.44%	1.49%
B2–1	#10AWG–CU	335	1.09%	1.13%
B2–2	#10AWG–CU	240	0.78%	0.82%
B2–3	#10AWG–CU	145	0.47%	0.51%
B2–4	#10AWG–CU	50	0.16%	0.20%
B2–5	#10AWG–CU	435	1.41%	1.45%
B2–6	#10AWG–CU	340	1.10%	1.14%
B2–7	#10AWG–CU	250	0.81%	0.85%
B2–8	#10AWG–CU	150	0.49%	0.53%
B2–9	#10AWG–CU	60	0.19%	0.24%
B2–10	#10AWG–CU	445	1.44%	1.49%
B2–11	#10AWG–CU	350	1.14%	1.18%
B3–1	#10AWG–CU	240	0.78%	0.88%
B3–2	#10AWG–CU	145	0.47%	0.57%
B3–3	#10AWG–CU	50	0.16%	0.26%
B3–4	#10AWG–CU	435	1.41%	1.51%
B3–5	#10AWG–CU	340	1.10%	1.20%
B3–6	#10AWG–CU	250	0.81%	0.91%
B3–7	#10AWG–CU	150	0.49%	0.59%
B3–8	#10AWG–CU	60	0.19%	0.30%
B3–9	#10AWG–CU	445	1.44%	1.54%
B3–10	#10AWG–CU	350	1.14%	1.24%
B3–11	#10AWG–CU	260	0.84%	0.94%
B4–1	#10AWG–CU	145	0.47%	0.63%
B4–2	#10AWG–CU	50	0.16%	0.32%
B4–3	#10AWG–CU	435	1.41%	1.57%
B4–4	#10AWG–CU	340	1.10%	1.26%
B4–5	#10AWG–CU	250	0.81%	0.97%
B4–6	#10AWG–CU	150	0.49%	0.65%
B4–7	#10AWG–CU	60	0.19%	0.35%
B4–8	#10AWG–CU	445	1.44%	1.60%
B4–9	#10AWG–CU	350	1.14%	1.29%
B4–10	#10AWG–CU	260	0.84%	1.00%
B4–11	#10AWG–CU	160	0.52%	0.68%
B5–1	#10AWG–CU	50	0.16%	0.39%
B5–2	#10AWG–CU	440	1.43%	1.65%
B5–3	#10AWG–CU	345	1.12%	1.35%
B5–4	#10AWG–CU	250	0.81%	1.04%
B5–5	#10AWG–CU	155	0.50%	0.73%
B5–6	#10AWG–CU	65	0.21%	0.44%
B5–7	#10AWG–CU	450	1.46%	1.69%
B5–8	#10AWG–CU	360	1.17%	1.39%
B5–9	#10AWG–CU	265	0.86%	1.09%
B5–10	#10AWG–CU	170	0.55%	0.78%
B5–11	#10AWG–CU	75	0.24%	0.47%
B6–1	#10AWG–CU	425	1.38%	1.68%
B6–2	#10AWG–CU	335	1.09%	1.39%
B6–3	#10AWG–CU	240	0.78%	1.08%
B6–4	#10AWG–CU	145	0.47%	0.77%
B6–5	#10AWG–CU	50	0.16%	0.46%
B6–6	#10AWG–CU	440	1.43%	1.73%
B6–7	#10AWG–CU	350	1.14%	1.44%
B6–8	#10AWG–CU	255	0.83%	1.13%
B6–9	#10AWG–CU	160	0.52%	0.82%
B6–10	#10AWG–CU	65	0.21%	0.51%
B6–11	#10AWG–CU	80	0.26%	0.56%
B7–1	#10AWG–CU	160	0.52%	0.85%
B7–2	#10AWG–CU	255	0.83%	1.16%
B7–3	#10AWG–CU	350	1.14%	1.47%
B7–4	#10AWG–CU	440	1.43%	1.76%
B7–5	#10AWG–CU	50	0.16%	0.50%
B7–6	#10AWG–CU	145	0.47%	0.81%
B7–7	#10AWG–CU	240	0.78%	1.11%
B7–8	#10AWG–CU	335	1.09%	1.42%
B7–9	#10AWG–CU	425	1.38%	1.71%
B7–10	#10AWG–CU	65	0.21%	0.55%
B7–11	#10AWG–CU	160	0.52%	0.85%

STRING VOLTAGE DROP CALCULATIONS – SYSTEM B			MAX TOTAL VOLTAGE DROP	1.88%
			AVERAGE TOTAL VOLTAGE DROP	1.11%
STRING NUMBER	STRING WIRE GAUGE	TOTAL STRING DISTANCE [FT]	STRING VOLTAGE DROP	TOTAL VOLTAGE DROP
B8–1	#10AWG–CU	255	0.83%	1.22%
B8–2	#10AWG–CU	350	1.14%	1.53%
B8–3	#10AWG–CU	440	1.43%	1.82%
B8–4	#10AWG–CU	50	0.16%	0.56%
B8–5	#10AWG–CU	145	0.47%	0.86%
B8–6	#10AWG–CU	240	0.78%	1.17%
B8–7	#10AWG–CU	335	1.09%	1.48%
B8–8	#10AWG–CU	425	1.38%	1.77%
B8–9	#10AWG–CU	65	0.21%	0.60%
B8–10	#10AWG–CU	160	0.52%	0.91%
B8–11	#10AWG–CU	255	0.83%	1.22%
B9–1	#10AWG–CU	350	1.14%	1.59%
B9–2	#10AWG–CU	440	1.43%	1.88%
B9–3	#10AWG–CU	50	0.16%	0.61%
B9–4	#10AWG–CU	145	0.47%	0.92%
B9–5	#10AWG–CU	240	0.78%	1.23%
B9–6	#10AWG–CU	335	1.09%	1.54%
B9–7	#10AWG–CU	425	1.38%	1.83%
B9–8	#10AWG–CU	440	1.43%	1.88%
B9–9	#10AWG–CU	350	1.14%	1.59%
B9–10	#10AWG–CU	255	0.83%	1.28%
B9–11	#10AWG–CU	160	0.52%	0.97%
B10–1	#10AWG–CU	50	0.16%	0.68%
B10–2	#10AWG–CU	300	0.97%	1.49%
B10–3	#10AWG–CU	205	0.66%	1.19%
B10–4	#10AWG–CU	110	0.36%	0.88%
B10–5	#10AWG–CU	15	0.05%	0.57%
B10–6	#10AWG–CU	315	1.02%	1.54%
B10–7	#10AWG–CU	215	0.70%	1.22%
B10–8	#10AWG–CU	120	0.39%	0.91%
B10–9	#10AWG–CU	35	0.11%	0.63%
B10–10	#10AWG–CU	330	1.07%	1.59%
B10–11	#10AWG–CU	225	0.73%	1.25%
B10–12	#10AWG–CU	135	0.44%	0.96%
B11–1	#10AWG–CU	50	0.16%	0.86%
B11–2	#10AWG–CU	250	0.81%	1.50%
B11–3	#10AWG–CU	155	0.50%	1.20%
B11–4	#10AWG–CU	60	0.19%	0.89%
B11–5	#10AWG–CU	260	0.84%	1.54%
B11–6	#10AWG–CU	165	0.54%	1.23%
B11–7	#10AWG–CU	75	0.24%	0.94%
B11–8	#10AWG–CU	270	0.88%	1.57%
B11–9	#10AWG–CU	180	0.58%	1.28%
B11–10	#10AWG–CU	85	0.28%	0.97%
B11–11	#10AWG–CU	285	0.92%	1.62%
B11–12	#10AWG–CU	190	0.62%	1.31%
B12–1	#10AWG–CU	50	0.16%	0.97%
B12–2	#10AWG–CU	255	0.83%	1.64%
B12–3	#10AWG–CU	155	0.50%	1.32%
B12–4	#10AWG–CU	65	0.21%	1.02%
B12–5	#10AWG–CU	170	0.55%	1.36%
B12–6	#10AWG–CU	75	0.24%	1.06%
B12–7	#10AWG–CU	185	0.60%	1.41%
B12–8	#10AWG–CU	90	0.29%	1.10%
B12–9	#10AWG–CU	200	0.65%	1.46%
B12–10	#10AWG–CU	105	0.34%	1.15%
B12–11	#10AWG–CU	210	0.68%	1.49%
B12–12	#10AWG–CU	120	0.39%	1.20%
B13–1	#10AWG–CU	145	0.47%	1.45%
B13–2	#10AWG–CU	50	0.16%	1.14%
B13–3	#10AWG–CU	65	0.21%	1.19%
B13–4	#10AWG–CU	80	0.26%	1.24%
B13–5	#10AWG–CU	95	0.31%	1.28%
B13–6	#10AWG–CU	110	0.36%	1.33%
B13–7	#10AWG–CU	125	0.41%	1.38%
B13–8	#10AWG–CU	135	0.44%	1.41%
B13–9	#10AWG–CU	150	0.49%	1.46%
B13–10	#10AWG–CU	165	0.54%	1.51%
B13–11	#10AWG–CU	180	0.58%	1.56%
B13–12	#10AWG–CU	195	0.63%	1.61%

PROJECT

SOLAR GROUND MOUNT SYSTEM AT
WINCHESTER
41.939445, -73.069261
WINCHESTER, CT 06098

DC SYSTEM SIZE: 3,758,400 WHDC
AC SYSTEM SIZE: 3,250,000 KWAC
MODULE TYPE: HELENE HSPF 540W
MODULE QUANTITY: 6960
ORIENTATION: SAT, 0° AZIMUTH

PAGE SIZE

36" x 24"

PROJECT #

05705

DEVELOPER

GREENSKIES

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GREENSKIES

a Clean Focus company

ENCLOSURE

ENGINTECH

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ENGINTECH

ENGINTECH, INC.

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ENGINTECH

ENGINTECH, INC.

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WINSTON-SALEM, NC 27157
WWW.PUREPOWER.COM

REVISION DESCRIPTION

DATE

02/21/2025

07/12/2024

03/26/2024

03/14/2024

PERMIT SET – REV 1

PERMIT SET

CONCEPTUAL DESIGN (REV 6)

CONCEPTUAL DESIGN (REV 5)

PM ENG CHK

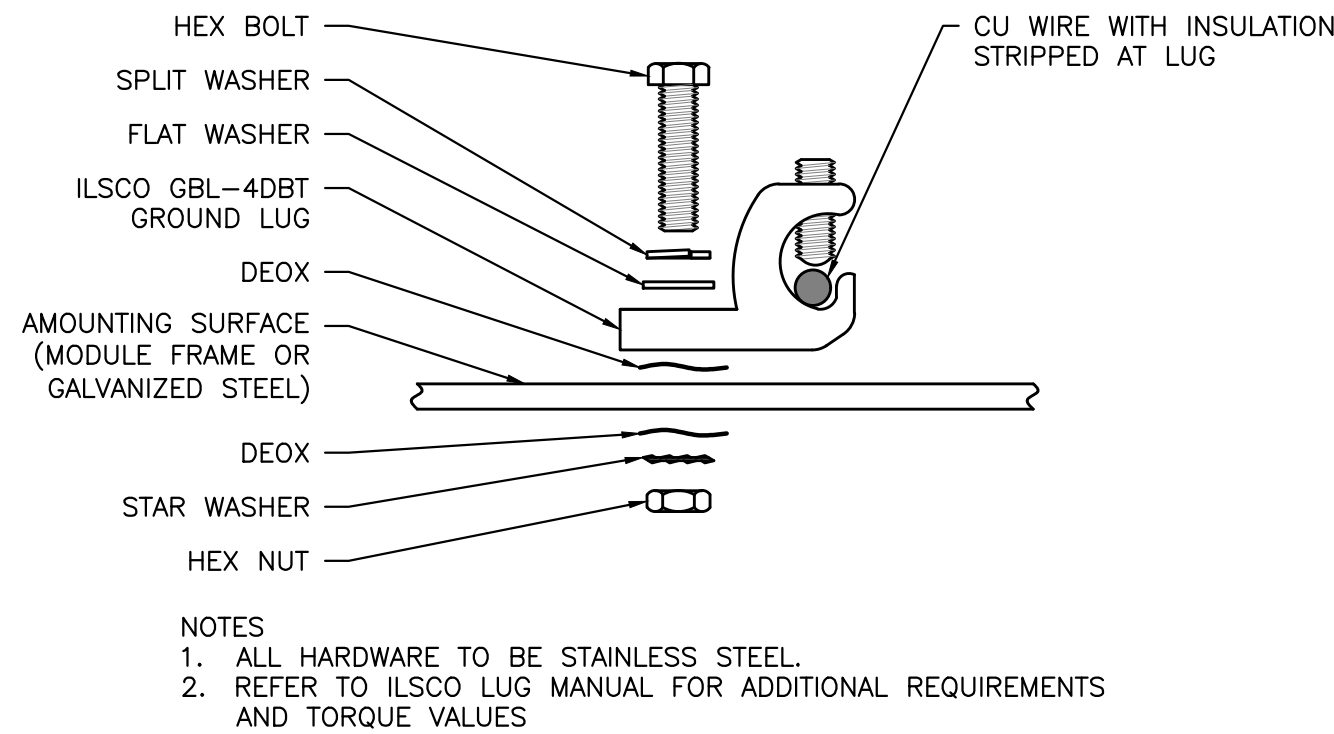
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SK SF RI

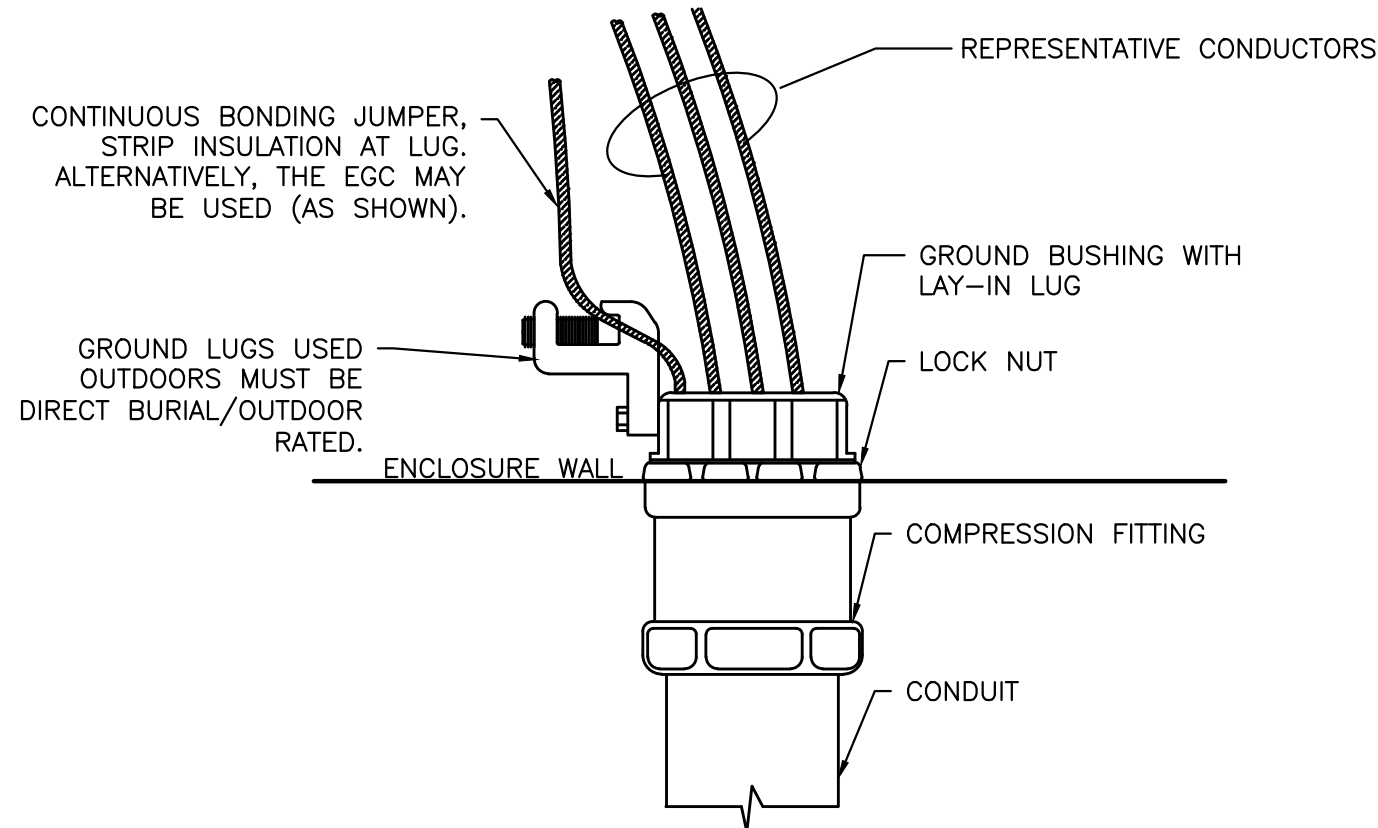
SK SF RI

SK SF RI

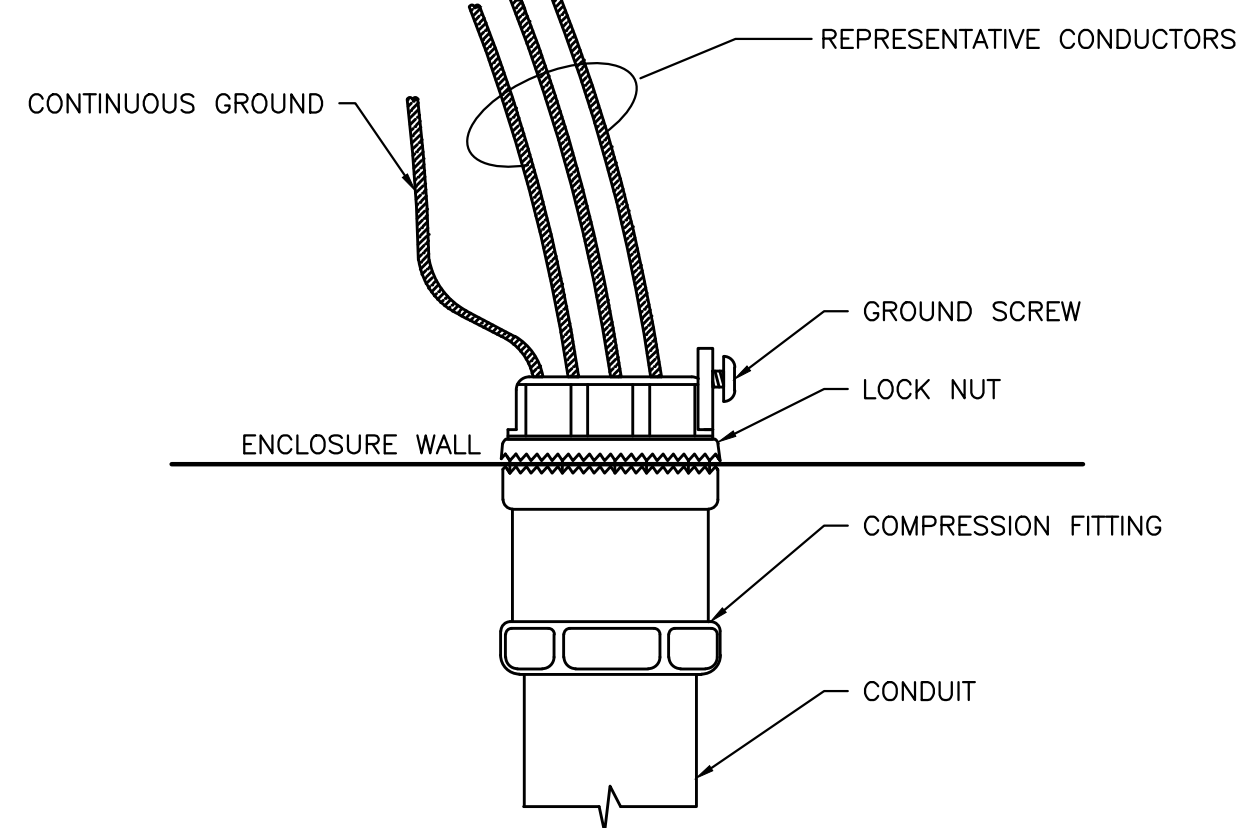
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1
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RULER IN INCHES:
PLOT DATE: 2/20/2025 2:50 PM



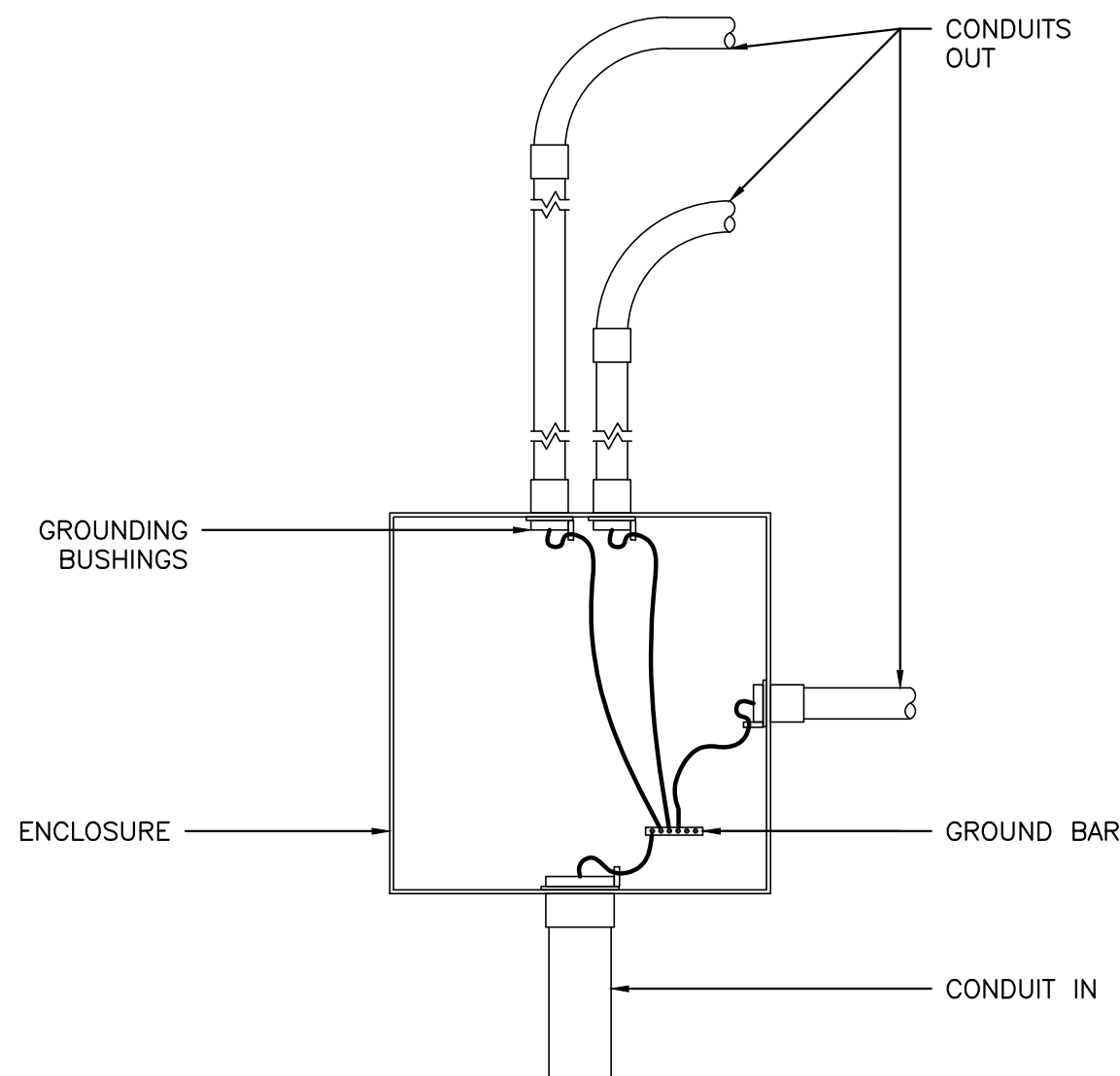
1 GROUND LUG
SCALE: NONE



2 CONDUIT BUSHING GROUNDING
SCALE: NONE



3 MYERS HUB GROUNDING
SCALE: NONE



4 PULL BOX/TROUGH GROUNDING
SCALE: NONE

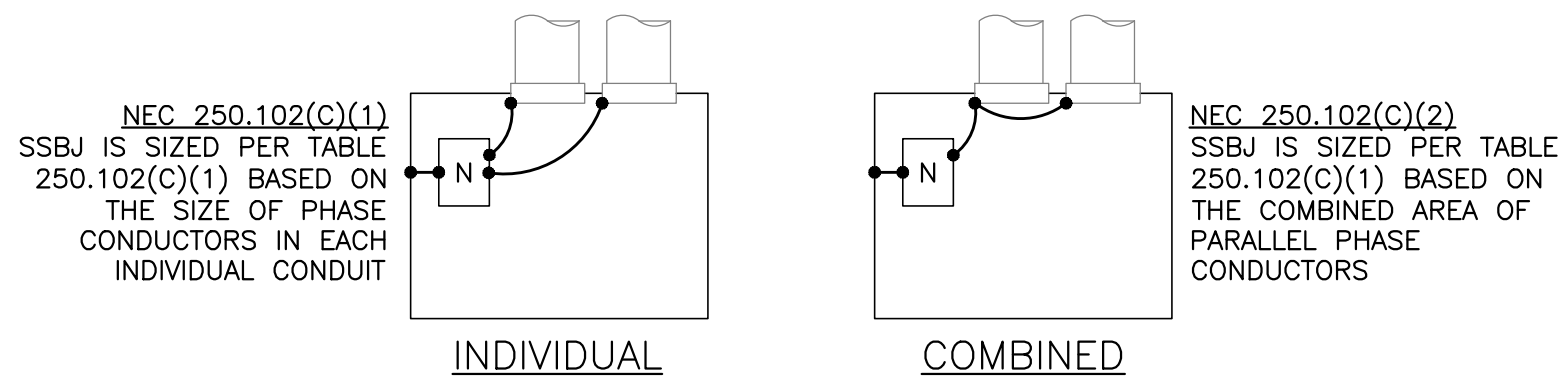


TABLE 250.102(C)(1)			
SIZE OF LARGEST UNGROUNDED CONDUCTOR OR EQUIVALENT AREA FOR PARALLEL CONDUCTORS (AWG/KCMIL)		SIZE OF GROUNDED CONDUCTOR OR BONDING JUMPER (AWG/KCMIL)	
COPPER	ALUMINUM OR COPPER-CLAD ALUMINUM	COPPER	ALUMINUM OR COPPER-CLAD ALUMINUM
2 OR SMALLER	1/0 OR SMALLER	8	6
1 OR 1/0	2/0 OR 3/0	6	4
2 OR 2/0	4/0 OR 250	4	2
OVER 3/0 THROUGH 350	OVER 250 THROUGH 500	2	1/0
OVER 350 THROUGH 600	OVER 500 THROUGH 900	1/0	3/0
OVER 600 THROUGH 1100	OVER 900 THROUGH 1750	2/0	4/0
OVER 1100	OVER 1750	REFER TO NOTES IN NEC TABLE 250.102(C)(1)	

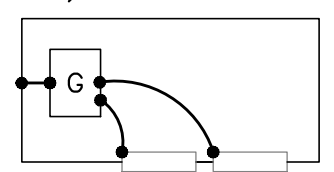
5 SUPPLY SIDE BONDING JUMPERS (SSBJ)
SCALE: NONE

A) FOR CONCENTRIC KNOCKOUTS, USE BONDING JUMPERS AS FOLLOWS:

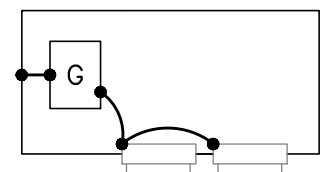
OVERCURRENT DEVICE CIRCUIT NOT EXCEEDING (AMPERES)	SIZE (AWG OR KCMIL)	
	COPPER	ALUMINUM
15	14	12
20	12	10
60	10	8
100	8	6
200	6	4
300	4	2
400	3	1
500	2	1/0
600	1	2/0
800	1/0	3/0
1000	2/0	4/0
1200	3/0	250
1600	4/0	350
2000	250	400
2500	350	600
3000	400	600
4000	500	750

FOR PARALLEL FEEDERS - NEC 250.102(D) EQUIPMENT BONDING JUMPER IS SIZED PER TABLE 250.122, REGARDLESS IF COMBINED OR INDIVIDUAL BONDING JUMPERS ARE USED

1) INDIVIDUAL



2) COMBINED



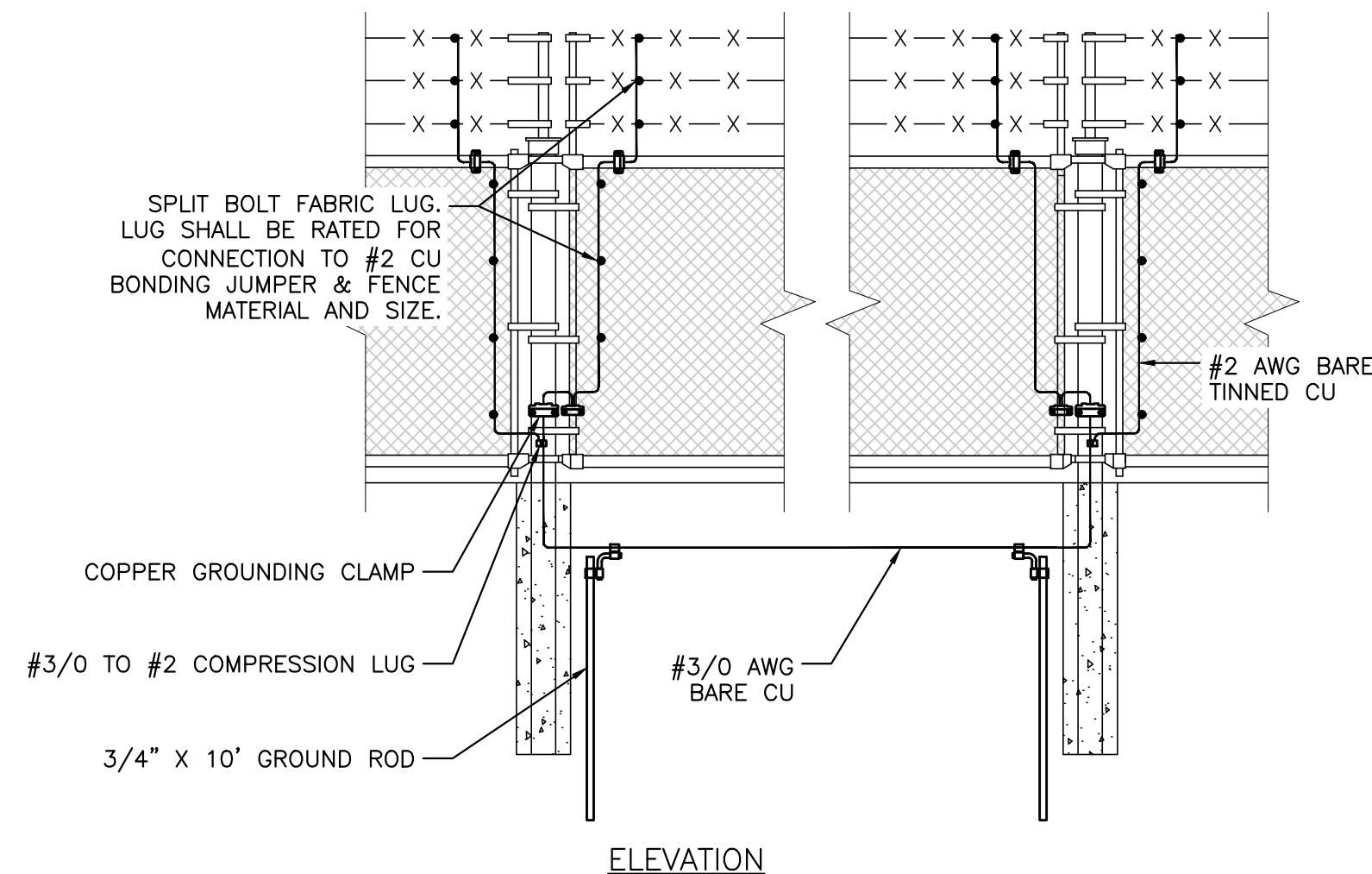
B) FOR NON-CONCENTRIC KNOCKOUTS, THE FOLLOWING METHODS SHALL BE PERMITTED (PER NEC 250.97)

- 1) THREADLESS COUPLINGS AND CONNECTORS FOR CABLES WITH METAL SHEATHS
- 2) TWO LOCKNUTS, ON RIGID METAL CONDUIT OR INTERMEDIATE METAL CONDUIT, ONE INSIDE AND ONE OUTSIDE OF BOXES AND CABINETS
- 3) FITTINGS WITH SHOULDERS THAT SEAT FIRMLY AGAINST THE BOX OR CABINET, SUCH AS ELECTRICAL METALLIC TUBING CONNECTORS, FLEXIBLE METAL CONDUIT CONNECTORS, AND CABLE CONNECTORS, WITH ONE LOCKNUT ON THE INSIDE OF BOXES AND CABINETS
- 4) LISTED FITTINGS (SUCH AS MYERS HUB)

6 LOAD SIDE EQUIPMENT BONDING JUMPER
SCALE: NONE

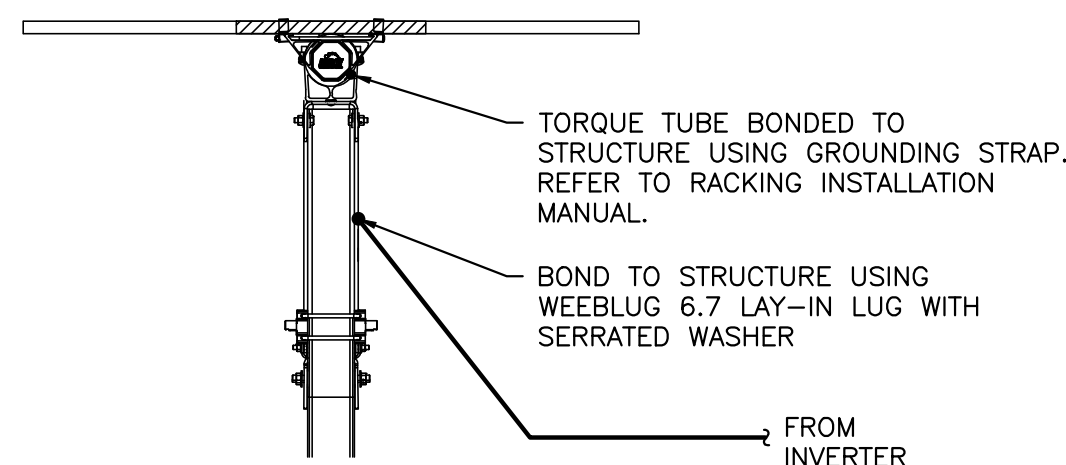
FENCE GROUNDING NOTES:

- (1) COORDINATE EXACT GROUNDING HARDWARE REQUIREMENTS WITH FENCE CONTRACTOR. GROUNDING HARDWARE SHALL BE COMPATIBLE WITH PHYSICAL ASPECTS OF THE FENCE DESIGN (I.E. POST DIAMETER).
- (2) DETAILS ARE SHOWN FOR ELECTRICAL GROUNDING COORDINATION ONLY. REFER TO CIVIL DRAWINGS FOR FENCE SPECIFICATIONS.
- (3) ALL GROUNDING EQUIPMENT SHALL BE RATED FOR OUTDOOR USE.

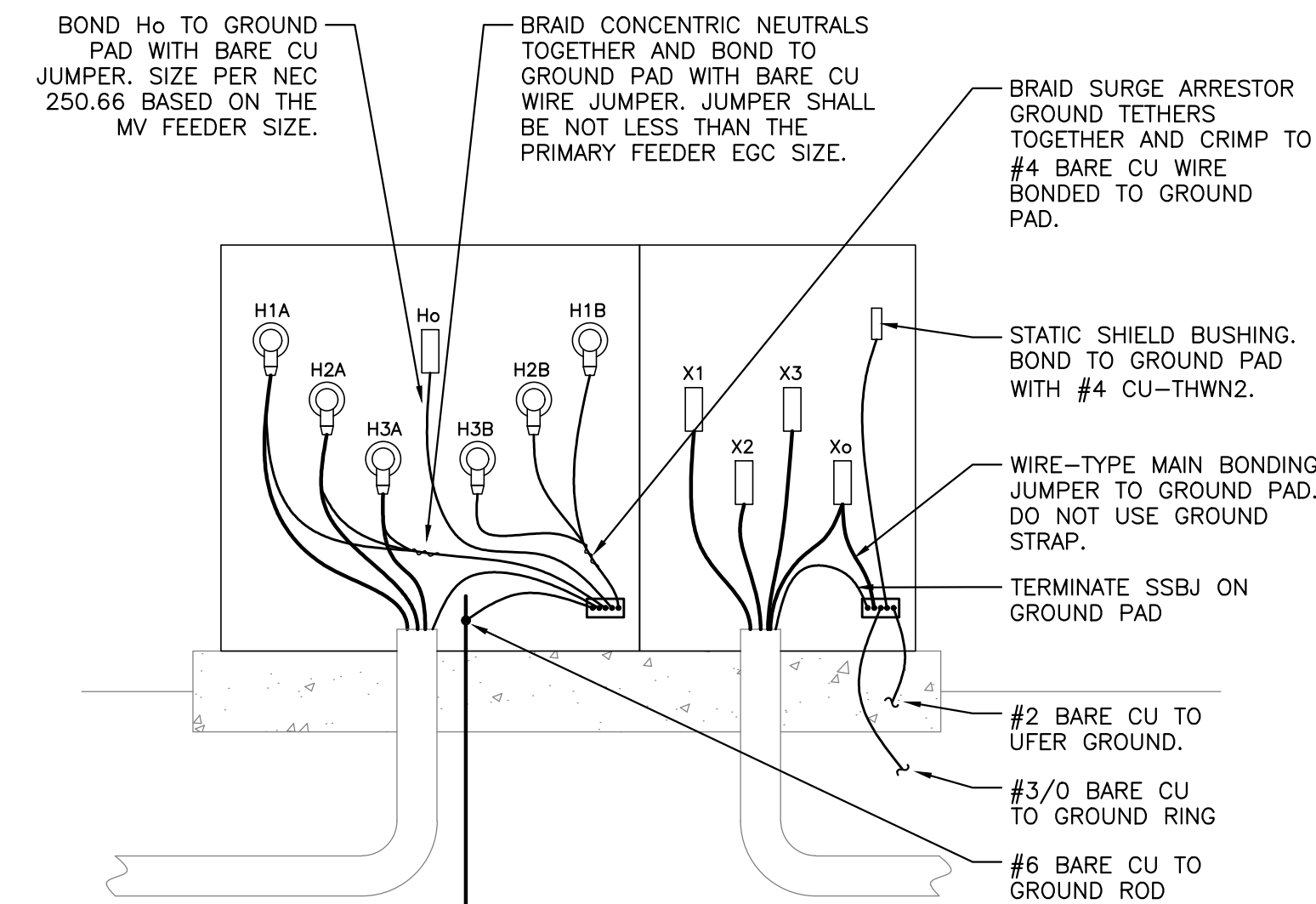


10 GROUNDED FENCE GATE
SCALE: NONE

- NOTES:
1. EACH SUBARRAY CONNECTED TO AN INVERTER SHALL HAVE AN EGC RUN TO THAT INVERTER
 2. PV MODULES AND RAILS GROUNDED PER NEC 690.43

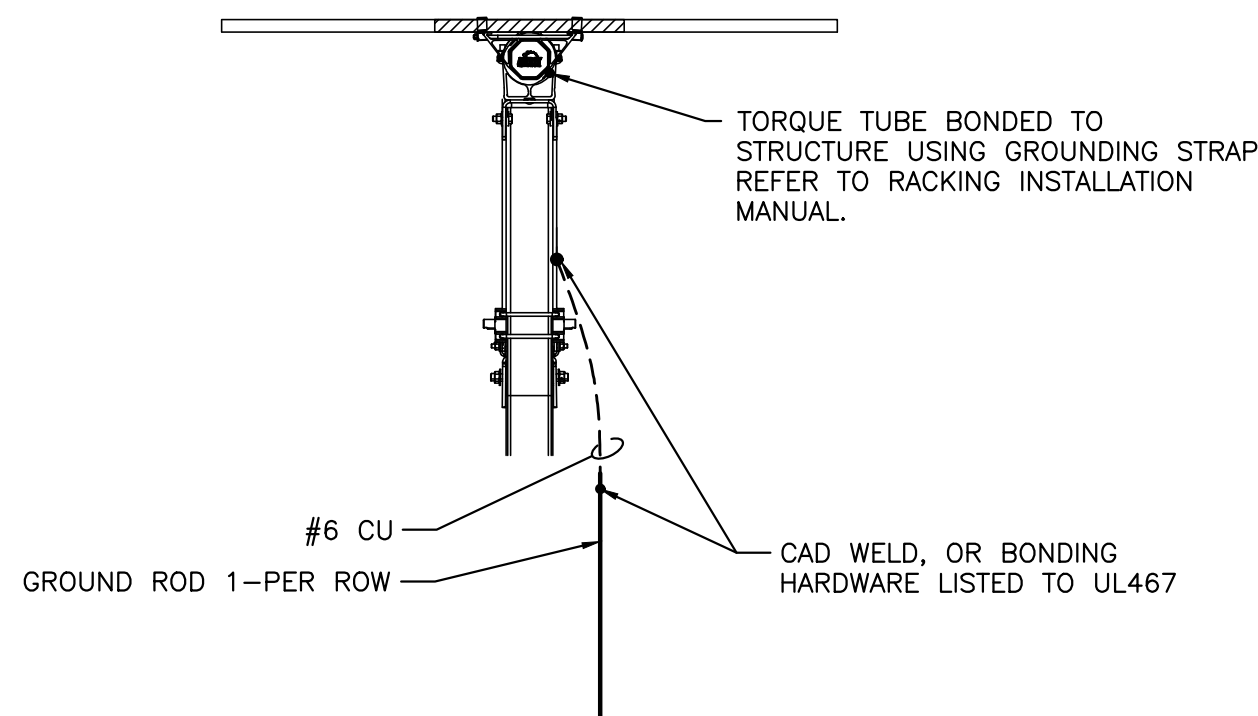


11 ARRAY GROUNDING - END POST
SCALE: NONE



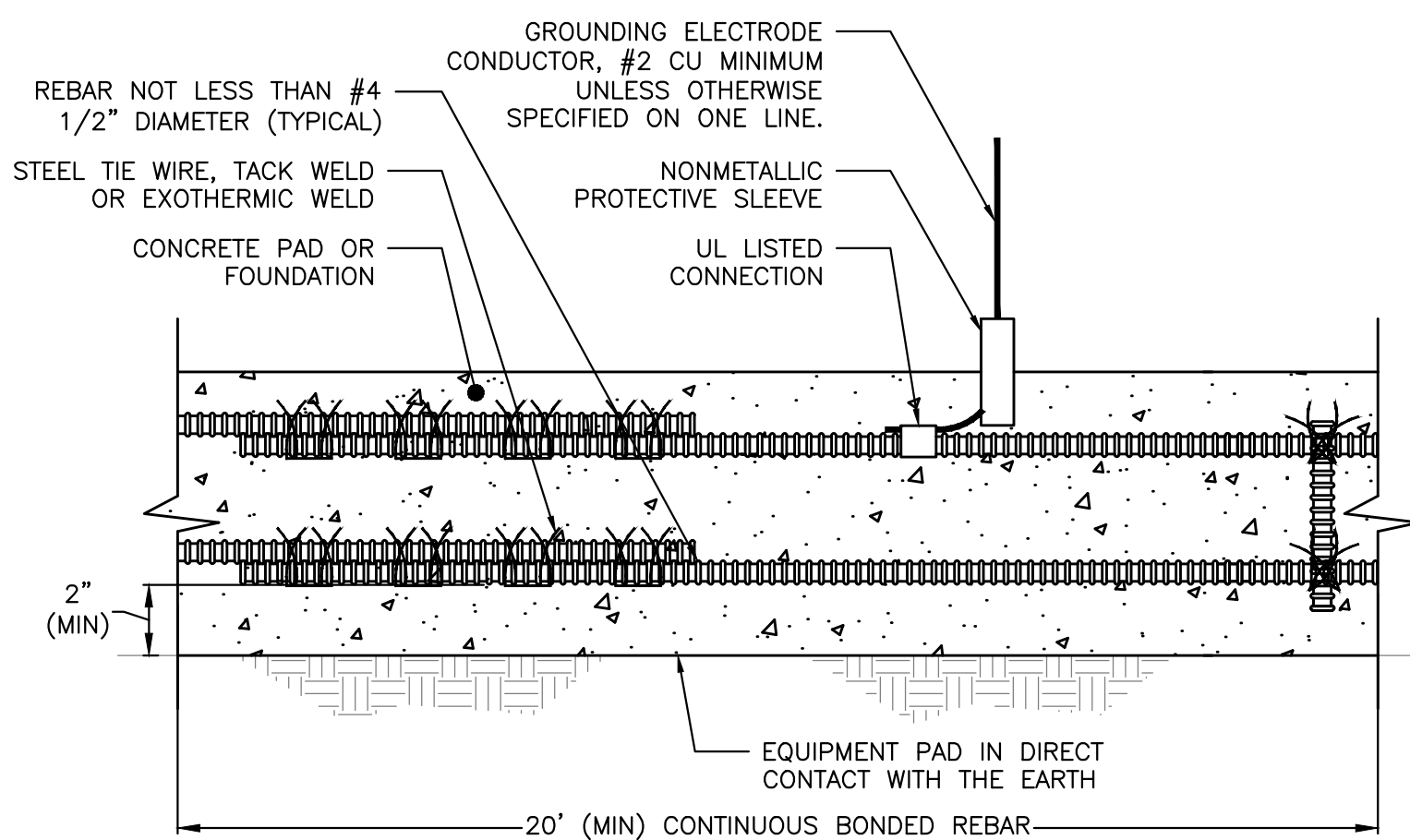
8 TRANSFORMER GROUNDING
SCALE: NONE

- NOTES:
1. EACH SUBARRAY CONNECTED TO AN INVERTER SHALL HAVE AN EGC RUN TO THAT INVERTER
 2. PV MODULES AND RAILS GROUNDED PER NEC 690.43



12 ARRAY GROUNDING - MOTOR POST
SCALE: NONE

NOTE:
SHORTER LENGTHS OF REBAR CAN BE CONNECTED TOGETHER TO FORM AN ELECTRODE OF AT LEAST 20' BY STEEL TIE WIRES, EXOTHERMIC WELDING, OR WELDING.



9 EQUIPMENT PAD GROUNDING - UFER
SCALE: NONE

DRAWING TITLE
GROUNDING DETAILS

PLT DATE: 2/20/2025 2:50 PM

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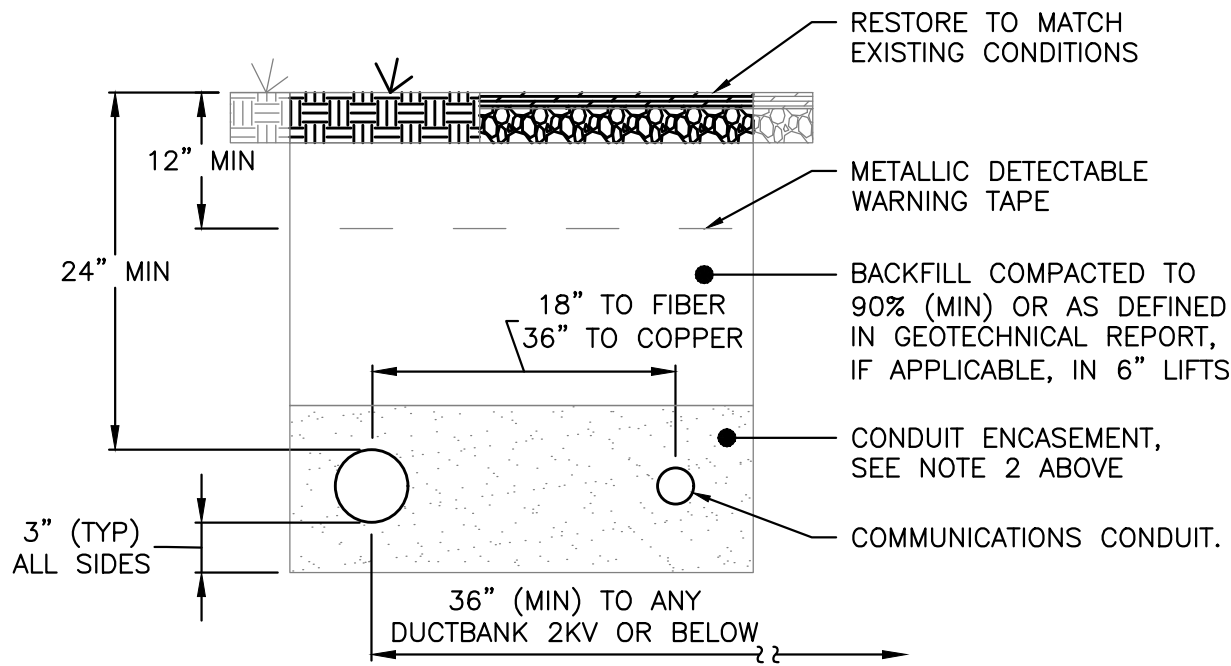
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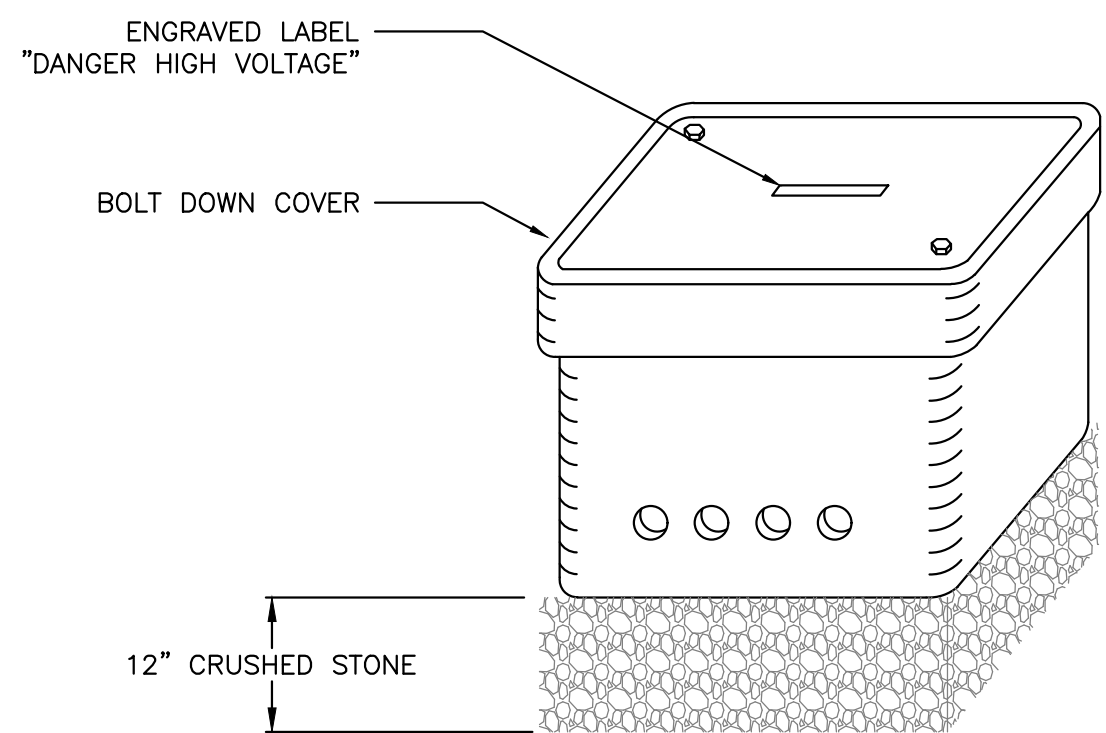
RULER IN INCHES:

- NOTES:
1. ALL UNDERGROUND CONDUIT SHALL BE PVC AND TRANSITION TO RMC FOR ELBOW. RMC ELBOW DOES NOT NEED TO BE BONDED IF THE ENTIRE ELBOW IS $\geq 18"$ DEEP (NEC 250.86 EXCEPTION 3)
 2. UNDER ROADS AND PARKING AREAS ENCASEMENT SHALL BE 2500 PSI CONCRETE. UNDER GRASSY AREAS NOT SUBJECT TO VEHICULAR TRAFFIC ENCASEMENT SHALL BE EITHER SAND, NATIVE BACKFILL CONTAINING NO ROCKS LARGER THAN 3/4" AND FREE FROM SHARP ANGULAR SUBSTANCES, OR SOIL ON SITE AS CONFIRMED ACCEPTABLE BY SITE SUPERVISOR.
 3. CALL BEFORE YOU DIG, DIAL 811 TO BE CONNECTED TO THE LOCAL ON-CALL CENTER. YOU MUST CALL AT LEAST 48 HOURS BEFORE EXCAVATING.
 4. IF DUCTBANK SLOPES SUCH THAT ANY PART OF THE DUCTBANK IS ABOVE STUB UP ELEVATION, INCLUDE HAND HOLE WITH GRAVEL BASE TO ALLOW DRAINAGE AT LOWEST ELEVATION.

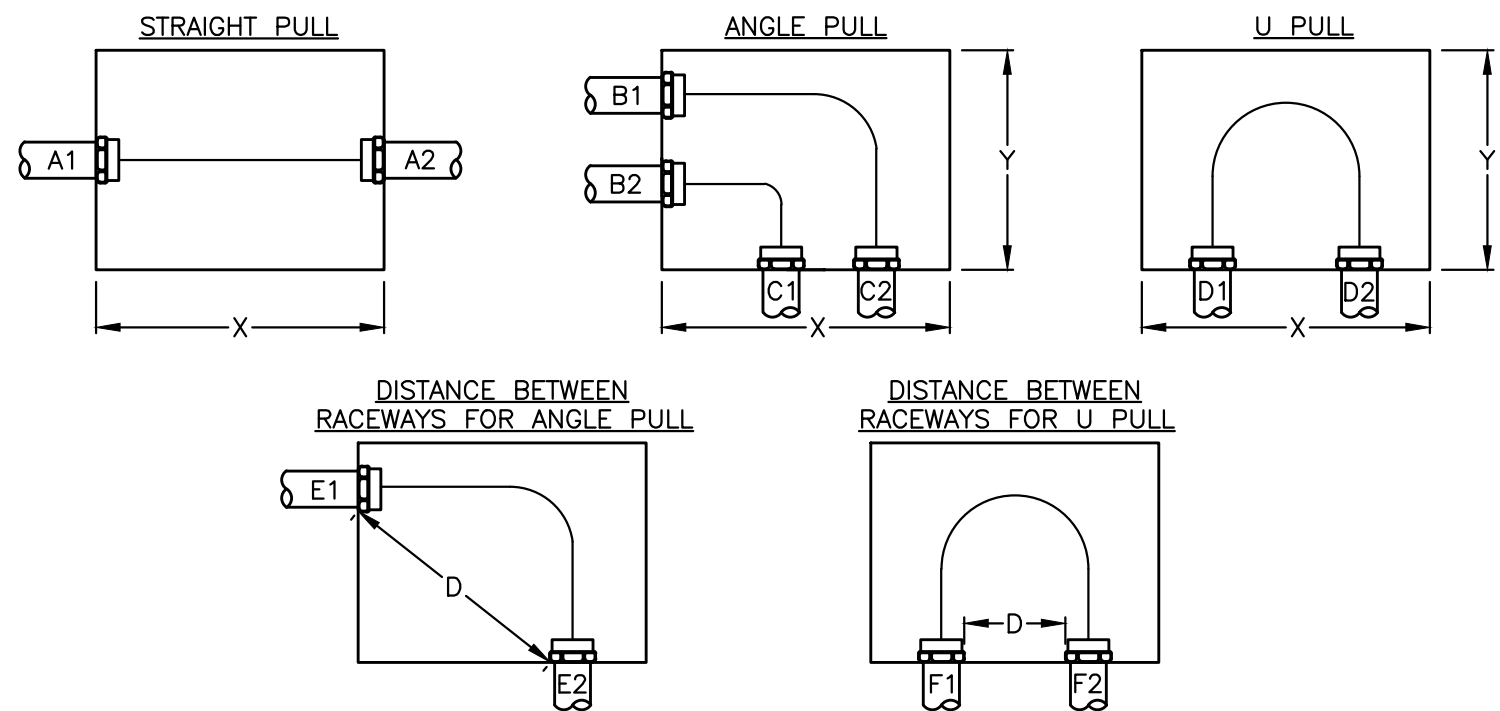


① TYPICAL MV DUCTBANK
SCALE: NONE

- NOTES:
1. BOX SHALL BE RATED T8 FOR USE IN GRASSY AREAS NOT SUBJECT TO VEHICULAR TRAFFIC, OR RATED T22 FOR USE IN SIDEWALKS OR PARKING LOTS SUBJECT TO OCCASIONAL NON-DELIBERATE HEAVY VEHICULAR TRAFFIC. BOXES TO BE USED IN ROADWAYS OR AREAS FREQUENTLY SUBJECT HEAVY VEHICULAR TRAFFIC SHALL BE SUBMITTED TO EOR FOR APPROVAL FINISHED GRADE.
 2. CONDUITS SHALL ENTER ON SIDES. MINIMUM BURIAL DEPTHS OF CONDUITS IS 24" BELOW FINISHED GRADE.
 3. CONDUIT KNOCKOUTS SHALL BE DRILLED OR PUNCHED ON SITE, QUANTITIES AND SIZES TO MATCH TRENCH PLAN AND COMBINER SCHEDULE.



⑤ HANDHOLE
SCALE: NONE

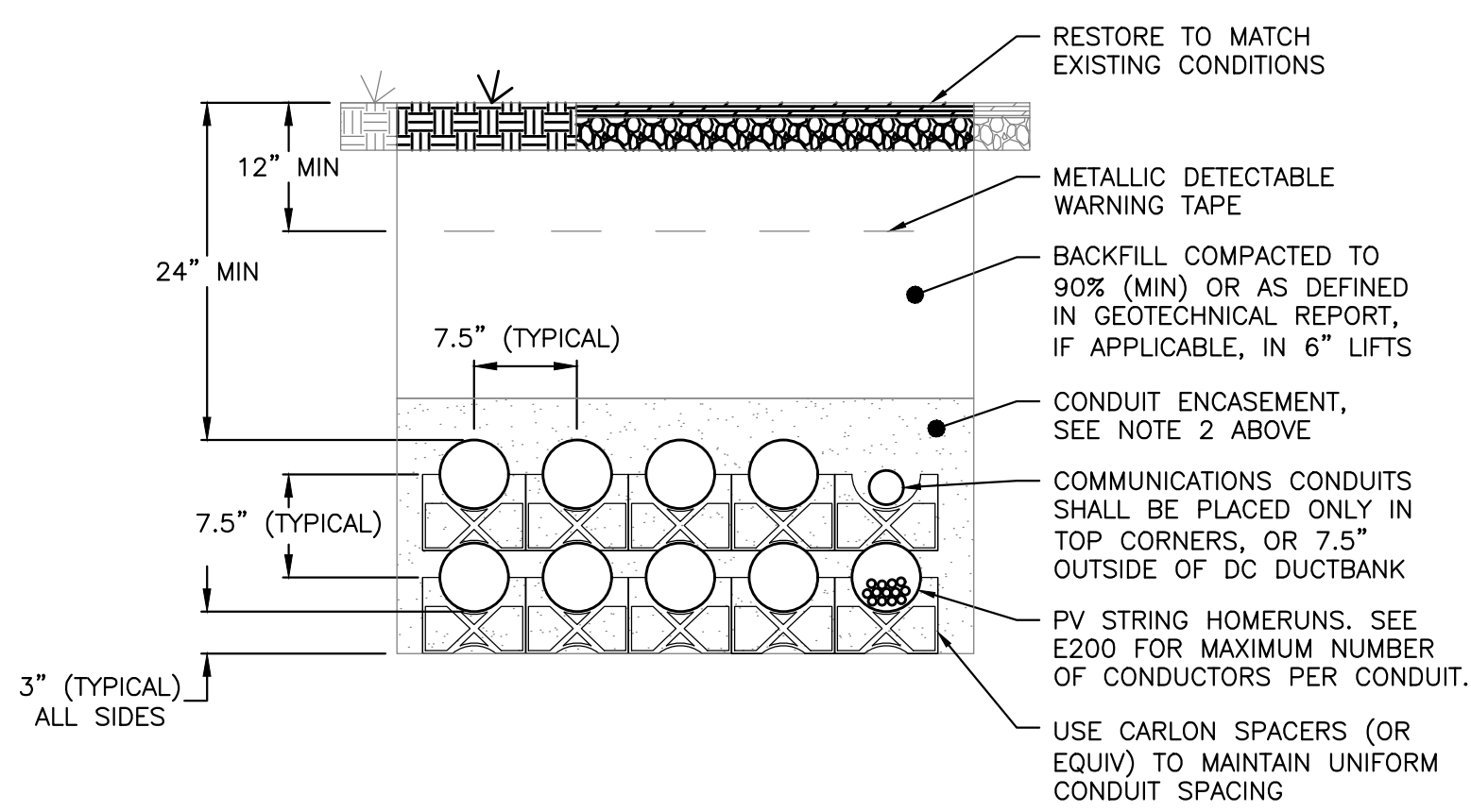


NEC 314.28(A)(1)-(3) PULL BOX SIZING (UP TO 1000V)			
BOX TYPE	LENGTH (X)	HEIGHT (Y)	DISTANCE (D)
STRAIGHT PULL	8 X LARGEST OF A1 & A2	AS NEEDED	N/A
ANGLE PULL	6 X (LARGEST OF B1 & B2) + SUM OF OTHER CONDUIT ENTERING THE SAME WALL	6 X (LARGEST OF C1 & C2) + SUM OF OTHER CONDUIT ENTERING THE SAME WALL	6 X LARGEST OF E1 & E2
U PULL	AS NEEDED	6 X (LARGEST OF D1 & D2) + SUM OF OTHER CONDUIT ENTERING THE SAME WALL	6 X LARGEST OF F1 & F2

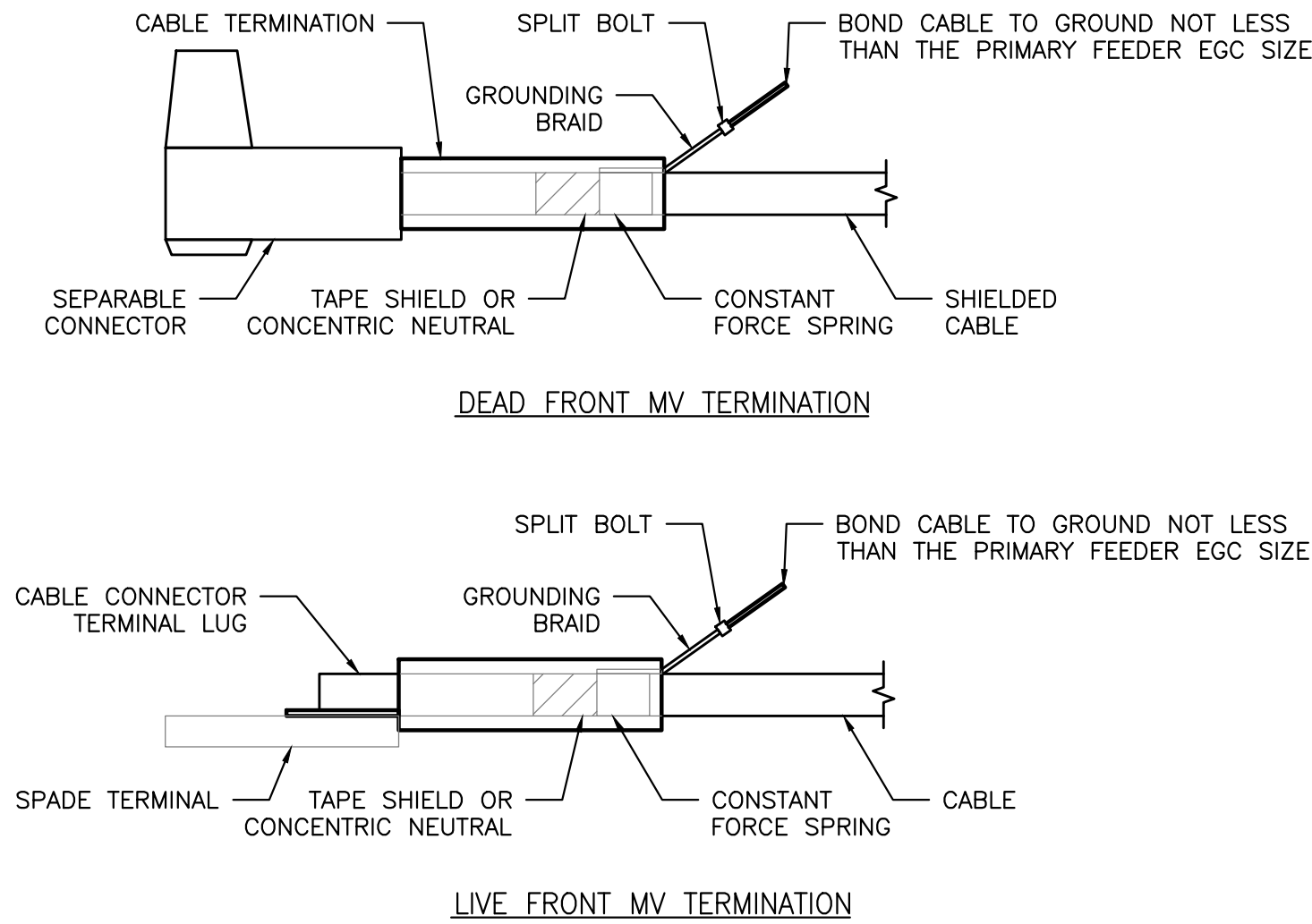
- NOTES:
1. REFER TO NEC 314.28 FOR ADDITIONAL REQUIREMENTS.
 2. ENSURE CONDUCTOR BEND RADIUS MINIMUMS ARE MET. REFER TO NEC 312.6 FOR ADDITIONAL REQUIREMENTS.

⑨ PULL BOX & JUNCTION BOX SIZING
SCALE: NONE

- NOTES:
1. ALL UNDERGROUND CONDUIT SHALL BE PVC AND TRANSITION TO RMC FOR ELBOW. RMC ELBOW DOES NOT NEED TO BE BONDED IF THE ENTIRE ELBOW IS $\geq 18"$ DEEP (NEC 250.86 EXCEPTION 3)
 2. UNDER ROADS AND PARKING AREAS ENCASEMENT SHALL BE 2500 PSI CONCRETE. UNDER GRASSY AREAS NOT SUBJECT TO VEHICULAR TRAFFIC ENCASEMENT SHALL BE EITHER SAND, NATIVE BACKFILL CONTAINING NO ROCKS LARGER THAN 3/4" AND FREE FROM SHARP ANGULAR SUBSTANCES, OR SOIL ON SITE AS CONFIRMED ACCEPTABLE BY SITE SUPERVISOR.
 3. CALL BEFORE YOU DIG, DIAL 811 TO BE CONNECTED TO THE LOCAL ON-CALL CENTER. YOU MUST CALL AT LEAST 48 HOURS BEFORE EXCAVATING.
 4. IF DUCTBANK SLOPES SUCH THAT ANY PART OF THE DUCTBANK IS ABOVE STUB UP ELEVATION, INCLUDE HAND HOLE WITH GRAVEL BASE TO ALLOW DRAINAGE AT LOWEST ELEVATION.
 5. DUCTBANK SIZE SHOWN IS THE MAXIMUM ALLOWABLE SIZE WITHOUT THERMAL ANALYSIS.

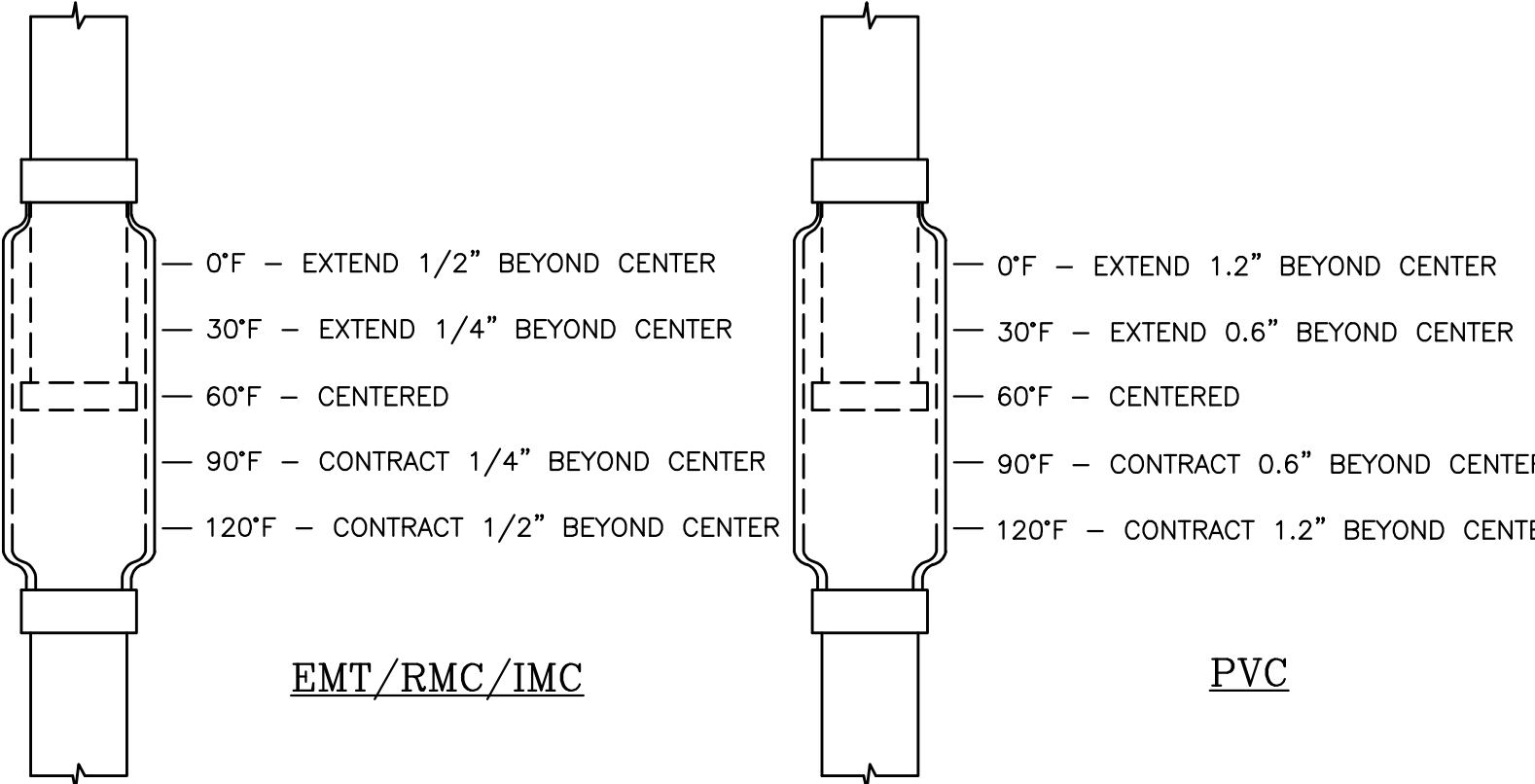


② TYPICAL DC DUCTBANK
SCALE: NONE



⑥ MV CABLE TERMINATION
SCALE: NONE

- NOTES:
1. INSTALL EXPANSION COUPLING EVERY 100' OF STRAIGHT CONDUIT RUN.
 2. IF EXPANSION COUPLINGS ARE INSTALLED AT LENGTHS GREATER OR LESS THAN 100', THE OFFSET FROM CENTER SHALL BE ADJUSTED PROPORTIONALLY.
 3. IF EXPANSION JOINT IS NOT PROVIDED WITH INTERNAL BONDING JUMPER, AN EXTERNAL BONDING JUMPER MUST BE INSTALLED.

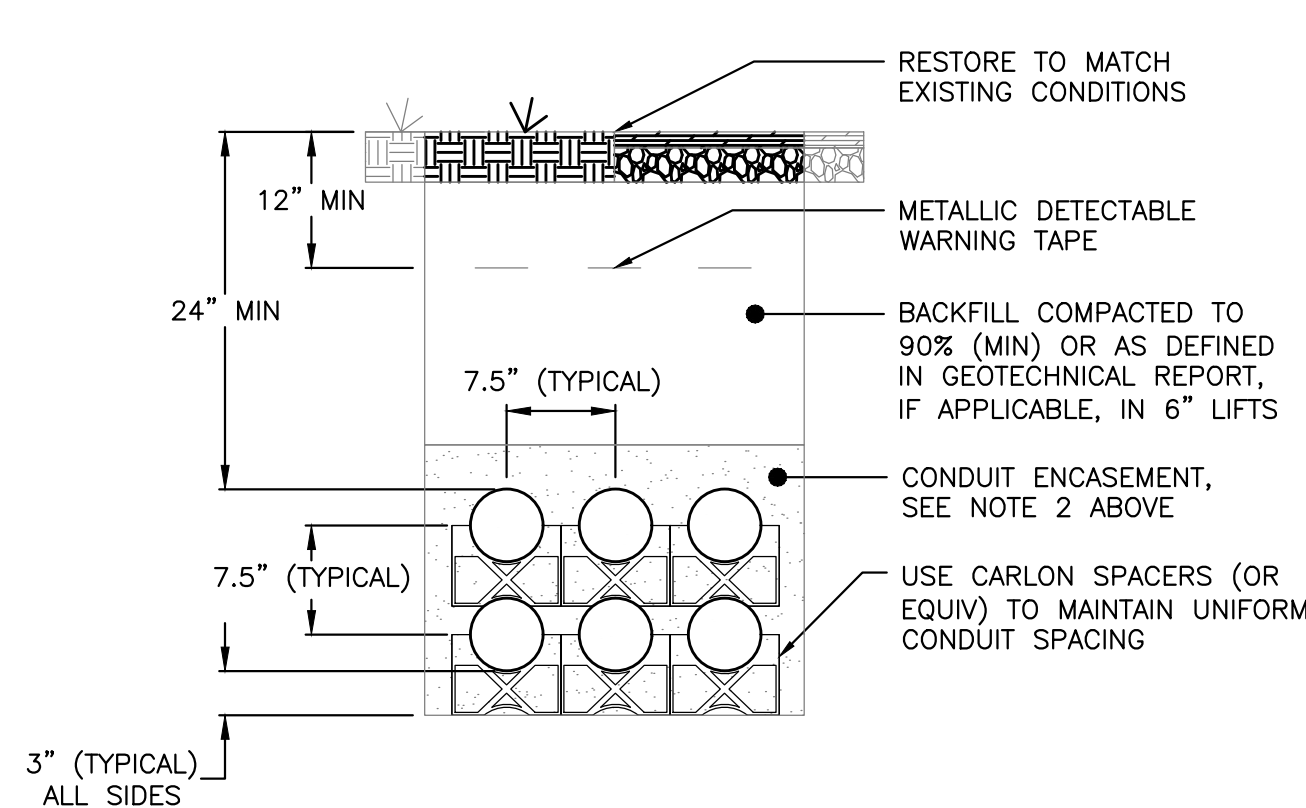


NOTE: THE COEFFICIENT OF THERMAL EXPANSION IN STEEL CONDUIT= 0.65×10^{-6} IN./IN./°F FOR EVERY 120°F CHANGE IN TEMPERATURE, THE LENGTH CHANGE IS 0.94 INCHES PER 100 FEET OF CONDUIT RUN.

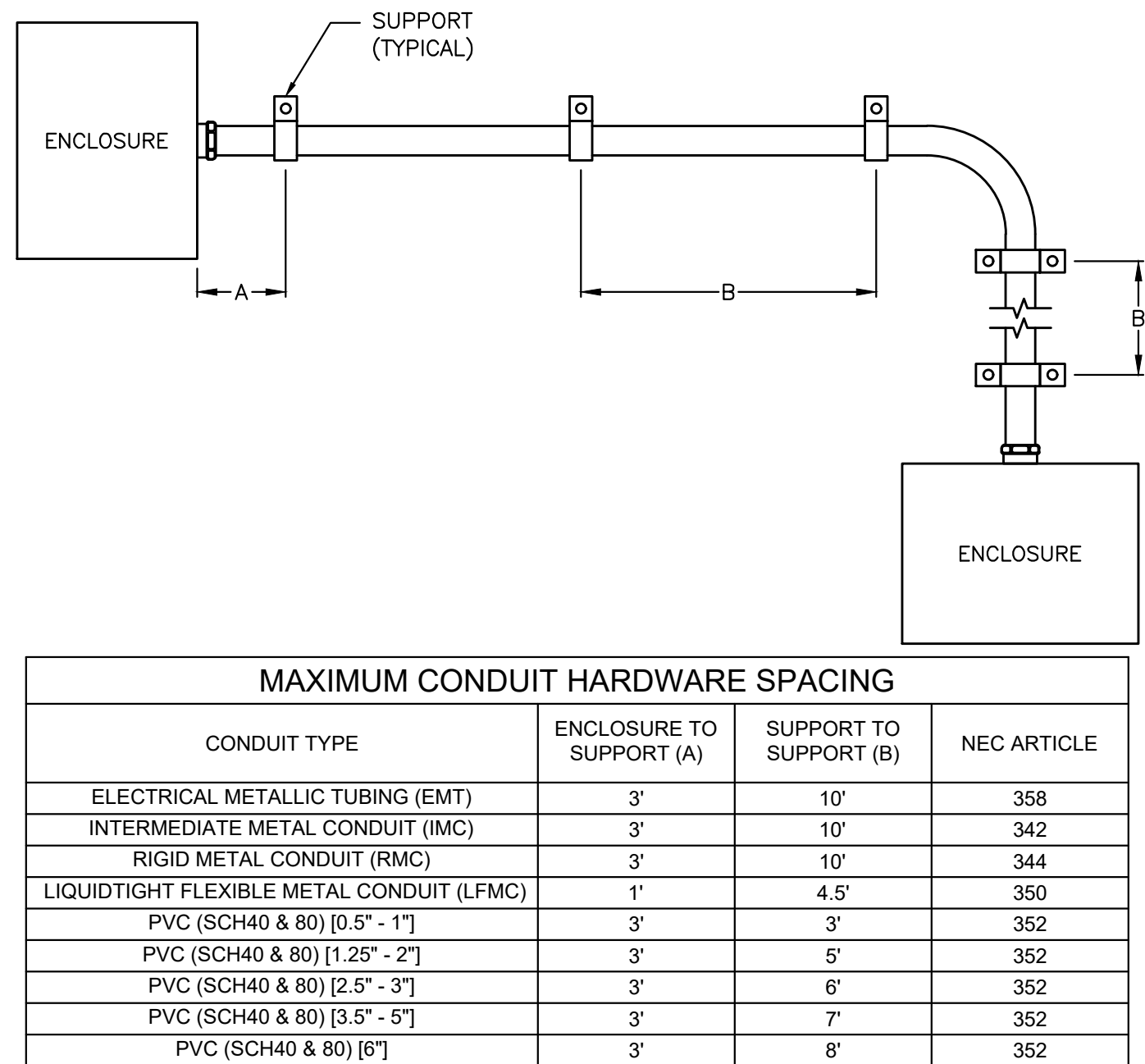
NOTE: THE COEFFICIENT OF THERMAL EXPANSION IN PVC CONDUIT= 3.38×10^{-4} IN./IN./°F FOR EVERY 30°F CHANGE IN TEMPERATURE, THE CHANGE IN LENGTH IS 0.6 INCHES PER 50 FEET OF CONDUIT RUN.

⑪ EXPANSION COUPLING
SCALE: NONE

- NOTES:
1. ALL UNDERGROUND CONDUIT SHALL BE PVC AND TRANSITION TO RMC FOR ELBOW. RMC ELBOW DOES NOT NEED TO BE BONDED IF THE ENTIRE ELBOW IS $\geq 18"$ DEEP (NEC 250.86 EXCEPTION 3)
 2. UNDER ROADS AND PARKING AREAS ENCASEMENT SHALL BE 2500 PSI CONCRETE. UNDER GRASSY AREAS NOT SUBJECT TO VEHICULAR TRAFFIC ENCASEMENT SHALL BE EITHER SAND, NATIVE BACKFILL CONTAINING NO ROCKS LARGER THAN 3/4" AND FREE FROM SHARP ANGULAR SUBSTANCES, OR SOIL ON SITE AS CONFIRMED ACCEPTABLE BY SITE SUPERVISOR.
 3. CALL BEFORE YOU DIG, DIAL 811 TO BE CONNECTED TO THE LOCAL ON-CALL CENTER. YOU MUST CALL AT LEAST 48 HOURS BEFORE EXCAVATING.
 4. IF DUCTBANK SLOPES SUCH THAT ANY PART OF THE DUCTBANK IS ABOVE STUB UP ELEVATION, INCLUDE HAND HOLE WITH GRAVEL BASE TO ALLOW DRAINAGE AT LOWEST ELEVATION.
 5. DUCTBANK SIZE SHOWN IS THE MAXIMUM ALLOWABLE SIZE WITHOUT THERMAL ANALYSIS.

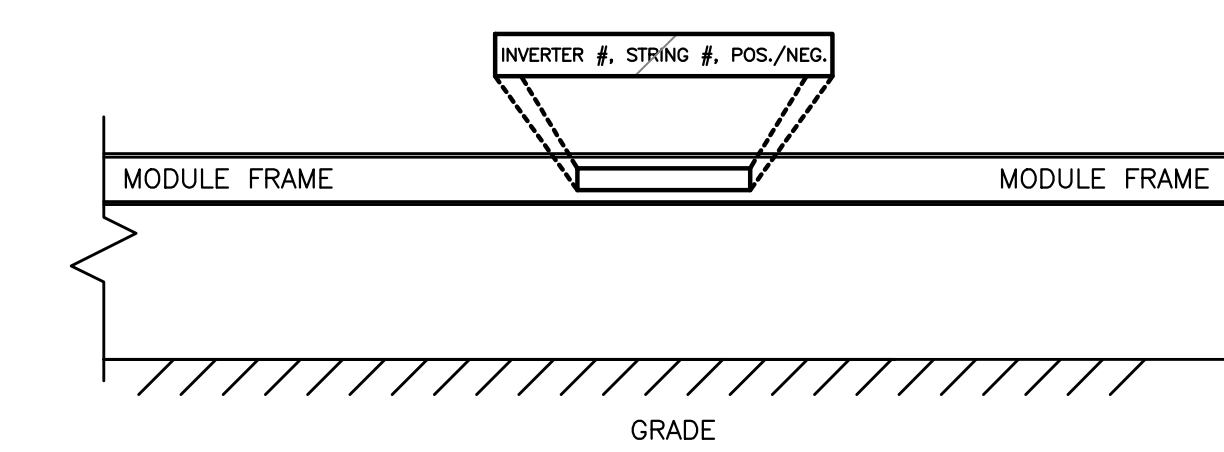


③ TYPICAL AC DUCTBANK
SCALE: NONE



⑦ CONDUIT SUPPORT SPACING
SCALE: NONE

MAXIMUM CONDUIT HARDWARE SPACING			
CONDUIT TYPE	ENCLOSURE TO SUPPORT (A)	SUPPORT TO SUPPORT (B)	NEC ARTICLE
ELECTRICAL METALLIC TUBING (EMT)	3'	10'	358
INTERMEDIATE METAL CONDUIT (IMC)	3'	10'	342
RIGID METAL CONDUIT (RMC)	3'	10'	344
LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)	1'	4.5'	350
PVC (SCH40 & 80) [0.5" - 1"]	3'	3'	352
PVC (SCH40 & 80) [1.25" - 2"]	3'	5'	352
PVC (SCH40 & 80) [2.5" - 3"]	3'	6'	352
PVC (SCH40 & 80) [3.5" - 5"]	3'	7'	352
PVC (SCH40 & 80) [6"]	3'	8'	352

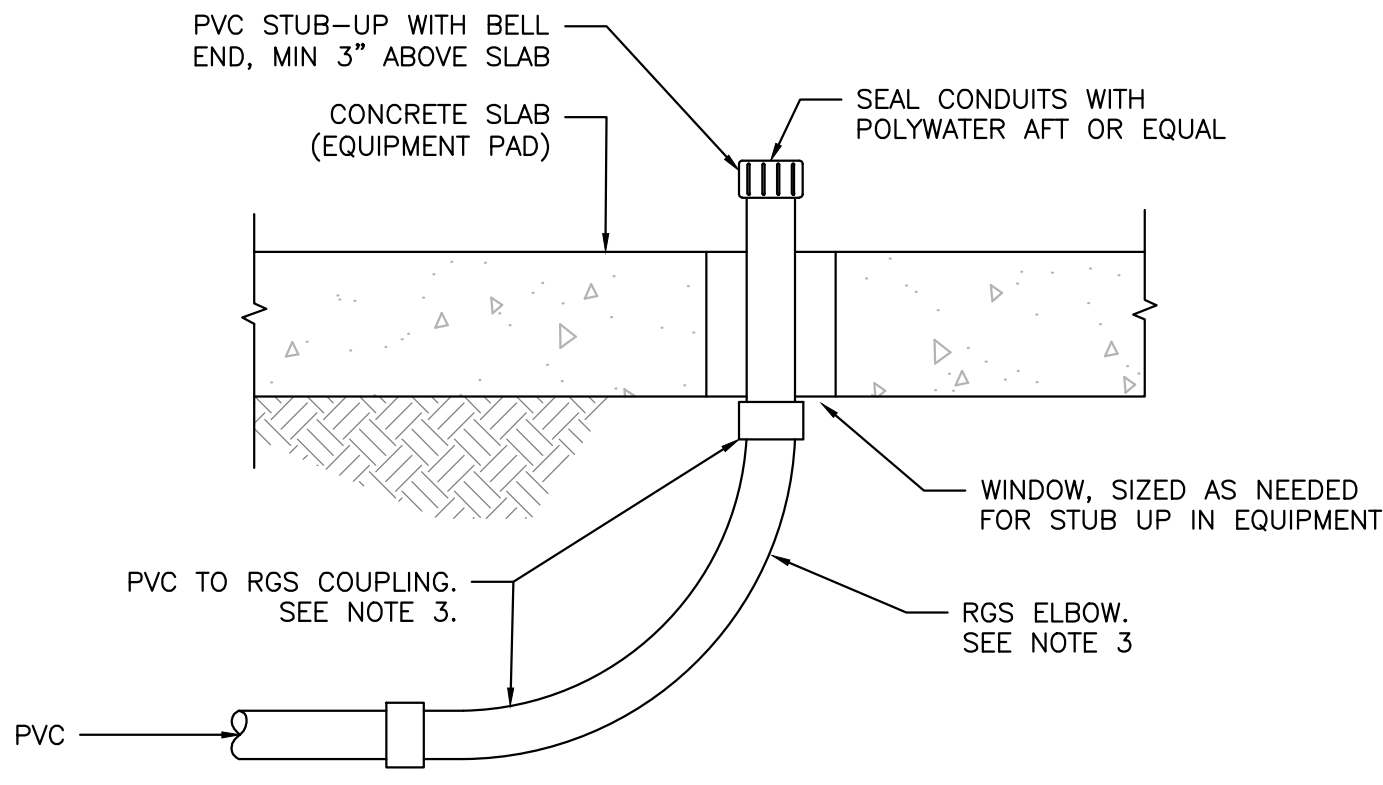


VIEW FROM PROJECT NORTH TO PROJECT SOUTH

- NOTES:
1. INSTALL LABEL ADJACENT TO THE HOME RUN CONNECTOR IDENTIFYING THE INVERTER AND STRING NUMBER. LABEL MUST HAVE RED BACKGROUND FOR POSITIVE OR BLACK BACKGROUND FOR NEGATIVE. TEXT SHALL BE WHITE WITH A HEIGHT THAT IS LEGIBLE. INSTALL LABEL ON LONG SIDE OF MODULE FRAME THAT FACES PROJECT NORTH. LABEL MUST BE UV RESISTANT LISTED FOR OUTDOOR USE.
 2. NO CROSS MATING OF CONNECTORS IS AUTHORIZED. BOTH MALE AND FEMALE CONNECTOR ENDS MUST BE OF THE SAME MANUFACTURER TO ENSURE UL COMPLIANCE. THE MANUFACTURER SPECIFIC TOOL KIT MUST BE USED WHILE MAKING FIELD CONNECTIONS.
 3. MOUNTING DETAIL APPLIES TO ALL ROOFTOP RACKING PRODUCTS. CONTRACTOR SHALL ADJUST EXACT SIZE AND POSITION OF LABEL BASED ON RACKING PRODUCT. CONTACT GREENSKIES IF RACKING DOES NOT HAVE SPACE FOR FULLY SIZED LABEL.

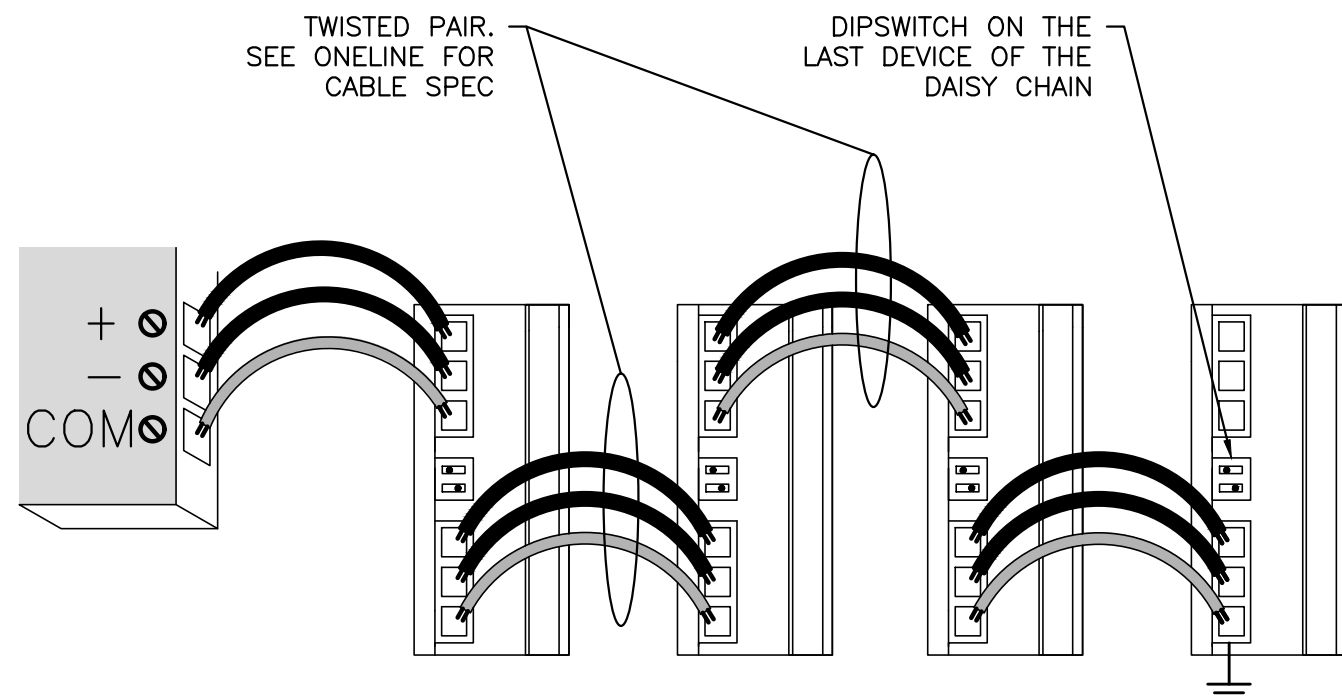
⑪ STRING LABEL MOUNTING LOCATION
SCALE: NONE

- NOTES:
1. INITIALLY INSTALL COUPLING CAP TO PREVENT DAMAGE TO STUB-UP UNTIL GEAR IS SET.
 2. INSTALL ROUNDED FITTING BEFORE PULLING CABLES TO AVOID DAMAGE TO CABLES.
 3. RMC ELBOW ONLY REQUIRED ON ONE SIDE OF EACH PULL NEAREST THE LOCATION OF THE PULLING MACHINE. ON OPPOSITE SIDE, PVC SCH80 ELBOWS ARE PERMITTED.

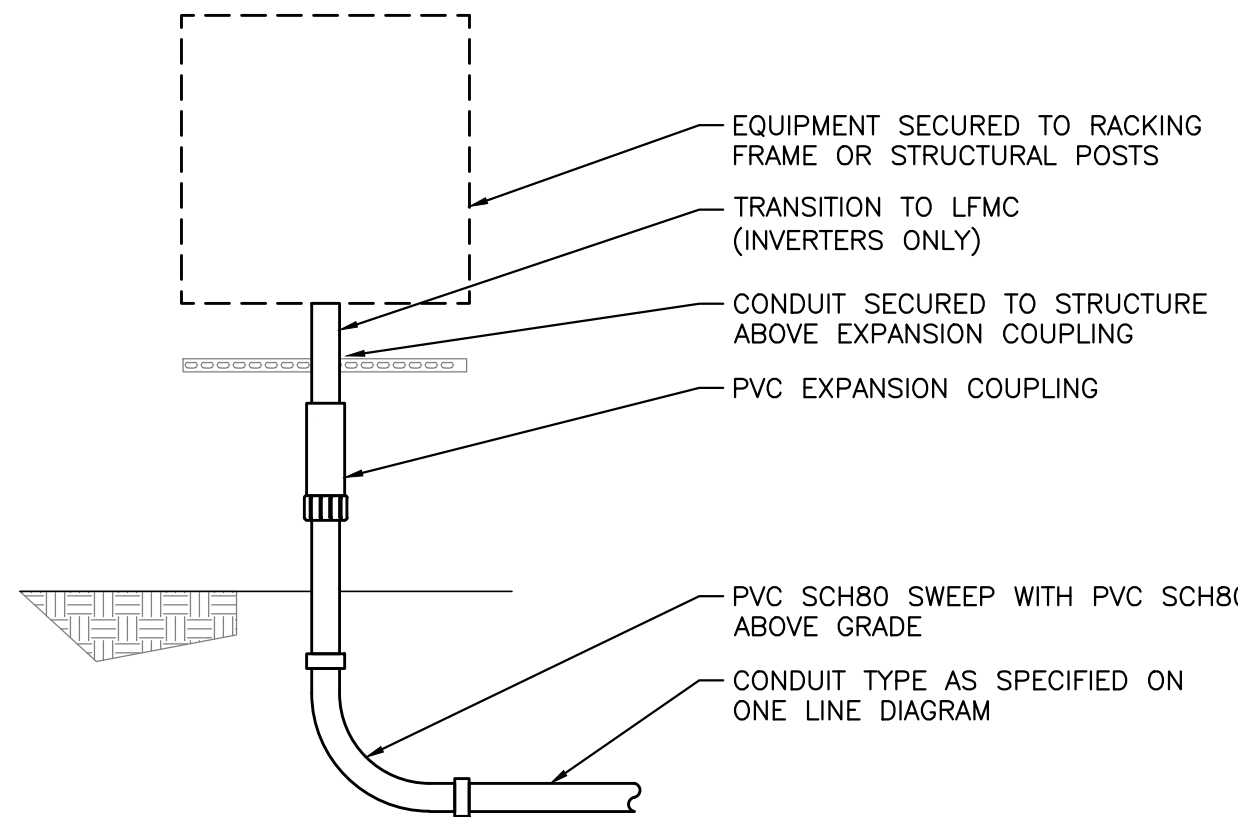


④ EQUIPMENT PAD STUB-UP
SCALE: NONE

- MONITORING NOTES:
1. REFER TO MONITORING SYSTEM INSTALLATION MANUAL FOR DETAILS ON TERMINAL BLOCKS, CABLE TERMINATIONS, AND SYSTEM CONFIGURATION.
 2. WIRELESS TRANSCEIVERS MUST HAVE LINE-OF-SIGHT BETWEEN EACH OTHER.
 3. PYRANOMETER MUST BE INSTALLED IN UNSHADED LOCATION.



⑧ MODBUS COMMUNICATIONS
SCALE: NONE



- NOTES:
1. EXPANSION FITTINGS SHALL BE PROVIDED FOR ALL CONDUITS EXITING FROM GRADE THAT TERMINATE ON FIXED EQUIPMENT. CONDUITS THAT TERMINATE AT WEATHER HEADS DO NOT REQUIRE PROVISION FOR EARTH MOVEMENT.
 2. PVC SWEEPS SHALL ONLY BE USED AT END WHERE WIRE REEL IS LOCATED. RMC SWEEPS SHALL BE USED AT END WHERE THE PULLING MACHINE IS LOCATED.

⑫ TRANSITION FROM GRADE
SCALE: NONE

DRAWING TITLE
ELECTRICAL DETAILS



