APPENDIX 22-A

Electric and Magnetic Fields Study

TETRA TECH

Electric and Magnetic Fields Calculation

SOMERSET SOLAR 345 KV OVERHEAD TRANSMISSION GEN-TIE LINE

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PRESENTED TO

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REVISION HISTORY

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APPENDICES

1.0 PURPOSE

The purpose of this study is to present the magnitude of the electric and magnetic fields (EMF) associated with the proposed 345 kV overhead gen-tie transmission line connecting the proposed Somerset Solar Project (Project) collection substation to the Point of Interconnect (POI) at the existing Kintigh Substation.

Note that while there is no national code requirement specifying transmission line maximum electric and magnetic field strengths, the State of New York does have requirements as referenced below.

No calculations of corona level, radio, and TV (RF) interference, or audible noise are within the scope of this report.

2.0 SUMMARY

The minimum right-of-way is 120 feet based on the electric field strength. See Appendix A for calculations.

3.0 CALCULATION CRITERIA AND DESIGN DECISIONS

- Line is designed as a 3-phase, single-circuit, vertical deadend H-frame configuration with two (2) shield wires. See Appendix B for structure framing and geometry, and line plan view.
- Conductor is designed as double-bundled 795 kcmil 26/7 ACSR “Drake” conductor. Bundle spacing is 9 inches.
- Line shall have capacity to transmit a maximum power of 125 MW with 0.95 leading to 0.95 lagging power factor, i.e., maximum capacity of 131.6 MVA.
- Line shall be energized at 345 kV under normal operation, but is to be designed for short-term operating voltage of 380 kV. This study is based on the nominal rating.
- The project has a design production capacity of 125 MW. Calculations are based on this production capacity, i.e., this capacity is taken as the maximum power that the gen-tie will transmit.
  - No provision for future expansion or increased gen-tie transmission power capacity has been specified.
  - Seasonal winter/summer/ normal/emergency ampacity requirements do not apply.
- There are no other lines in the proximity of the gen-tie line that have any affect on the EMF strength within the proposed ROW.
- Line design is based on non-final location of terminus point within Kintigh Station (to be provided by others). As such, calculations may need to be revised upon gantry location determination
- No future road is assumed to be located beneath the gen-tie due to limited distance between Project collector station and Kintigh Station.

4.0 CODES AND STANDARDS REFERENCES

- Institute of Electrical and Electronics Engineers (IEEE) 644 – 2019, IEEE standard for measurement of power frequency EMF from alternating current (AC) power lines
- Calculations based on the Electric Power Research institute (EPRI) Red Book methods (3rd Edition, 2005 - 7.4 Calculation of Magnetic Fields and Appendices 7.1 Calculation of Field Ellipse Parameters and 7.6 Electric Field Calculations for 3D Geometry).
- “Statement of Interim Policy on Magnetic Fields of Major Electric Transmission Facilities,” issued and effective September 11, 1990, New York State Public Service Commission, Cases 26529 and 26559
- Regulations Implementing Section 94-c of the Executive Law, Chapter XVIII, Title 19 of NYCRR Part 900, Office of Renewable Energy Siting (ORES);

- National Electrical Safety Code (NESC, 2017)

5.0 COMPUTER PROGRAM USED

Power Line Systems PLS-CADD version 17.22 is used for calculation.

6.0 REQUIREMENTS AND ACCEPTANCE CRITERIA

EMF levels are calculated at 1.0 meter (3.28 feet) above ground level with five (5)-foot measurement intervals depicting the width of the entire ROW and out to five hundred (500) feet from the edge of the ROW on both sides per ORES. NYSPC specifies the following EMF requirements:

- Electric field shall be no greater than 1.6 kV/m at the edge of the right-of-way (ROW);
- Magnetic field shall be no greater than 200 milligauss (mG) at the edge of the ROW;
- Electric field shall be no greater than 11.8 kV/m anywhere;

7.0 EMF CALCULATION

See Appendix A.

8.0 RESULTS

In summary, the calculation results are:

- Based on the NESC minimum requirement, the ROW is calculated as 76 feet.
- Based on the EMF calculations, the ROW is calculated as 120 feet:
  - The peak electric field is 2.3 kV/m offset from the centerline by ±35 feet, which reduces to 1.6 kV/m at ±60 feet from centerline.
  - The peak magnetic field is 22.5 mG located with no offset from the centerline, which reduces to 10.3 mG at ±60 feet from centerline.

The larger of the two calculations governs, therefore the minimum required ROW is 120 feet.

This study addresses Sections 900-2.23(d)(4), and 900-2.23(d)(5) of the Regulations Implementing Section 94-c of the Executive Law, Chapter XVIII, Title 19 of NYCRR Part 900, Office of Renewable Energy Siting (ORES), in that the gen-tie is designed for the maximum power output of the plant and thus the concept of seasonal and emergency output is not applicable; and that there is no provision in the Project scope that output shall be increased in the future.

The calculated Project electrical and magnetic field strengths are within the limits specified by Section 900-2.23(d)(7) of the Regulations Implementing Section 94-c of the Executive Law, Chapter XVIII, Title 19 of NYCRR Part 900, Office of Renewable Energy Siting (ORES), which references “Statement of Interim Policy on Magnetic Fields of Major Electric Transmission Facilities,” issued and effective September 11, 1990, New York State Public Service Commission, Cases 26529 and 26559.

APPENDIX A – ROW CALCULATION

Minimum Right-of-Way Width Calculation

Summary

The minimum right-of-way is calculated by determining the NESC minimum required clearance, and the maximum electric and magnetic field strengths allowed by the State of New York. The larger of the two results determines the minimum right-of-way width; minimum width is 120 feet per the electric field requirement.

Detailed Description

This calculation determines the minimum required right-of-way for the Somerset Solar 345 kV overhead transmission gen-tie line as described in the body of the report. This study is based the National Electrical Safety Code (NESC, 2017) and the EPRI Redbook methodology (1982).

The study is in two parts, one based on NESC requirements, and the other based on electric and magnetic field strength requirements.

NESC:

NESC 233A.1.a.(2) states that a conductor displaced from rest by the weather case of a 6 lbs./ft.^2 wind pressure at 60° F shall meet specified horizontal clearance requirements to nearby objects. In the calculation of rights-of-way this is typically taken to mean that the right-of-way (ROW) should be sufficiently wide to allow for the construction of a building abutting the edge of the ROW and still meet required horizontal clearances.

Conductor displacement X_H is calculated as:

$$X_H = (\text{sag})\sin(\Theta)$$

Θ is determined by:

$$\Theta = atan\left(P_W \cdot \frac{d_C}{w_C}\right)$$

where d_C is the conductor diameter, P_W is the wind pressure, and w_C is the conductor unit weight.

The total ROW width is twice the sum of the conductor attachment distance from the alignment centerline, the structure displacement, the conductor displacement under wind, and the required minimum code clearance.

The required code clearance is found from NESC 234C and is calculated to be 10.8 feet under the weather case above. The line sag is 6.9 feet. The structure displacement is assumed to be 2 feet.

$d_C := 1.108\ in$

$w_C := 1.094\ \frac{lbf}{ft}$

$P_W := 6\ \frac{lbf}{ft^2}$

$disp := 2\ ft$

$sag := 6.9\ ft$

$code\_clearance := 10.8\ ft$

$cond\_att := 22\ ft$

$$\Theta := \operatorname{atan}\left(P_W \cdot \frac{d_C}{w_C}\right) = 26.9\ deg$$

$$X_H := sag \cdot \sin(\Theta) = 3.1\ ft$$

$$width_{ROW} := 2 \cdot \left(X_H + disp + code\_clearance + cond\_att\right) = 76\ ft$$

Electric and Magnetic Field Calculation

The transmission line is 3-phase with 120° between phases. The maximum power of the line is given as 125 MW, a power factor of between ±0.95, with a maximum voltage (phase-phase) of 345 kV. This results in a current of:

$pf := 0.95$

$P := 125\ MW$

$V := 345\ kV$

$$i := \frac{P}{pf \cdot V \cdot \sqrt{3}} = 220\ A$$

These inputs were applied to the PLS-CADD calculations. See below for the output, and cross section displays for magnetic and electric fields. The calculations show that while the magnetic field is well under the allowable limit anywhere near the line, the electric field strength exceeds the maximum allowable limit within a distance of 60 feet to either side of the alignment centerline; thus the minimum ROW determined based on electric and magnetic field strength is 120 feet.

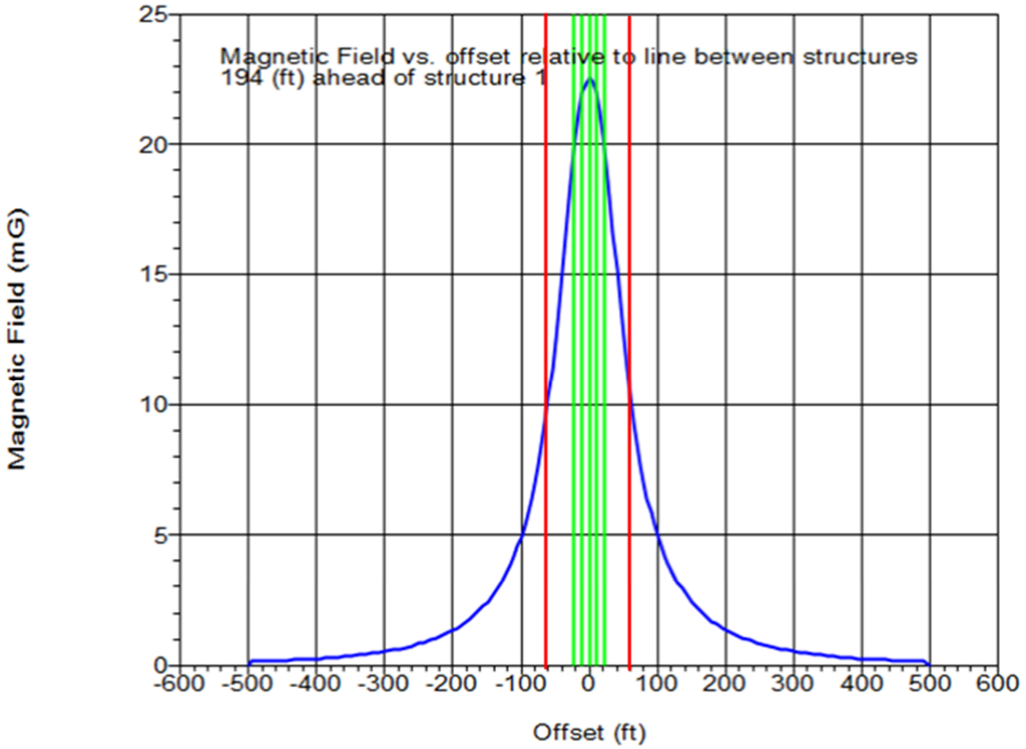
PLS-CADD Version 17.22x64 1:23:40 PM Wednesday, June 29, 2022

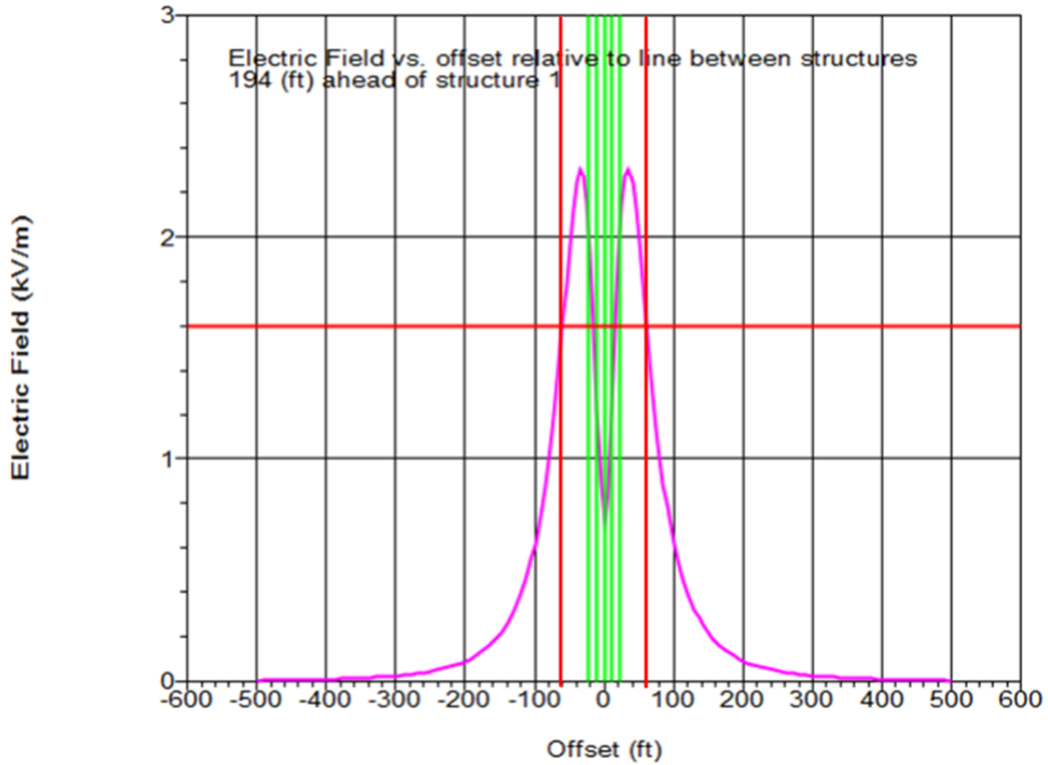
3D EMF Calculation Notes:
  1) Calculations based on the EPRI Red Book methods (3rd Edition, 2005 - 7.4 Calculation of Magnetic Fields and Appendices 7.1 Calculation of Field Ellipse Parameters and 7.6 Electric Field Calculations for 3D Geometry).
  2) All wire positions are modeled at the specified weather case and wind direction. Height above ground determined by the modeled ground TIN.
  3) Only the effects of wires are being analyzed. The effects of structures are not included unless enabled as noted below.
  4) Ground return is being ignored for magnetic field calculations.

Meter height above ground:	3.28	(ft)
Maximum wire distance:	500.00	(ft)
Maximum cable segment size:	9.80	(ft)
Cross section offset +/-:	500.00	(ft)
Result interval:	5.00	(ft)
Electric field limit:	1.60	(kV/m)
Magnetic field limit:	0.00	(mG)
Space potential limit:	0.00	(kV)
Contour Map Spacing:	15	(ft)
Analyzing spans between these structures:	1 - 2	

Section Data for 3D EMF Results:

Section Number	Section Note	Voltage Ph-Ph (kV)	Current (Amps)	Cable Filename	Cable Description	Conductors Per Phase	Bundle Diameter (in)	Cable Radius (in)	Weather Case	Condition	Wind Dir.	WC Temperature (deg F)	Effective Radius (in)
1		345.0	220.0	drake	DRAKE STANDARD ACSR 26/7 795.0 KCMILS	2	9.000	0.554	70 (deg F)	Creep FE	Left	70.000	2.233
2		0.0	0.0	3_8ehs	3/8 7 STRANDS EHS	1	0.000	0.180	15 (deg C)	Creep FE	Left	59.000	0.180
3		0.0	0.0	3_8ehs	3/8 7 STRANDS EHS	1	0.000	0.180	15 (deg C)	Creep FE	Left	59.000	0.180


Magnetic Field vs. offset relative to line between structures
194 (ft) ahead of structure 1
Magnetic Field (mG)
25
20
15
10
5
0
-600 -500 -400 -300 -200 -100 0 100 200 300 400 500 600
Offset (ft)


Electric Field vs. offset relative to line between structures
194 (ft) ahead of structure 1
Electric Field (kV/m)
3
2
1
0
-600 -500 -400 -300 -200 -100 0 100 200 300 400 500 600
Offset (ft)

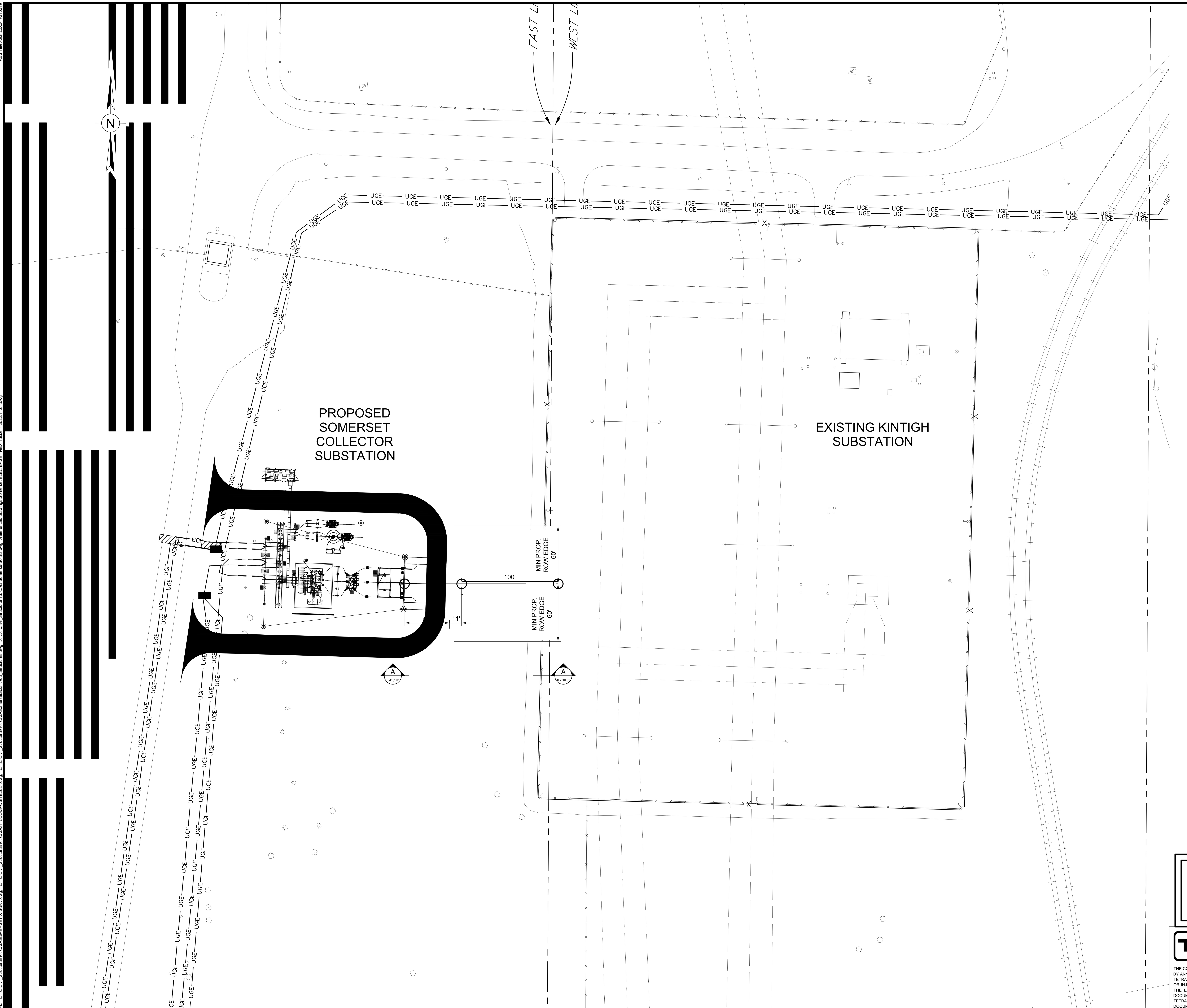
3D EMF Point Results Span from 1 to 2:

Measurement			B					H	EF					Space Potential			
X (ft)	Y (ft)	Z (ft)	Real (mG)	Imaginary (mG)	Angle (deg)	Magnitude (mG)	Polarization Axial Ratio %	Magnitude (A/m)	Real (kV/m)	Imaginary (kV/m)	Angle (deg)	Magnitude (kV/m)	Polarization Axial Ratio %	Real (kV)	Imaginary (kV)	Angle (deg)	Magnitude (kV)
134.5	500.0	3.3	0.000	0.000	-nan(ind)	0.000	-nan(ind)	0.000	0.000	0.000	-nan(ind)	0.000	-nan(ind)	0.000	0.000	-nan(ind)	0.000
134.5	495.0	3.3	0.130	0.069	28.0	0.147	0.2	0.012	0.004	0.000	4.8	0.004	0.2	0.004	-0.000	-4.8	0.004
134.5	490.0	3.3	0.133	0.071	28.0	0.151	0.2	0.012	0.004	0.000	4.6	0.004	0.2	0.004	-0.000	-4.6	0.004
134.5	485.0	3.3	0.137	0.073	28.0	0.155	0.2	0.012	0.005	0.000	4.4	0.005	0.2	0.005	-0.000	-4.4	0.005
134.5	480.0	3.3	0.141	0.075	27.9	0.160	0.2	0.013	0.005	0.000	4.2	0.005	0.2	0.005	-0.000	-4.2	0.005
134.5	475.0	3.3	0.145	0.077	27.9	0.165	0.2	0.013	0.005	0.000	4.0	0.005	0.2	0.005	-0.000	-4.0	0.005
134.5	470.0	3.3	0.150	0.079	27.9	0.169	0.2	0.013	0.005	0.000	3.8	0.005	0.2	0.005	-0.000	-3.8	0.005
134.5	465.0	3.3	0.154	0.082	27.9	0.174	0.2	0.014	0.005	0.000	3.6	0.005	0.2	0.005	-0.000	-3.5	0.005
134.5	460.0	3.3	0.159	0.084	27.9	0.179	0.2	0.014	0.006	0.000	3.3	0.006	0.2	0.006	-0.000	-3.3	0.006
134.5	455.0	3.3	0.163	0.086	27.8	0.185	0.2	0.015	0.006	0.000	3.1	0.006	0.2	0.006	-0.000	-3.1	0.006
134.5	450.0	3.3	0.168	0.089	27.8	0.190	0.2	0.015	0.006	0.000	2.9	0.006	0.2	0.006	-0.000	-2.9	0.006
134.5	445.0	3.3	0.174	0.092	27.8	0.196	0.2	0.016	0.006	0.000	2.7	0.006	0.2	0.006	-0.000	-2.7	0.006
134.5	440.0	3.3	0.179	0.094	27.8	0.202	0.2	0.016	0.007	0.000	2.5	0.007	0.2	0.007	-0.000	-2.5	0.007
134.5	435.0	3.3	0.185	0.097	27.8	0.209	0.2	0.017	0.007	0.000	2.3	0.007	0.2	0.007	-0.000	-2.3	0.007
134.5	430.0	3.3	0.190	0.100	27.7	0.215	0.2	0.017	0.007	0.000	2.1	0.007	0.2	0.007	-0.000	-2.1	0.007
134.5	425.0	3.3	0.196	0.103	27.7	0.222	0.2	0.018	0.007	0.000	1.9	0.007	0.2	0.007	-0.000	-1.9	0.007
134.5	420.0	3.3	0.203	0.107	27.7	0.229	0.3	0.018	0.008	0.000	1.7	0.008	0.2	0.008	-0.000	-1.7	0.008
134.5	415.0	3.3	0.209	0.110	27.7	0.236	0.3	0.019	0.008	0.000	1.5	0.008	0.2	0.008	-0.000	-1.4	0.008
134.5	410.0	3.3	0.216	0.113	27.7	0.244	0.3	0.019	0.008	0.000	1.2	0.008	0.2	0.008	-0.000	-1.2	0.008
134.5	405.0	3.3	0.223	0.117	27.6	0.252	0.3	0.020	0.009	0.000	1.0	0.009	0.2	0.009	-0.000	-1.0	0.009
134.5	400.0	3.3	0.231	0.121	27.6	0.261	0.3	0.021	0.009	0.000	0.8	0.009	0.2	0.009	-0.000	-0.8	0.009
134.5	395.0	3.3	0.239	0.125	27.6	0.269	0.3	0.021	0.010	0.000	0.6	0.010	0.2	0.010	-0.000	-0.6	0.010
134.5	390.0	3.3	0.247	0.129	27.6	0.278	0.3	0.022	0.010	0.000	0.4	0.010	0.2	0.010	-0.000	-0.4	0.010
134.5	385.0	3.3	0.255	0.133	27.5	0.288	0.3	0.023	0.010	0.000	0.2	0.010	0.2	0.010	-0.000	-0.2	0.010
134.5	380.0	3.3	0.264	0.138	27.5	0.298	0.3	0.024	0.011	0.000	0.1	0.011	0.2	0.011	0.000	0.0	0.011
134.5	375.0	3.3	0.274	0.142	27.5	0.308	0.3	0.025	0.011	0.000	0.3	0.011	0.2	0.011	0.000	0.3	0.011
134.5	370.0	3.3	0.283	0.147	27.5	0.319	0.3	0.025	0.012	0.000	0.5	0.012	0.2	0.012	0.000	0.5	0.012
134.5	365.0	3.3	0.294	0.152	27.4	0.331	0.3	0.026	0.013	0.000	0.7	0.013	0.2	0.013	0.000	0.7	0.013
134.5	360.0	3.3	0.304	0.158	27.4	0.343	0.4	0.027	0.013	0.000	0.9	0.013	0.2	0.013	0.000	0.9	0.013
134.5	355.0	3.3	0.315	0.163	27.4	0.355	0.4	0.028	0.014	0.000	1.1	0.014	0.2	0.014	0.000	1.1	0.014
134.5	350.0	3.3	0.327	0.169	27.4	0.368	0.4	0.029	0.014	0.000	1.3	0.014	0.2	0.014	0.000	1.3	0.014
134.5	345.0	3.3	0.339	0.175	27.3	0.382	0.4	0.030	0.015	0.000	1.5	0.015	0.2	0.015	0.000	1.5	0.015
134.5	340.0	3.3	0.352	0.182	27.3	0.396	0.4	0.032	0.016	0.000	1.7	0.016	0.2	0.016	0.000	1.7	0.016
134.5	335.0	3.3	0.366	0.189	27.3	0.411	0.4	0.033	0.017	0.001	1.9	0.017	0.2	0.017	0.001	1.9	0.017
134.5	330.0	3.3	0.380	0.196	27.3	0.427	0.4	0.034	0.018	0.001	2.2	0.018	0.2	0.018	0.001	2.1	0.018
134.5	325.0	3.3	0.395	0.203	27.2	0.444	0.4	0.035	0.019	0.001	2.4	0.019	0.2	0.019	0.001	2.4	0.019
134.5	320.0	3.3	0.410	0.211	27.2	0.461	0.5	0.037	0.020	0.001	2.6	0.020	0.2	0.020	0.001	2.6	0.020
134.5	315.0	3.3	0.427	0.219	27.2	0.480	0.5	0.038	0.021	0.001	2.8	0.021	0.2	0.021	0.001	2.8	0.021
134.5	310.0	3.3	0.444	0.228	27.1	0.499	0.5	0.040	0.022	0.001	3.0	0.022	0.2	0.022	0.001	3.0	0.022
134.5	305.0	3.3	0.462	0.237	27.1	0.519	0.5	0.041	0.023	0.001	3.2	0.023	0.2	0.023	0.001	3.2	0.023
134.5	300.0	3.3	0.482	0.246	27.1	0.541	0.5	0.043	0.024	0.001	3.4	0.024	0.2	0.024	0.001	3.4	0.024
134.5	295.0	3.3	0.502	0.256	27.0	0.563	0.5	0.045	0.026	0.002	3.6	0.026	0.2	0.026	0.002	3.6	0.026
134.5	290.0	3.3	0.523	0.267	27.0	0.587	0.6	0.047	0.027	0.002	3.8	0.027	0.2	0.027	0.002	3.8	0.027
134.5	285.0	3.3	0.546	0.278	27.0	0.612	0.6	0.049	0.029	0.002	4.0	0.029	0.2	0.029	0.002	4.0	0.029
134.5	280.0	3.3	0.569	0.289	26.9	0.639	0.6	0.051	0.031	0.002	4.2	0.031	0.2	0.031	0.002	4.2	0.031
134.5	275.0	3.3	0.595	0.301	26.9	0.667	0.6	0.053	0.033	0.003	4.4	0.033	0.2	0.033	0.003	4.4	0.033
134.5	270.0	3.3	0.621	0.314	26.8	0.696	0.7	0.055	0.035	0.003	4.6	0.035	0.2	0.035	0.003	4.6	0.035
134.5	265.0	3.3	0.649	0.328	26.8	0.727	0.7	0.058	0.037	0.003	4.8	0.037	0.2	0.037	0.003	4.8	0.037
134.5	260.0	3.3	0.679	0.343	26.8	0.761	0.7	0.061	0.039	0.003	5.0	0.039	0.2	0.039	0.003	5.0	0.039
134.5	255.0	3.3	0.711	0.358	26.7	0.796	0.7	0.063	0.042	0.004	5.2	0.042	0.2	0.042	0.004	5.2	0.042
134.5	250.0	3.3	0.744	0.374	26.7	0.833	0.8	0.066	0.045	0.004	5.4	0.045	0.2	0.045	0.004	5.4	0.045
134.5	245.0	3.3	0.779	0.391	26.6	0.872	0.8	0.069	0.048	0.005	5.6	0.048	0.2	0.048	0.005	5.6	0.048
134.5	240.0	3.3	0.817	0.409	26.6	0.914	0.8	0.073	0.051	0.005	5.8	0.051	0.2	0.051	0.005	5.8	0.051
134.5	235.0	3.3	0.857	0.428	26.6	0.958	0.9	0.076	0.054	0.006	6.0	0.055	0.2	0.054	0.006	6.0	0.055
134.5	230.0	3.3	0.900	0.449	26.5	1.006	0.9	0.080	0.058	0.006	6.2	0.059	0.2	0.058	0.006	6.1	0.059
134.5	225.0	3.3	0.945	0.470	26.5	1.056	1.0	0.084	0.063	0.007	6.3	0.063	0.2	0.063	0.007	6.3	0.063
134.5	220.0	3.3	0.994	0.493	26.4	1.109	1.0	0.088	0.067	0.008	6.5	0.068	0.2	0.067	0.008	6.5	0.068
134.5	215.0	3.3	1.045	0.518	26.4	1.166	1.1	0.093	0.072	0.008	6.7	0.073	0.2	0.072	0.008	6.7	0.073
134.5	210.0	3.3	1.100	0.544	26.3	1.227	1.1	0.098	0.078	0.009	6.9	0.078	0.2	0.078	0.009	6.9	0.078
134.5	205.0	3.3	1.159	0.572	26.3	1.292	1.2	0.103	0.084	0.010	7.1	0.084	0.2	0.084	0.010	7.0	0.084
134.5	200.0	3.3	1.222	0.601	26.2	1.362	1.2	0.108	0.090	0.011	7.2	0.091	0.2	0.090	0.011	7.2	0.091
134.5	195.0	3.3	1.290	0.633	26.1	1.437	1.3	0.114	0.098	0.013	7.4	0.099	0.2	0.098	0.013	7.4	0.098
134.5	190.0	3.3	1.362	0.667	26.1	1.517	1.4	0.121	0.106	0.014	7.6	0.107	0.2	0.106	0.014	7.6	0.107
134.5	185.0	3.3	1.440	0.703	26.0	1.602	1.5	0.128	0.115	0.016	7.7	0.116	0.2	0.115	0.016	7.7	0.116
134.5	180.0	3.3	1.524	0.742	26.0	1.695	1.6	0.135	0.124	0.017	7.9	0.126	0.2	0.124	0.017	7.9	0.126
134.5	175.0	3.3	1.614	0.783	25.9	1.794	1.7	0.143	0.135	0.019	8.0	0.137	0.2	0.135	0.019	8.0	0.137
134.5	170.0	3.3	1.712	0.828	25.8	1.901	1.8	0.151	0.147	0.021	8.2	0.149	0.2	0.147	0.021	8.2	0.149
134.5	165.0	3.3	1.817	0.876	25.7	2.017	1.9	0.160	0.161	0.024	8.4	0.163	0.2	0.161	0.024	8.3	0.163
134.5	160.0	3.3	1.931	0.927	25.7	2.142	2.0	0.170	0.176	0.026	8.5	0.178	0.2	0.176	0.026	8.5	0.178

134.5	155.0	3.3	2.054	0.983	25.6	2.278	2.1	0.181	0.193	0.029	8.6	0.195	0.2	0.193	0.029	8.6	0.195	
134.5	150.0	3.3	2.189	1.043	25.5	2.425	2.3	0.193	0.212	0.033	8.8	0.214	0.2	0.212	0.033	8.8	0.214	
134.5	145.0	3.3	2.335	1.108	25.4	2.585	2.4	0.206	0.233	0.037	8.9	0.236	0.2	0.233	0.036	8.9	0.235	
134.5	140.0	3.3	2.495	1.179	25.3	2.760	2.6	0.220	0.257	0.041	9.1	0.260	0.1	0.256	0.041	9.0	0.260	
134.5	135.0	3.3	2.670	1.256	25.2	2.951	2.8	0.235	0.284	0.046	9.2	0.287	0.1	0.283	0.046	9.2	0.287	
134.5	130.0	3.3	2.862	1.339	25.1	3.160	3.0	0.251	0.314	0.051	9.3	0.318	0.1	0.314	0.051	9.3	0.318	
134.5	125.0	3.3	3.073	1.431	25.0	3.390	3.2	0.270	0.349	0.058	9.4	0.353	0.1	0.348	0.058	9.4	0.353	
134.5	120.0	3.3	3.306	1.530	24.8	3.643	3.5	0.290	0.388	0.065	9.5	0.393	0.1	0.387	0.065	9.5	0.393	
134.5	115.0	3.3	3.563	1.640	24.7	3.922	3.8	0.312	0.432	0.074	9.7	0.439	0.1	0.432	0.073	9.7	0.438	
134.5	110.0	3.3	3.848	1.760	24.6	4.231	4.1	0.337	0.483	0.083	9.8	0.491	0.1	0.483	0.083	9.8	0.490	
134.5	105.0	3.3	4.166	1.892	24.4	4.575	4.4	0.364	0.542	0.094	9.9	0.550	0.1	0.541	0.094	9.9	0.549	
134.5	100.0	3.3	4.520	2.039	24.3	4.958	4.8	0.395	0.609	0.107	10.0	0.618	0.1	0.608	0.107	10.0	0.617	
134.5	95.0	3.3	4.916	2.201	24.1	5.386	5.3	0.429	0.685	0.122	10.1	0.696	0.1	0.684	0.122	10.1	0.695	
134.5	90.0	3.3	5.360	2.381	24.0	5.865	5.8	0.467	0.772	0.140	10.3	0.785	0.2	0.771	0.139	10.3	0.784	
134.5	85.0	3.3	5.859	2.583	23.8	6.403	6.3	0.510	0.872	0.160	10.4	0.887	0.2	0.871	0.160	10.4	0.885	
134.5	80.0	3.3	6.421	2.808	23.6	7.008	7.0	0.558	0.985	0.184	10.6	1.002	0.2	0.984	0.184	10.6	1.001	
134.5	75.0	3.3	7.054	3.061	23.5	7.690	7.7	0.612	1.113	0.212	10.8	1.133	0.3	1.111	0.211	10.8	1.131	
134.5	70.0	3.3	7.767	3.346	23.3	8.457	8.5	0.673	1.256	0.245	11.0	1.280	0.3	1.254	0.244	11.0	1.277	
134.5	65.0	3.3	8.567	3.667	23.2	9.319	9.4	0.742	1.413	0.284	11.3	1.441	0.4	1.410	0.283	11.4	1.438	
134.5	**60.0**	**3.3**	**9.461**	**4.031**	**23.1**	**10.284**	**10.4**	**0.818**	**1.580**	**0.329**	**11.8**	**1.614**	**0.6**	**1.576**	**0.329**	**11.8**	**1.610**	**EF exceeds limit NG**
134.5	**55.0**	**3.3**	**10.452**	**4.442**	**23.0**	**11.357**	**11.6**	**0.904**	**1.753**	**0.383**	**12.3**	**1.794**	**0.8**	**1.747**	**0.383**	**12.4**	**1.788**	**EF exceeds limit NG**
134.5	**50.0**	**3.3**	**11.535**	**4.909**	**23.1**	**12.536**	**13.0**	**0.998**	**1.919**	**0.447**	**13.1**	**1.970**	**1.0**	**1.912**	**0.446**	**13.1**	**1.963**	**EF exceeds limit NG**
134.5	**45.0**	**3.3**	**12.696**	**5.436**	**23.2**	**13.811**	**14.5**	**1.099**	**2.064**	**0.520**	**14.1**	**2.128**	**1.4**	**2.054**	**0.519**	**14.2**	**2.119**	**EF exceeds limit NG**
134.5	**40.0**	**3.3**	**13.909**	**6.030**	**23.4**	**15.160**	**16.2**	**1.206**	**2.166**	**0.603**	**15.6**	**2.248**	**1.9**	**2.153**	**0.601**	**15.6**	**2.235**	**EF exceeds limit NG**
134.5	**35.0**	**3.3**	**15.128**	**6.694**	**23.9**	**16.543**	**18.1**	**1.316**	**2.198**	**0.694**	**17.5**	**2.305**	**2.6**	**2.182**	**0.691**	**17.6**	**2.289**	**EF exceeds limit NG**
134.5	**30.0**	**3.3**	**16.297**	**7.428**	**24.5**	**17.910**	**20.1**	**1.425**	**2.137**	**0.787**	**20.2**	**2.277**	**3.7**	**2.116**	**0.783**	**20.3**	**2.257**	**EF exceeds limit NG**
134.5	**25.0**	**3.3**	**17.344**	**8.226**	**25.4**	**19.196**	**22.2**	**1.528**	**1.962**	**0.873**	**24.0**	**2.148**	**5.1**	**1.936**	**0.868**	**24.1**	**2.121**	**EF exceeds limit NG**
134.5	**20.0**	**3.3**	**18.203**	**9.070**	**26.5**	**20.337**	**24.4**	**1.618**	**1.669**	**0.936**	**29.3**	**1.913**	**7.3**	**1.634**	**0.928**	**29.6**	**1.879**	**EF exceeds limit NG**
134.5	15.0	3.3	18.817	9.931	27.8	21.277	26.4	1.693	1.273	0.955	36.9	1.591	10.9	1.225	0.944	37.6	1.546	
134.5	10.0	3.3	19.153	10.768	29.3	21.973	28.0	1.749	0.816	0.907	48.0	1.220	17.9	0.738	0.891	50.4	1.156	
134.5	5.0	3.3	19.206	11.525	31.0	22.399	29.2	1.782	0.405	0.775	62.4	0.875	34.6	0.216	0.749	73.9	0.780	
134.5	-0.0	3.3	18.992	12.142	32.6	22.542	29.5	1.794	0.443	0.558	51.5	0.713	61.4	-0.296	0.512	-60.0	0.591	
134.5	-5.0	3.3	18.544	12.562	34.1	22.399	29.2	1.782	0.819	0.307	20.6	0.875	34.6	-0.757	0.188	-13.9	0.780	
134.5	-10.0	3.3	17.900	12.743	35.4	21.973	28.0	1.749	1.177	0.323	15.4	1.220	17.9	-1.140	-0.194	9.6	1.156	
134.5	-15.0	3.3	17.096	12.666	36.5	21.277	26.4	1.693	1.454	0.646	24.0	1.591	10.9	-1.430	-0.589	22.4	1.546	
134.5	**-20.0**	**3.3**	**16.167**	**12.338**	**37.3**	**20.337**	**24.4**	**1.618**	**1.639**	**0.987**	**31.1**	**1.913**	**7.3**	**-1.621**	**-0.951**	**30.4**	**1.879**	**EF exceeds limit NG**
134.5	**-25.0**	**3.3**	**15.145**	**11.794**	**37.9**	**19.196**	**22.2**	**1.528**	**1.733**	**1.268**	**36.2**	**2.148**	**5.1**	**-1.719**	**-1.243**	**35.9**	**2.121**	**EF exceeds limit NG**
134.5	**-30.0**	**3.3**	**14.066**	**11.086**	**38.2**	**17.910**	**20.1**	**1.425**	**1.748**	**1.460**	**39.9**	**2.277**	**3.7**	**-1.737**	**-1.441**	**39.7**	**2.257**	**EF exceeds limit NG**
134.5	**-35.0**	**3.3**	**12.966**	**10.274**	**38.4**	**16.543**	**18.1**	**1.316**	**1.699**	**1.559**	**42.5**	**2.305**	**2.6**	**-1.690**	**-1.545**	**42.4**	**2.289**	**EF exceeds limit NG**
134.5	**-40.0**	**3.3**	**11.880**	**9.417**	**38.4**	**15.160**	**16.2**	**1.206**	**1.604**	**1.575**	**44.5**	**2.248**	**1.9**	**-1.597**	**-1.564**	**44.4**	**2.235**	**EF exceeds limit NG**
134.5	**-45.0**	**3.3**	**10.837**	**8.561**	**38.3**	**13.811**	**14.5**	**1.099**	**1.482**	**1.528**	**45.9**	**2.128**	**1.4**	**-1.476**	**-1.520**	**45.8**	**2.119**	**EF exceeds limit NG**
134.5	**-50.0**	**3.3**	**9.859**	**7.743**	**38.1**	**12.536**	**13.0**	**0.998**	**1.346**	**1.439**	**46.9**	**1.970**	**1.0**	**-1.342**	**-1.433**	**46.9**	**1.963**	**EF exceeds limit NG**
134.5	**-55.0**	**3.3**	**8.957**	**6.982**	**37.9**	**11.357**	**11.6**	**0.904**	**1.208**	**1.326**	**47.7**	**1.794**	**0.8**	**-1.205**	**-1.322**	**47.6**	**1.788**	**EF exceeds limit NG**
134.5	**-60.0**	**3.3**	**8.137**	**6.289**	**37.7**	**10.284**	**10.4**	**0.818**	**1.075**	**1.204**	**48.2**	**1.614**	**0.6**	**-1.073**	**-1.201**	**48.2**	**1.610**	**EF exceeds limit NG**
134.5	-65.0	3.3	7.397	5.667	37.5	9.319	9.4	0.742	0.952	1.082	48.7	1.441	0.4	-0.950	-1.079	48.6	1.438	
134.5	-70.0	3.3	6.735	5.114	37.2	8.457	8.5	0.673	0.840	0.966	49.0	1.280	0.3	-0.838	-0.964	49.0	1.277	
134.5	-75.0	3.3	6.144	4.623	37.0	7.690	7.7	0.612	0.740	0.858	49.2	1.133	0.3	-0.739	-0.857	49.2	1.131	
134.5	-80.0	3.3	5.617	4.190	36.7	7.008	7.0	0.558	0.652	0.761	49.4	1.002	0.2	-0.651	-0.760	49.4	1.001	
134.5	-85.0	3.3	5.148	3.808	36.5	6.403	6.3	0.510	0.575	0.675	49.6	0.887	0.2	-0.574	-0.674	49.6	0.885	
134.5	-90.0	3.3	4.728	3.470	36.3	5.865	5.8	0.467	0.507	0.599	49.7	0.785	0.2	-0.506	-0.598	49.7	0.784	
134.5	-95.0	3.3	4.353	3.172	36.1	5.386	5.3	0.429	0.448	0.532	49.9	0.696	0.1	-0.448	-0.531	49.9	0.695	
134.5	-100.0	3.3	4.017	2.906	35.9	4.958	4.8	0.395	0.397	0.473	50.0	0.618	0.1	-0.397	-0.473	50.0	0.617	
134.5	-105.0	3.3	3.715	2.670	35.7	4.575	4.4	0.364	0.353	0.422	50.1	0.550	0.1	-0.352	-0.422	50.1	0.549	
134.5	-110.0	3.3	3.443	2.460	35.5	4.231	4.1	0.337	0.314	0.377	50.2	0.491	0.1	-0.314	-0.377	50.2	0.490	
134.5	-115.0	3.3	3.197	2.271	35.4	3.922	3.8	0.312	0.280	0.338	50.3	0.439	0.1	-0.280	-0.337	50.3	0.438	
134.5	-120.0	3.3	2.975	2.102	35.2	3.643	3.5	0.290	0.250	0.303	50.5	0.393	0.1	-0.250	-0.303	50.5	0.393	
134.5	-125.0	3.3	2.773	1.949	35.1	3.390	3.2	0.270	0.224	0.273	50.6	0.353	0.1	-0.224	-0.273	50.6	0.353	
134.5	-130.0	3.3	2.589	1.812	35.0	3.160	3.0	0.251	0.202	0.246	50.7	0.318	0.1	-0.201	-0.246	50.7	0.318	
134.5	-135.0	3.3	2.421	1.687	34.9	2.951	2.8	0.235	0.181	0.223	50.8	0.287	0.1	-0.181	-0.222	50.8	0.287	
134.5	-140.0	3.3	2.267	1.573	34.8	2.760	2.6	0.220	0.164	0.202	51.0	0.260	0.1	-0.164	-0.202	51.0	0.260	
134.5	-145.0	3.3	2.127	1.470	34.6	2.585	2.4	0.206	0.148	0.183	51.1	0.236	0.2	-0.148	-0.183	51.1	0.235	
134.5	-150.0	3.3	1.997	1.375	34.6	2.425	2.3	0.193	0.134	0.167	51.2	0.214	0.2	-0.134	-0.167	51.2	0.214	
134.5	-155.0	3.3	1.878	1.289	34.5	2.278	2.1	0.181	0.122	0.152	51.4	0.195	0.2	-0.122	-0.152	51.4	0.195	
134.5	-160.0	3.3	1.768	1.209	34.4	2.142	2.0	0.170	0.111	0.139	51.5	0.178	0.2	-0.111	-0.139	51.5	0.178	
134.5	-165.0	3.3	1.666	1.136	34.3	2.017	1.9	0.160	0.101	0.128	51.6	0.163	0.2	-0.101	-0.127	51.7	0.163	
134.5	-170.0	3.3	1.572	1.069	34.2	1.901	1.8	0.151	0.092	0.117	51.8	0.149	0.2	-0.092	-0.117	51.8	0.149	
134.5	-175.0	3.3	1.485	1.007	34.1	1.794	1.7	0.143	0.084	0.108	52.0	0.137	0.2	-0.084	-0.108	52.0	0.137	
134.5	-180.0	3.3	1.404	0.949	34.1	1.695	1.6	0.135	0.077	0.099	52.1	0.126	0.2	-0.077	-0.099	52.1	0.126	
134.5	-185.0	3.3	1.329	0.896	34.0	1.602	1.5	0.128	0.071	0.091	52.3	0.116	0.2	-0.071	-0.091	52.3	0.116	
134.5	-190.0	3.3	1.258	0.847	33.9	1.517	1.4	0.121	0.065	0.085	52.4	0.107	0.2	-0.065	-0.085	52.4	0.107	
134.5	-195.0	3.3	1.193	0.801	33.9	1.437	1.3	0.114	0.060	0.078	52.6	0.099	0.2	-0.060	-0.078	52.6	0.098	
134.5	-200.0	3.3	1.132	0.758	33.8	1.362	1.2	0.108	0.055	0.073	52.8	0.091	0.2	-0.055	-0.073	52.8	0.091	
134.5	-205.0	3.3	1.075	0.718	33.8	1.292	1.2	0.103	0.051	0.067	52.9	0.084	0.2	-0.051	-0.067	53.0	0.084	
134.5	-210.0	3.3	1.021	0.681	33.7	1.227	1.1	0.098	0.047	0.063	53.1	0.078	0.2	-0.047	-0.063	53.1	0.078	
134.5	-215.0	3.3	0.971	0.646	33.6	1.166	1.1	0.093	0.043	0.058	53.3	0.073	0.2	-0.043	-0.058	53.3	0.073	

134.5	-220.0	3.3	0.924	0.614	33.6	1.109	1.0	0.088	0.040	0.054	53.5	0.068	0.2	-0.040	-0.054	53.5	0.068
134.5	-225.0	3.3	0.880	0.583	33.5	1.056	1.0	0.084	0.037	0.051	53.7	0.063	0.2	-0.037	-0.051	53.7	0.063
134.5	-230.0	3.3	0.839	0.555	33.5	1.006	0.9	0.080	0.035	0.047	53.9	0.059	0.2	-0.035	-0.047	53.9	0.059
134.5	-235.0	3.3	0.800	0.528	33.4	0.958	0.9	0.076	0.032	0.044	54.0	0.055	0.2	-0.032	-0.044	54.0	0.055
134.5	-240.0	3.3	0.763	0.503	33.4	0.914	0.8	0.073	0.030	0.042	54.2	0.051	0.2	-0.030	-0.041	54.2	0.051
134.5	-245.0	3.3	0.728	0.480	33.4	0.872	0.8	0.069	0.028	0.039	54.4	0.048	0.2	-0.028	-0.039	54.4	0.048
134.5	-250.0	3.3	0.696	0.457	33.3	0.833	0.8	0.066	0.026	0.037	54.6	0.045	0.2	-0.026	-0.037	54.6	0.045
134.5	-255.0	3.3	0.665	0.436	33.3	0.796	0.7	0.063	0.024	0.034	54.8	0.042	0.2	-0.024	-0.034	54.8	0.042
134.5	-260.0	3.3	0.636	0.417	33.2	0.761	0.7	0.061	0.023	0.032	55.0	0.039	0.2	-0.023	-0.032	55.0	0.039
134.5	-265.0	3.3	0.609	0.398	33.2	0.727	0.7	0.058	0.021	0.030	55.2	0.037	0.2	-0.021	-0.030	55.2	0.037
134.5	-270.0	3.3	0.583	0.381	33.2	0.696	0.7	0.055	0.020	0.029	55.4	0.035	0.2	-0.020	-0.029	55.4	0.035
134.5	-275.0	3.3	0.558	0.364	33.1	0.667	0.6	0.053	0.019	0.027	55.6	0.033	0.2	-0.018	-0.027	55.6	0.033
134.5	-280.0	3.3	0.535	0.349	33.1	0.639	0.6	0.051	0.017	0.026	55.8	0.031	0.2	-0.017	-0.025	55.8	0.031
134.5	-285.0	3.3	0.513	0.334	33.0	0.612	0.6	0.049	0.016	0.024	56.0	0.029	0.2	-0.016	-0.024	56.0	0.029
134.5	-290.0	3.3	0.492	0.320	33.0	0.587	0.6	0.047	0.015	0.023	56.2	0.027	0.2	-0.015	-0.023	56.2	0.027
134.5	-295.0	3.3	0.473	0.307	33.0	0.563	0.5	0.045	0.014	0.022	56.4	0.026	0.2	-0.014	-0.022	56.4	0.026
134.5	-300.0	3.3	0.454	0.294	32.9	0.541	0.5	0.043	0.013	0.020	56.6	0.024	0.2	-0.013	-0.020	56.6	0.024
134.5	-305.0	3.3	0.436	0.282	32.9	0.519	0.5	0.041	0.013	0.019	56.8	0.023	0.2	-0.013	-0.019	56.8	0.023
134.5	-310.0	3.3	0.419	0.271	32.9	0.499	0.5	0.040	0.012	0.018	57.0	0.022	0.2	-0.012	-0.018	57.0	0.022
134.5	-315.0	3.3	0.403	0.260	32.8	0.480	0.5	0.038	0.011	0.017	57.2	0.021	0.2	-0.011	-0.017	57.2	0.021
134.5	-320.0	3.3	0.388	0.250	32.8	0.461	0.5	0.037	0.011	0.017	57.4	0.020	0.2	-0.011	-0.017	57.4	0.020
134.5	-325.0	3.3	0.373	0.240	32.8	0.444	0.4	0.035	0.010	0.016	57.6	0.019	0.2	-0.010	-0.016	57.6	0.019
134.5	-330.0	3.3	0.359	0.231	32.7	0.427	0.4	0.034	0.009	0.015	57.9	0.018	0.2	-0.009	-0.015	57.9	0.018
134.5	-335.0	3.3	0.346	0.222	32.7	0.411	0.4	0.033	0.009	0.014	58.1	0.017	0.2	-0.009	-0.014	58.1	0.017
134.5	-340.0	3.3	0.334	0.214	32.7	0.396	0.4	0.032	0.008	0.014	58.3	0.016	0.2	-0.008	-0.014	58.3	0.016
134.5	-345.0	3.3	0.322	0.206	32.7	0.382	0.4	0.030	0.008	0.013	58.5	0.015	0.2	-0.008	-0.013	58.5	0.015
134.5	-350.0	3.3	0.310	0.199	32.6	0.368	0.4	0.029	0.008	0.012	58.7	0.014	0.2	-0.008	-0.012	58.7	0.014
134.5	-355.0	3.3	0.299	0.191	32.6	0.355	0.4	0.028	0.007	0.012	58.9	0.014	0.2	-0.007	-0.012	58.9	0.014
134.5	-360.0	3.3	0.289	0.185	32.6	0.343	0.4	0.027	0.007	0.011	59.1	0.013	0.2	-0.007	-0.011	59.1	0.013
134.5	-365.0	3.3	0.279	0.178	32.6	0.331	0.3	0.026	0.006	0.011	59.3	0.013	0.2	-0.006	-0.011	59.3	0.013
134.5	-370.0	3.3	0.269	0.172	32.5	0.319	0.3	0.025	0.006	0.010	59.5	0.012	0.2	-0.006	-0.010	59.5	0.012
134.5	-375.0	3.3	0.260	0.166	32.5	0.308	0.3	0.025	0.006	0.010	59.7	0.011	0.2	-0.006	-0.010	59.7	0.011
134.5	-380.0	3.3	0.251	0.160	32.5	0.298	0.3	0.024	0.005	0.009	60.0	0.011	0.2	-0.005	-0.009	60.0	0.011
134.5	-385.0	3.3	0.243	0.155	32.5	0.288	0.3	0.023	0.005	0.009	60.2	0.010	0.2	-0.005	-0.009	60.2	0.010
134.5	-390.0	3.3	0.235	0.149	32.4	0.278	0.3	0.022	0.005	0.009	60.4	0.010	0.2	-0.005	-0.009	60.4	0.010
134.5	-395.0	3.3	0.227	0.144	32.4	0.269	0.3	0.021	0.005	0.008	60.6	0.010	0.2	-0.005	-0.008	60.6	0.010
134.5	-400.0	3.3	0.220	0.140	32.4	0.261	0.3	0.021	0.004	0.008	60.8	0.009	0.2	-0.004	-0.008	60.8	0.009
134.5	-405.0	3.3	0.213	0.135	32.4	0.252	0.3	0.020	0.004	0.008	61.0	0.009	0.2	-0.004	-0.008	61.0	0.009
134.5	-410.0	3.3	0.206	0.131	32.3	0.244	0.3	0.019	0.004	0.007	61.2	0.008	0.2	-0.004	-0.007	61.2	0.008
134.5	-415.0	3.3	0.200	0.126	32.3	0.236	0.3	0.019	0.004	0.007	61.4	0.008	0.2	-0.004	-0.007	61.4	0.008
134.5	-420.0	3.3	0.194	0.122	32.3	0.229	0.3	0.018	0.004	0.007	61.7	0.008	0.2	-0.004	-0.007	61.7	0.008
134.5	-425.0	3.3	0.188	0.119	32.3	0.222	0.2	0.018	0.003	0.007	61.9	0.007	0.2	-0.003	-0.006	61.9	0.007
134.5	-430.0	3.3	0.182	0.115	32.3	0.215	0.2	0.017	0.003	0.006	62.1	0.007	0.2	-0.003	-0.006	62.1	0.007
134.5	-435.0	3.3	0.176	0.111	32.2	0.209	0.2	0.017	0.003	0.006	62.3	0.007	0.2	-0.003	-0.006	62.3	0.007
134.5	-440.0	3.3	0.171	0.108	32.2	0.202	0.2	0.016	0.003	0.006	62.5	0.007	0.2	-0.003	-0.006	62.5	0.007
134.5	-445.0	3.3	0.166	0.105	32.2	0.196	0.2	0.016	0.003	0.006	62.7	0.006	0.2	-0.003	-0.006	62.7	0.006
134.5	-450.0	3.3	0.161	0.101	32.2	0.190	0.2	0.015	0.003	0.005	62.9	0.006	0.2	-0.003	-0.005	62.9	0.006
134.5	-455.0	3.3	0.157	0.098	32.2	0.185	0.2	0.015	0.003	0.005	63.1	0.006	0.2	-0.003	-0.005	63.1	0.006
134.5	-460.0	3.3	0.152	0.095	32.1	0.179	0.2	0.014	0.003	0.005	63.3	0.006	0.2	-0.003	-0.005	63.3	0.006
134.5	-465.0	3.3	0.148	0.093	32.1	0.174	0.2	0.014	0.002	0.005	63.5	0.005	0.2	-0.002	-0.005	63.5	0.005
134.5	-470.0	3.3	0.143	0.090	32.1	0.169	0.2	0.013	0.002	0.005	63.8	0.005	0.2	-0.002	-0.005	63.8	0.005
134.5	-475.0	3.3	0.139	0.087	32.1	0.165	0.2	0.013	0.002	0.004	64.0	0.005	0.2	-0.002	-0.004	64.0	0.005
134.5	-480.0	3.3	0.136	0.085	32.1	0.160	0.2	0.013	0.002	0.004	64.2	0.005	0.2	-0.002	-0.004	64.2	0.005
134.5	-485.0	3.3	0.132	0.082	32.0	0.155	0.2	0.012	0.002	0.004	64.4	0.005	0.2	-0.002	-0.004	64.4	0.005
134.5	-490.0	3.3	0.128	0.080	32.0	0.151	0.2	0.012	0.002	0.004	64.6	0.004	0.2	-0.002	-0.004	64.6	0.004
134.5	-495.0	3.3	0.125	0.078	32.0	0.147	0.2	0.012	0.002	0.004	64.8	0.004	0.2	-0.002	-0.004	64.8	0.004
134.5	-500.0	3.3	0.000	0.000	-nan(ind)	0.000	-nan(ind)	0.000	0.000	0.000	-nan(ind)	0.000	-nan(ind)	0.000	0.000	-nan(ind)	0.000

APPENDIX B – SOMERSET SOLAR 345 KV TRANSMISSION LINE DESIGN



NOTES

1. DESIGN IS PRELIMINARY.
2. COLLECTOR SYSTEM SUBSTATION LOCATION AND SCALE SHOWN IS IN BEST APPROXIMATION.
3. PER ASSUMPTIONS LOG (REVIEWED BY AES), KINTIGH STATION WILL BE EXPANDED TO ACCOMMODATE GEN-TIE INTERCONNECTION. PROPOSED FENCELINE LOCATION IS ASSUMED TO BE 17'-0" FROM THE TRANSMISSION LINE STRUCTURE.
4. C GEN-TIE SCOPE LINE OF DEMARACTION IS THE DEADEND CABLE CONNECTIONS ON COLLECTOR SIDE OF STRUCTURE. JUMPERS AND CONNECTION TO KINITGH STATION ARE BY OTHERS.

LEGEND

- 345kV COLLECTOR SUBSTATION TAKE-OFF
- 345kV H-FRAME STRUCTURE
- 345kV KINTIGH SUBSTATION TAKE-OFF
- COLLECTOR SUBSTATION FENCE
- GEN-TIE CENTERLINE (795 KCMIL 26/7 ACSR "DRAKE")

REFERENCE DRAWINGS

HV-P.01.01 - 345/34.5kV SUBSTATION GENERAL PLAN

TL-P.01.01 - 345kV GEN-TIE TRANSMISSION LINE ELEVATION VIEW

TL-P.02.01 - 345kV GEN-TIE TRANSMISSION LINE WOOD H-FRAME FRAMING DRAWING

PRELIMINARY
NOT FOR CONSTRUCTION

TETRA TECH

DOCUMENT CONTROL NUMBER
705-2161940300-DWG-S0001-E

aes
AES CLEAN ENERGY DEVELOPMENT, LLC
292 MADISON AVENUE, 15TH FLOOR,
NEW YORK, NY 10017

TETRA TECH

KEY PLAN:

REVISIONS:

NO.	DATE	DESCRIPTION
A	07/22/2022	94-C SUBMITTAL
B	07/29/2022	94-C SUBMITTAL
C	08/04/2022	94-C SUBMITTAL
D	12/12/2022	IFP
E	02/17/2023	IFP RESUBMITTAL

PROJECT TITLE:

SOMERSET SOLAR PROJECT

PROJECT LOCATION:

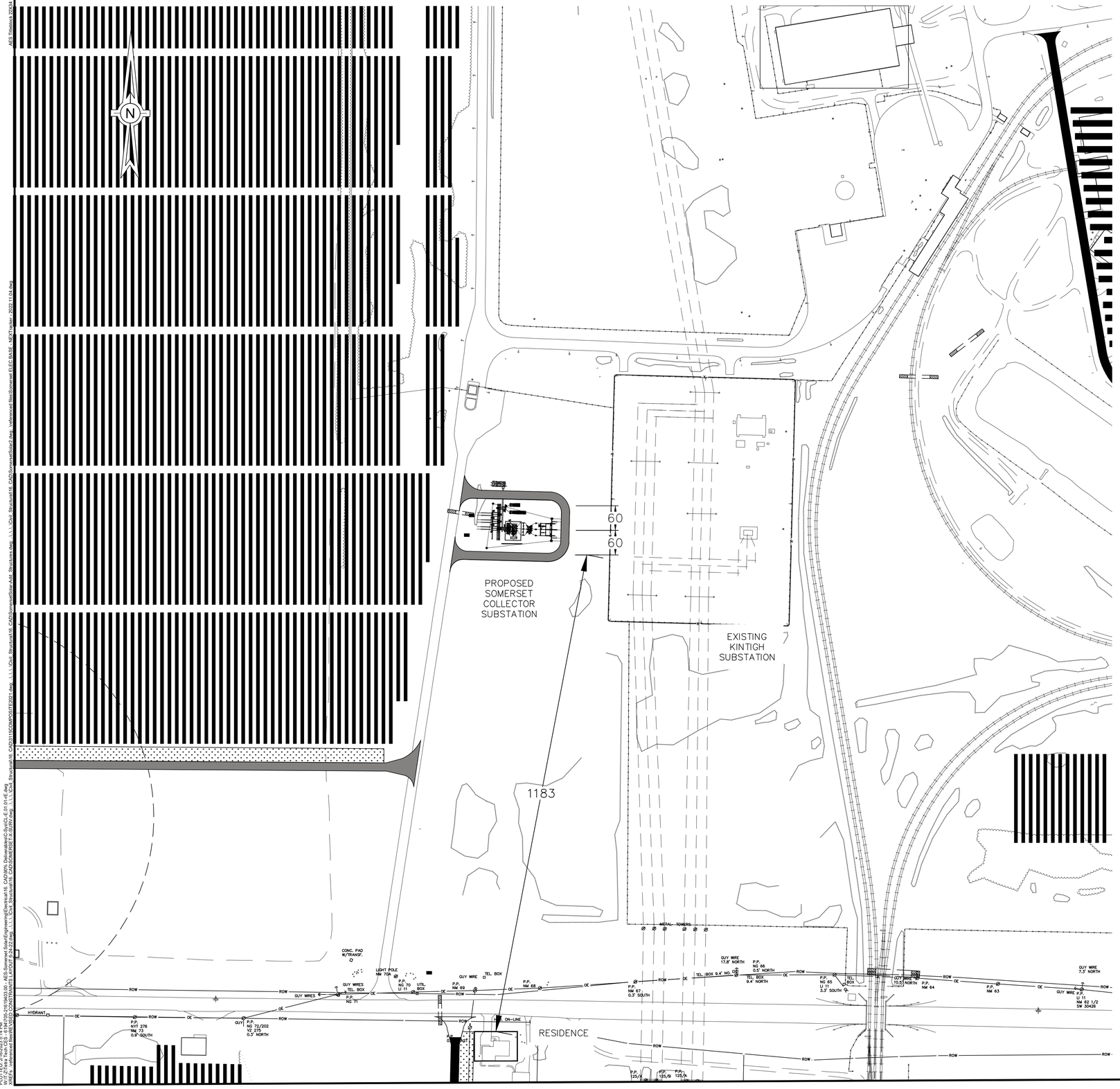
LAKE ROAD
SOMERSET, NY

SHEET TITLE & DESCRIPTION:

345kV GEN-TIE TRANSMISSION LINE

ROUTE MAP

PROJ NUM:	SU20.0012
DES:	HAMDI GATO
DWN:	HAMDI GATO
CHK:	JON LEMON, P.E.
APV:	JON LEMON, P.E.
DATE:	07/22/2022
SCALE:	N.T.S
SHEET NO:	TL-P.00.01
REV:	E



NOTES

1. ALL DIMENSIONS IN FEET.

REFERENCE DRAWINGS

1. TL–P.00.01
2. PV–E.01.01

AES CLEAN ENERGY DEVELOPMENT, LLC
292 MADISON AVENUE, 15TH FLOOR,
NEW YORK, NY 10017

TETRA TECH

PE STAMP:

KEY PLAN:

REVISIONS:

NO.	DATE	DESCRIPTION
A	07/22/2022	94-C PERMIT
B	08/02/2022	94-C SUBMITTAL
C	08/04/2022	94-C SUBMITTAL
D	12/12/2022	IFP
E	02/17/2023	IFP RESUBMITTAL

PROJECT TITLE:

SOMERSET SOLAR PROJECT

PROJECT LOCATION:

LAKE ROAD
SOMERSET, NY

SHEET TITLE & DESCRIPTION:

PROPOSED SOMERSET HIGH-VOLTAGE SUBSTATION

GEN-TIE PROXIMITY TO RESIDENCE

PROJ NUM:	SU20.0012
DES:	SAAD HARIS
DWN:	SAHARNAZ BODAGHI
CHK:	JON LEMON, P.E.
APV:	JON LEMON, P.E.
DATE:	07/22/2022
SCALE:	N.T.S
SHEET NO:	CL-E.01.01
REV:	E

PRELIMINARY
NOT FOR CONSTRUCTION

TETRA TECH DOCUMENT CONTROL NUMBER
705–2161940300–DWG–E0038–E

AES Titleblock 22X34 v210319

NOTES

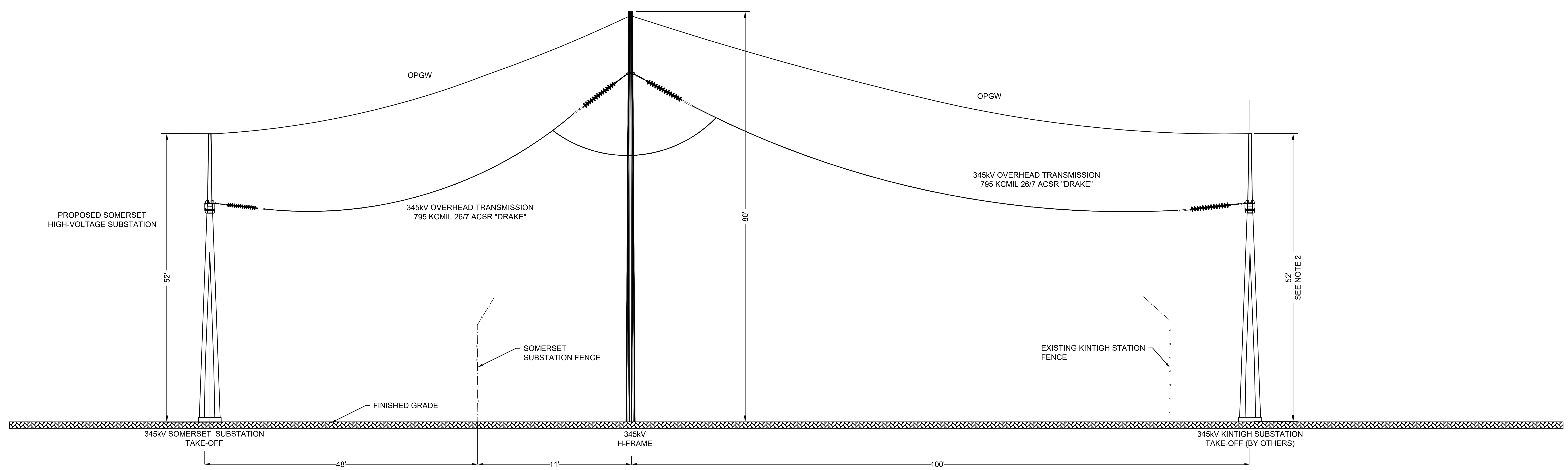
1. DESIGN IS PRELIMINARY.
2. HEIGHT OF PROPOSED TAKE-OFF ASSUMED TO BE SAME AS COLLECTOR SYSTEM TAKE-OFF.
3. PER ASSUMPTIONS LOG (REVIEWED BY AES), KINTIGH STATION WILL BE EXPANDED TO ACCOMODATE GEN-TIE INTERCONNECTION. PROPOSED FENCELINE LOCATION IS ASSUMED TO BE 17'-0" FROM THE TRANSMISSION LINE STRUCTURE H-FRAME.
4. GEN-TIE SCOPE LINE OF DEMARACTION IS THE DEADEND CABLE CONNECTIONS ON COLLECTOR SIDE OF STRUCTURE, JUMPERS AND CONNECTION TO KINITGH STATION ARE BY OTHERS.
5. DIMENSIONS ARE APPROXIMATE.

REFERENCE DRAWINGS

HV-P.02.01 - 345/34.5kV SUBSTATION 345kV ELEVATION VIEW

TL-P.00.01 - 345kV GEN-TIE TRANSMISSION LINE ROUTE MAP

TL-P.02.01 - 345kV GEN-TIE TRANSMISSION LINE WOOD H-FRAME FRAMING



SECTION A TL-P.01.01
NTS

PRELIMINARY
NOT FOR CONSTRUCTION

TETRA TECH

DOCUMENT CONTROL NUMBER
705-2161940300-DWG-S0002-E

aes
AES CLEAN ENERGY DEVELOPMENT, LLC
292 MADISON AVENUE, 15TH FLOOR,
NEW YORK, NY 10017

TETRA TECH

KEY PLAN:

REVISIONS:

NO.	DATE	DESCRIPTION
A	07/22/2022	94-C SUBMITTAL
B	07/29/2022	94-C SUBMITTAL
C	08/05/2022	94-C SUBMITTAL
D	12/12/2022	IFP
E	02/17/2023	IFP RESUBMITTAL

PROJECT TITLE:

SOMERSET SOLAR PROJECT

PROJECT LOCATION:

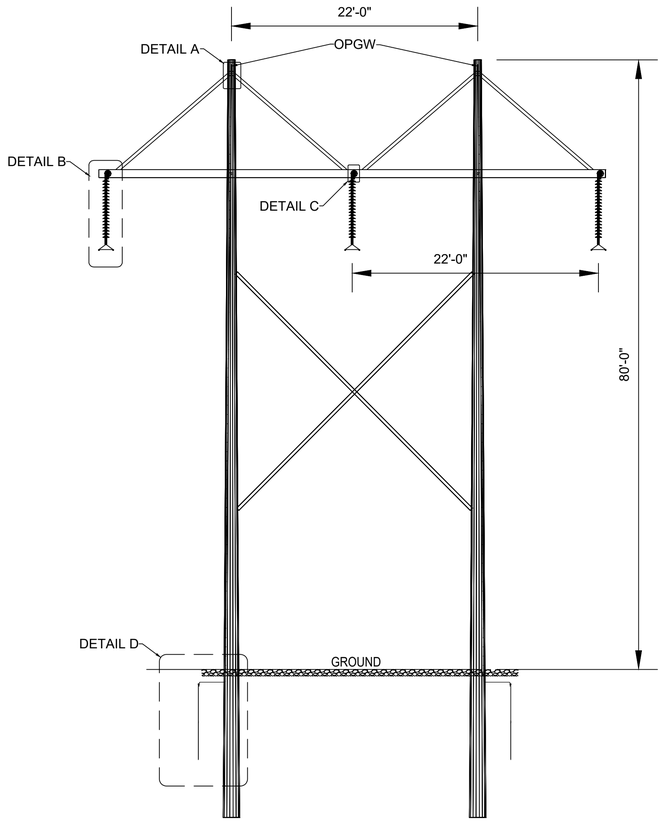
LAKE ROAD
SOMERSET, NY

SHEET TITLE & DESCRIPTION:

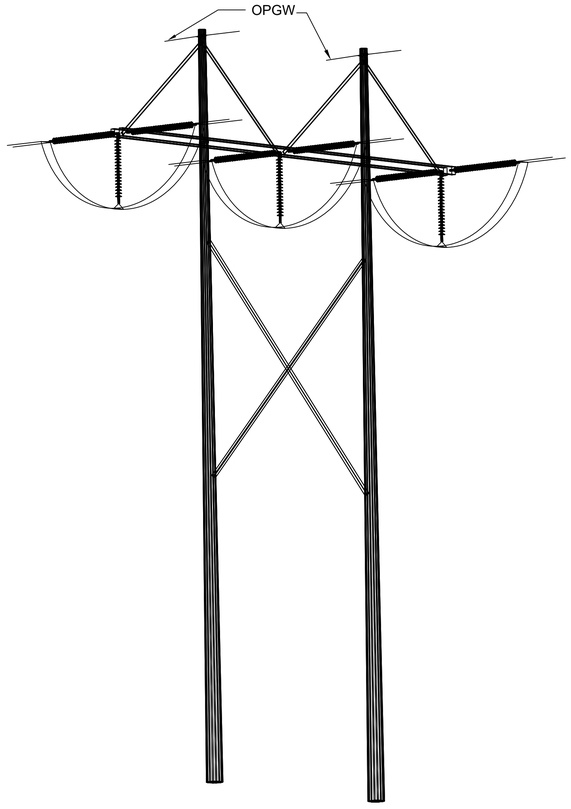
345kV GEN-TIE TRANSMISSION LINE

ELEVATION VIEW

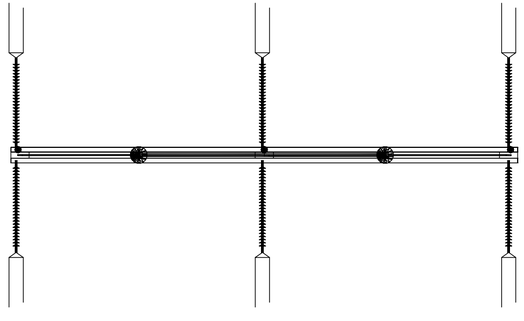
PROJ NUM:	SU20.0012
DES:	HAMDI GATO
DWN:	HAMDI GATO
CHK:	JON LEMON, P.E.
APV:	JON LEMON, P.E.
DATE:	07/22/2022
SCALE:	N.T.S
SHEET NO:	TL-P.01.01
REV:	E



ELEVATION VIEW
1:8



ISOMETRIC VIEW
1:8



PLAN VIEW
1:8

NOTES

1. DESIGN IS PRELIMINARY.
2. CONDUCTOR SIZE SELECTED IS ACSR 795kcmil DRAKE.
3. SFPOC/SFSJ-J-13587 IS SELECTED FOR OPGW.
4. TYPICAL EMBEDMENT IS 10% POLE LENGTH + 2 FT.

REFERENCE DRAWINGS

TL-P.00.01 - 345kV GEN-TIE TRANSMISSION LINE ROUTE MAP

TL-P.01.01 - 345kV GEN-TIE TRANSMISSION LINE ELEVATION VIEW

PRELIMINARY
NOT FOR CONSTRUCTION

TETRA TECH DOCUMENT CONTROL NUMBER
705-2161940300-DWG-S0003-D

AES CLEAN ENERGY DEVELOPMENT, LLC
292 MADISON AVENUE, 15TH FLOOR,
NEW YORK, NY 10017

TETRA TECH

KEY PLAN:

REVISIONS:

NO.	DATE	DESCRIPTION
A	07/22/2022	94-C SUBMITTAL
B	07/29/2022	94-C SUBMITTAL
C	12/12/2022	IFP
D	02/17/2023	IFP RESUBMITTAL

PROJECT TITLE:

SOMERSET SOLAR PROJECT

PROJECT LOCATION:

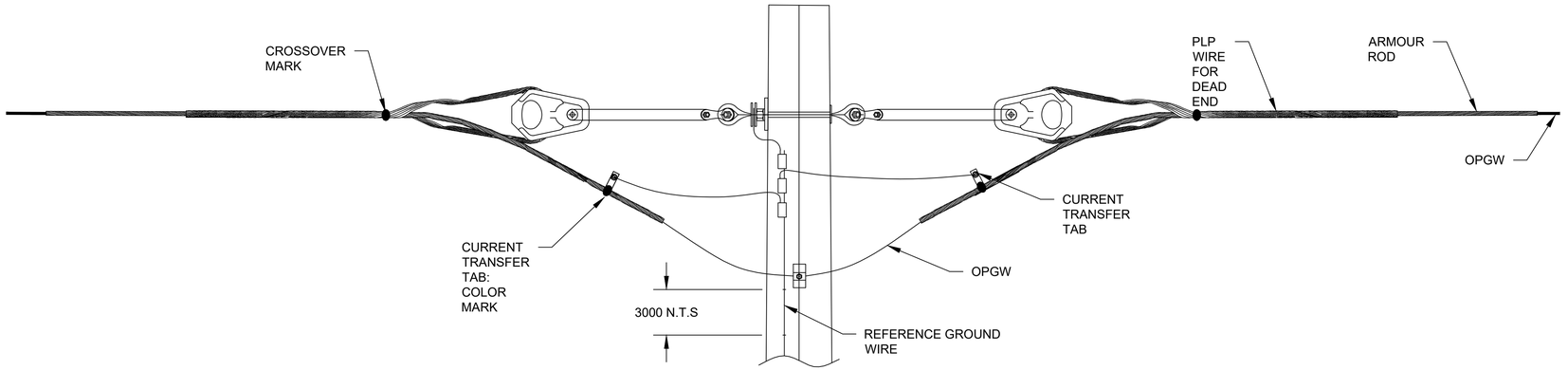
LAKE ROAD
SOMERSET, NY

SHEET TITLE & DESCRIPTION:

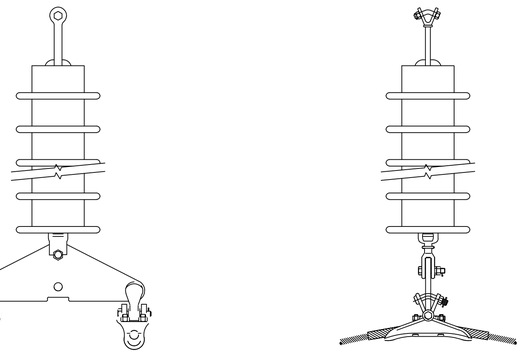
345kV GEN-TIE TRANSMISSION LINE

WOOD H-FRAME FRAMING DRAWING

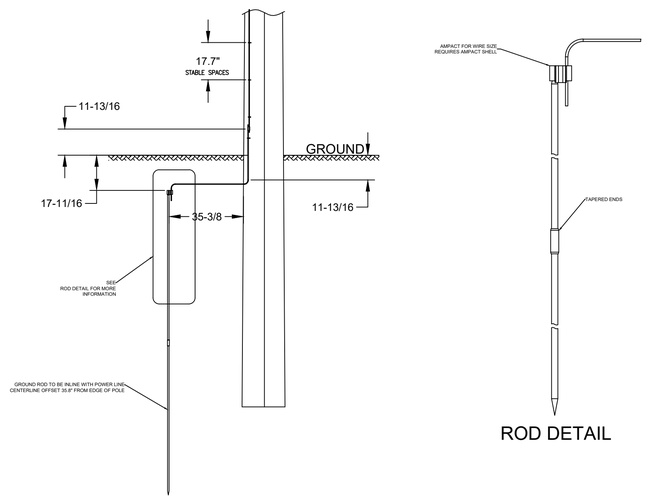
PROJ NUM:	SU20.0012
DES:	HAMDI GATO
DWN:	HAMDI GATO
CHK:	JON LEMON, P.E.
APV:	JON LEMON, P.E.
DATE:	07/22/2022
SCALE:	N.T.S
SHEET NO:	TL-P.02.01-SHEET 1OF3
REV:	D



DETAIL A - OPGW DOUBLE DEADEND ASSEMBLY
N.T.S

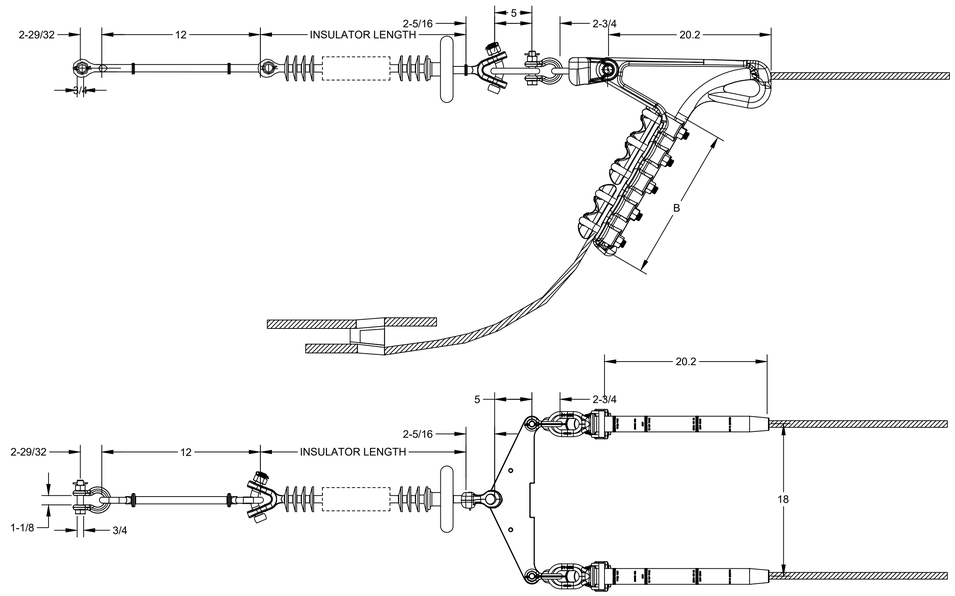


DETAIL B - JUMPER INSULATOR ASSEMBLY
N.T.S



DETAIL D - GROUNDING
N.T.S

ROD DETAIL



DETAIL C - STRAIN INSULATOR ASSEMBLY
N.T.S

NOTES

1. DESIGN IS PRELIMINARY.
2. CONDUCTOR SIZE SELECTED IS ACSR 795kcmil DRAKE.
3. SFPOC/SFSJ-J-13587 IS SELECTED FOR OPGW.
4. TYPICAL EMBEDMENT IS 10% POLE LENGTH + 2 FT.

REFERENCE DRAWINGS

TL-P.00.01 - 345kV GEN-TIE TRANSMISSION LINE ROUTE MAP

TL-P.01.01 - 345kV GEN-TIE TRANSMISSION LINE ELEVATION VIEW

PRELIMINARY
NOT FOR CONSTRUCTION

TETRA TECH
DOCUMENT CONTROL NUMBER
705-2161940300-DWG-S0003-D

AES CLEAN ENERGY DEVELOPMENT, LLC
292 MADISON AVENUE, 15TH FLOOR,
NEW YORK, NY 10017

TETRA TECH

KEY PLAN:

REVISIONS:

NO.	DATE	DESCRIPTION
A	07/22/2022	94-C SUBMITTAL
B	07/29/2022	94-C SUBMITTAL
C	12/12/2022	IFP
D	02/17/2023	IFP RESUBMITTAL

PROJECT TITLE:

SOMERSET SOLAR PROJECT

PROJECT LOCATION:

LAKE ROAD
SOMERSET, NY

SHEET TITLE & DESCRIPTION:

345kV GEN-TIE TRANSMISSION LINE

WOOD H-FRAME FRAMING DRAWING

PROJ NUM:	SU20.0012
DES:	HAMDI GATO
DWN:	HAMDI GATO
CHK:	JON LEMON, P.E.
APV:	JON LEMON, P.E.
DATE:	07/22/2022
SCALE:	N.T.S
SHEET NO:	TL-P.02.01-SHEET 2OF3
REV:	D

BILL OF MAJOR MATERIAL

ITEM	QTY	UNIT	DESCRIPTION	MANUFACTURE PART # OR DESIGNER APPROVED EQUIVALENT
1	2	EA	CLASS H1 80' WOOD POLE	
2	145	m	TWO OPGW	SFPOC/SFSJ-J-13587
3	225	m	TWO CONDUCTOR PER PHASE OF ACSR 795kcmil DRAKE	
4	2	EA	CROSS BRACE STRAP FOR H FRAME 32.5FT	
5	2	EA	STEEL CROSS ARM 45.5FT	
6	4	EA	CROSS BRACE STRAP 14.5FT	
7	174	EA	GLASS BELL SUSPENSION W/ZINC SLEEVE (18 BELLS FOR JUMPER AND 20 BELLS FOR STRAIN)	

NOTES

1. DESIGN IS PRELIMINARY.
2. CONDUCTOR SIZE SELECTED IS ACSR 795kcmil DRAKE.
3. SFPOC/SFSJ-J-13587 IS SELECTED FOR OPGW.
4. TYPICAL EMBEDMENT IS 10% POLE LENGTH + 2 FT.

REFERENCE DRAWINGS

TL-P.00.01 - 345kV GEN-TIE TRANSMISSION LINE ROUTE MAP

TL-P.01.01 - 345kV GEN-TIE TRANSMISSION LINE ELEVATION VIEW

PRELIMINARY
NOT FOR CONSTRUCTION

TETRA TECH
DOCUMENT CONTROL NUMBER
705-2161940300-DWG-S0003-D

AES CLEAN ENERGY DEVELOPMENT, LLC
292 MADISON AVENUE, 15TH FLOOR,
NEW YORK, NY 10017

TETRA TECH

KEY PLAN:

REVISIONS:

NO.	DATE	DESCRIPTION
A	07/22/2022	94-C SUBMITTAL
B	07/29/2022	94-C SUBMITTAL
C	12/12/2022	IFP
D	02/17/2023	IFP RESUBMITTAL

PROJECT TITLE:

SOMERSET SOLAR PROJECT

PROJECT LOCATION:

LAKE ROAD
SOMERSET, NY

SHEET TITLE & DESCRIPTION:

345kV GEN-TIE TRANSMISSION LINE

WOOD H-FRAME FRAMING DRAWING

PROJ NUM:	SU20.0012
DES:	HAMDI GATO
DWN:	HAMDI GATO
CHK:	JON LEMON, P.E.
APV:	JON LEMON, P.E.
DATE:	07/22/2022
SCALE:	N.T.S

SHEET NO: TL-P.02.01-SHEET 3OF3

REV: D