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Document Title:	App 2D-F Project Description Appendices Part 4
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Section 2.0

Project Description Appendices 4 of 4

Appendix 2D

Electric and Magnetic Fields Calculation



ISSUE SUMMARY Form SOP-0402-07, Revision 12

	DESIGN CONTROL SUMMARY	
CLIENT:	Prairie Song Reliability Project LLC UNIT NO.:	PAGE NO.: 1
PROJECT NAME:	Prairie Song Reliability Project 500kV Transmission Line	
PROJECT NO .:	15474.001 S&L	NUCLEAR QA PROGRAM
CALC. NO:	15474-001-TL-001 API	PLICABLE 🗌 YES 🖾 NO
TITLE:	EMF Calculation	
EQUIPMENT NO .:		
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REVIEWER:		DATE:
APPROVER:		DATE:
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REVIEW METHOD:		
		DATE
APPROVER:		DATE:

NOTE: PRINT AND SIGN IN THE SIGNATURE AREAS

PRAIRIE SONG RELABILITY PROJECT 500kV TRANSMISSION LINE EMF CALCULATION

REVISION: 1 DATED: 05/05/2025 PRELIMINARY - ISSUED FOR REVIEW PROJECT NO. 15474-001 REPORT NO. 15474-001-TL-001

55 East Monroe Street Chicago, IL 60603-5780 USA 312-269-2000 www.sargentlundy.com

Sargent & Lundy

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1.0. Purpose & Scope

The purpose of this calculation is to document the Electromagnetic Frequency design for the proposed Prairie Song Reliability Project transmission line from the Project Substation to the SCE Vincent Substation. This project is located in Los Angeles County, California. This calculation will be submitted to the California Energy Commission and documentation for their permitting process.

The scope of this project is the design of a 500 kV transmission line carrying triple bundled 795 kcmil ACSR (26/7) cables. Custom steel Monopoles on concrete caisson foundations are being used for the new design. This calculation is for the permitting package and will document design inputs, assumptions for the project design, methodology & acceptance criteria, calculations, results, PLS-CADD attachments, wire information, structural information, and inputs/constraints for the alignment and design. The lattice tower structure types are for the SCE part of the design. These structures have the same OHGW and OPGW but have different conductors. The lattice towers will use double bundle 2156 kcmil ASCR (84/16).

2.0. Design Inputs

Wire Data:

All wire properties are based on manufacturer provided data referenced in Attachments C, D, and E. Wire types evaluated are subject to change.

Properties	Prairie Song Conductor	SCE Conductor	OPGW	OHGW	
Туре	ACSR	ACSR	AFL 36 Fiber Hexacore	Extra High Strength Steel	
Code Name	Drake	Bluebird	DNO-10162 CC-38/48/551 1/2" 7 Stra		
Bundle	3	2	N/A	N/A	
Size	795 kcmil	2156 kcmil	N/A	N/A	
Stranding	26/7	84/16	36 Fiber	7	
Diameter (in)	1.108	1.762	0.551	0.495	
Weight (lbs/ft)	1.094	2.511	0.355	0.517	
Sub-conductor Horizontal Spacing (in)	18	18	N/A	N/A	

Table 1 – Wire Properties

Conductor Midspan Height:

The lowest conductor midspan height is determined based on the final sag of the conductor at 212°F, assuming a clearance to ground of 35 ft.

Shield Wire Midspan Height:

OPGW and OHGW sag is calculated as 75% of conductor sag at average ambient temperature (AAT). OPGW and OHGW midspan height is calculated based on structure dimensions and OPGW sag

Ground Elevation:

The project elevation is approximately 3,000 ft ASL.

3.0 Assumptions

Conductor Phasing:

EMF calculations are evaluated for the preferred phase layouts. The figures below display the preferred phasing set up for monopoles.

Measurement Height:

Audible noise is evaluated at a height of 5 ft (1.524 m) above ground.





Prairie Song Reliability Project Project No. 15474-001

Calculation Extent:

Project right of way width is 150 ft total, therefore, EMF calculations are evaluated for a cross section width of 150 ft (75 ft from center of structure).

4.0 Methodology & Acceptance Criteria

4.1 Methodology & Acceptance Criteria

Acceptance Criteria:

Since no specific requirement is provided, only the results will be presented.

<u>4.2</u> Computer Programs Used

The following computer programs were used:

Program Name	S&L Program Number	Source Files/Database Location
Bonneville Power Administration Corona and Field Effects Program v3.1	N/A	N/A
Microsoft Office 2016 v16.0	03.2.435-16.0	N/A
PLS_CADD STE 64bit v19.01	03.7.893-19.01	Prairie Song Reliability Project New Line 500kV.xyz

Table 3 – Computer Programs Used

4.3. General Inputs

Below is the list of inputs used to create the line model in the BPA Program:

- •Voltage: V= 500 kV
- •Current: = 2165.06 MVA / (v3×500) = 2500 A
- •The average span length for the tangent structure spans is 805 ft
- •The shield wire and conductor sags were obtained from PLS-CADD sag tension report for 801 ft ruling span.

Delta Monopole:

795 Drake Conductor at 212°F, no wind, no ice, final condition: 22.7 ft OPGW at 60°F, no wind, no ice, final condition: 12.3 ft OHGW at 60°F, no wind, no ice, final condition: 12.3 ft

Deadend Monopole:

795 Drake Conductor at 212°F, no wind, no ice, final condition: 25.4 ft OPGW at 60°F, no wind, no ice, final condition: 14.0 ft OHGW at 60°F, no wind, no ice, final condition: 14.0 ft

Lattice Tower

2156 Bluebird Conductor at 212°F, no wind, no ice, final condition: 29.1 ft OPGW at 60°F, no wind, no ice, final condition: 15.7 ft OHGW at 60° F, no wind, no ice, final condition: 15.7 ft

4.4. Structure Geometry

See Attachment B: Structure Framing Configurations for the structure heights, dimensions, and clearances. The structure framings in Attachment B represent the typical configurations used in this design,

5.0. Calculations

The 500kV conductors, OHGW, and OPGW are modeled in Bonneville Power Administration (BPA) v3.1. EMF values were calculated based on a voltage phase-to-ground of 288.675kV and an emergency rated current of 2,500 amp for a 150 ft right of way width with structures located at the center of the Right of Way.

6.0. <u>Results</u>

The results shown in Table 4 and 5 provide the maximum calculated electric and magnetic fields at the edge of the right of way. Table 6 and 7 provides the max corona gradient and max audible noise.

Case Designation	Max Calculated Electric Field at Edge of Right of Way (kV/m)	Max Calculated Electric Field Within Right of Way (kV/m)
Structure 1 – Lattice Tower	1.777	7.875
Structure 2 – Delta Monopole	1.928	8.132
Structure 3 – Deadend Monopole	0.342	8.650

Table 4 – Electric Field Results

Table 5 – Magnetic Field Results

Case Designation	Max Calculated Magnetic Field at Edge of Right of Way (mG)	Max Calculated Magnetic Field Within Right of Way (mG)
Structure 1 – Lattice Tower	171.29	319.68
Structure 2 – Delta Monopole	105.53	401.57
Structure 3 – Deadend Monopole	99.09	325.22

Table 6 – Max Corona Gradient

Case Designation	Max Calculated Corona Gradient (kV/cm)
Structure 1 – Lattice Tower	15.55
Structure 2 – Delta	18.26
Monopole	
Structure 3 – Deadend	17.80
Monopole	

Table 7 – Max Audible Noise						
	Max Calculated Audible Noise	Max Calculated Audible Noise				
Case Designation	at Edge of Right of Way	at Edge of Right of Way				
	(L50 Fair - dBA)	(L50 Rain - dBA)				
Structure 1 – Lattice Tower	30.1	55.1				
Structure 2 – Delta	26.0	51.0				
Monopole						
Structure 3 – Deadend	24.6	49.6				
Monopole						

7.0. Conclusion

Given the inputs described in this report, the results show the EMF values of the proposed transmission line for the California Energy Commission Permit.

8.0 <u>References</u>

- National Electrical Safety Code (NESC) C2-2023
- EPRI AC Transmission Line Reference Book 200kV and Above
- Specification DNO-4711
- Southwire Overhead Conductor Manual 2nd edition for Conductor and Shield Wire Specifications

9.0. Attachments

- **Attachment A: BPA Results** •
- **Attachment B: Structure Framing Configurations** •
- **Attachment C: Conductor Properties** •
- **Attachment D: OPGW Properties** •
- **Attachment E: OHGW Properties** •

Attachment A: BPA Results

INPUT DATA LIST

4/ 1/2025 15:32:03 CROSS SECTION 1,,,,,,,,, LATTICE TOWER SINGLE CIRCUIT WITH 1 500KV LINE,,,,,,,,,, 1,0, 3, 5,0.0, 0.50, 0.04,3000.00

(ENGLISH UNITS OPTION)

(GRADIENTS ARE COMPUTED BY PROGRAM)

PHYSICAL SYSTEM CONSISTS OF 5 CONDUCTORS, OF WHICH 3 ARE ENERGIZED PHASES

OPTIONS: COMB,,,,,,,,,,

5.000, 6.600, 9.800, 0.000, 1.000, 75.000, 3.280, 10.000, 3.280 'C-PHASE'', 'A', 107.00, 104.00, 2, 1.762, 18.000, 288.675, 0.000, 2.500, 0.000 'A-PHASE'', 'A', 107.00, 69.50, 2, 1.762, 18.000, 288.675, 120.000, 2.500, 0.000 'B-PHASE'', 'A', 107.00, 35.00, 2, 1.762, 18.000, 288.675, -120.000, 2.500, 0.000 'OHGW' ', 'A', 67.20, 130.00, 1, 0.495, 0.000, 0.000, 0.000, 0.000, 0.000 'OPGW' ', 'A', 82.80, 130.00, 1, 0.551, 0.000, 0.000, 0.000, 0.000, 0.000 100 0.0 5.0 1COMBINED OUTPUT OF AUDIBLE NOISE, RADIO NOISE, TVI, OZONE CONCENTRATION, GROUND GRADIENT AND MAGNETIC FIELD CROSS SECTION 1,,,,,,,,,

LATTICE TOWER SINGLE CIRCUIT WITH 1 500KV LINE,,,,,,,,,

	DIST. FROM		MAXIMUM	SUBCON	NO. OF	SUBCON	VOLTAGE	PHASE	CURRENT	CORONA
	CENTER OF TOWER	HEIGHT	GRADIENT	DIAM.	SUBCON	SPACING	L-N	ANGLE		LOSSES
	(FEET)	(FEET)	(KV/CM)	(IN)		(IN)	(KV)	(DEGREES)	(kAmps)	(KW/MI)
C-PHASE'	107.00	104.00	14.42	1.76	2	18.00	288.67	0.00	2.50	9.927
A-PHASE'	107.00	69.50	15.55	1.76	2	18.00	288.67	120.00	2.50	16.203
B-PHASE'	107.00	35.00	15.42	1.76	2	18.00	288.67	-120.00	2.50	15.302
OHGW '	67.20	130.00	5.70	0.50	1	0.00	0.00	0.00	0.00	0.000
OPGW'	82.80	130.00	7.91	0.55	1	0.00	0.00	0.00	0.00	0.000
AN MICROP	HONE HT.= 5.0 FT	, RI ANT.	HT.= 6.6	5 FT, TV	ANT. HT.=	9.8 FT, AI	LTITUDE=	3000.0 FT	-	
RI FREQ=	1.000 MHZ, TV FR	REQ= 75.0	000 MHZ, WI	ND VEL.	(0Z) = 0.500	MPH, GROUN	ND CONDUC	TIVITY =	10.0 MMHO	S/M
E-FIELD T	RANSDUCER HT.= 3	8.3FT, B-F	IELD TRANS	DUCER H	T.= 3.3FT					
LATERAL D	IST AUDIBLE	NOISE	RADIO INTE	RFERENC	E TVI	Ľ	OZON	E		

-	-		-	-				
FROM	(RAIN)	(FAIR)	(RAIN)	(FAIR)	TOTAL	FOR RAIN RATE OF	ELECTRIC	MAGNETIC

REFERENCE	L50	L50	L50	L50	RAIN	0.04 IN/HR AT 0. FT LEVEL	FIELD	FIELD
(FEET)	DBA	DBA	DBUV/M	DBUV/M	DBUV/M	PPB	KV/M	GAUSS
0.0	52.2	27.2	60.2	43.2	22.1	0.00000	0.185	0.05998
5.0	52.4	27.4	60.7	43.7	22.5	0.00000	0.176	0.06428
10.0	52.6	27.6	61.2	44.2	22.9	0.00000	0.169	0.06901
15.0	52.8	27.8	61.8	44.8	23.3	0.00000	0.168	0.07424
20.0	53.0	28.0	62.3	45.3	23.7	0.00000	0.181	0.08003
25.0	53.2	28.2	62.9	45.9	24.2	0.00000	0.217	0.08646
30.0	53.4	28.4	63.4	46.4	24.7	0.00000	0.281	0.09362
35.0	53.6	28.6	64.0	47.0	25.2	0.00000	0.375	0.10160
40.0	53.9	28.9	64.6	47.6	25.8	0.00000	0.504	0.11054
45.0	54.1	29.1	65.2	48.2	26.4	0.00000	0.674	0.12056
50.0	54.3	29.3	65.8	48.8	27.0	0.00000	0.893	0.13181
55.0	54.6	29.6	66.4	49.4	27.7	0.00000	1.173	0.14446
60.0	54.9	29.9	67.0	50.0	28.3	0.00000	1.528	0.15868
65.0	55.1	30.1	67.7	50.7	29.1	0.00000	1.973	0.17462
70.0	55.4	30.4	69.1	52.1	29.9	0.00000	2.526	0.19239
75.0	55.7	30.7	70.5	53.5	30.7	0.00000	3.199	0.21197
80.0	56.0	31.0	72.0	55.0	31.5	0.00000	3.997	0.23313
85.0	56.3	31.3	73.5	56.5	32.4	0.00000	4.901	0.25525
90.0	56.5	31.5	74.8	57.8	33.2	0.00000	5.859	0.27712
95.0	56.8	31.8	76.1	59.1	34.0	0.00000	6.771	0.29683
100.0	56.9	31.9	77.0	60.0	34.5	0.00000	7.492	0.31185
105.0	57.0	32.0	77.4	60.4	34.8	0.00000	7.875	0.31968
110.0	57.0	32.0	77.4	60.4	34.8	0.007860	7.824	0.31878
115.0	56.9	31.9	76.8	59.8	34.4	0.292143	7.352	0.30935
120.0	56.7	31.7	75.8	58.8	33.8	0.421667	6.567	0.29317
125.0	56.5	31.5	74.6	57.6	33.1	0.466514	5.624	0.27285
130.0	56.2	31.2	73.2	56.2	32.2	0.470746	4.658	0.25080
135.0	55.9	30.9	71.7	54.7	31.4	0.456010	3.761	0.22880
140.0	55.7	30.7	70.2	53.2	30.5	0.433661	2.976	0.20792
145.0	55.4	30.4	68.8	51.8	29.7	0.409211	2.317	0.18869
150.0	55.1	30.1	67.5	50.5	28.9	0.385167	1.777	0.17129

INPUT DATA LIST

4/ 1/2025 09:41:18 CROSS SECTION 1,,,,,,,,, DELTA MONOPOLE SINGLE CIRCUIT WITH 1 500KV LINE,,,,,,,,,, 1,0, 3, 5,0.0, 0.50, 0.04,3000.00

(ENGLISH UNITS OPTION)

(GRADIENTS ARE COMPUTED BY PROGRAM)

PHYSICAL SYSTEM CONSISTS OF 5 CONDUCTORS, OF WHICH 3 ARE ENERGIZED PHASES

OPTIONS: COMB,,,,,,,,,,

5.000, 6.600, 9.800, 0.000, 1.000, 75.000, 3.280, 10.000, 3.280 'C-PHASE'', 'A', 94.00, 72.00, 3, 1.108, 18.000, 288.675, 0.000, 2.500, 0.000 'A-PHASE'', 'A', 94.00, 35.00, 3, 1.108, 18.000, 288.675, 120.000, 2.500, 0.000 'B-PHASE'', 'A', 56.00, 35.00, 3, 1.108, 18.000, 288.675, -120.000, 2.500, 0.000 'OHGW' ', 'A', 62.20, 119.40, 1, 0.495, 0.000, 0.000, 0.000, 0.000, 0.000 'OPGW' ', 'A', 87.80, 119.40, 1, 0.551, 0.000, 0.000, 0.000, 0.000, 0.000 100 0.0 5.0 1COMBINED OUTPUT OF AUDIBLE NOISE, RADIO NOISE, TVI, OZONE CONCENTRATION, GROUND GRADIENT AND MAGNETIC FIELD CROSS SECTION 1,,,,,,,,,,

DELTA MONOPOLE SINGLE CIRCUIT WITH 1 500KV LINE,,,,,,,,,

	DIST. FROM		MAXIMUM	SUBCON	NO. OF	SUBCON	VOLTAGE	PHASE	CURRENT	CORONA
	CENTER OF TOWER	HEIGHT	GRADIENT	DIAM.	SUBCON	SPACING	L-N	ANGLE		LOSSES
	(FEET)	(FEET)	(KV/CM)	(IN)		(IN)	(KV)	(DEGREES)	(kAmps)	(KW/MI)
C-PHASE'	94.00	72.00	16.59	1.11	3	18.00	288.67	0.00	2.50	6.539
A-PHASE'	94.00	35.00	18.26	1.11	3	18.00	288.67	120.00	2.50	12.168
B-PHASE'	56.00	35.00	17.46	1.11	3	18.00	288.67	-120.00	2.50	9.092
OHGW '	62.20	119.40	4.80	0.50	1	0.00	0.00	0.00	0.00	0.000
OPGW'	87.80	119.40	6.35	0.55	1	0.00	0.00	0.00	0.00	0.000
AN MICROPH	HONE HT.= 5.0 FT	, RI ANT.	HT.= 6.6	5 FT, TV	ANT. HT.=	9.8 FT, Al	LTITUDE=	3000.0 FT	Г	
RI FREQ=	1.000 MHZ, TV FR	REQ= 75.0	000 MHZ, WI	ND VEL.	(OZ) = 0.500	MPH, GROUN	ND CONDUC	TIVITY =	10.0 MMHO	S/M
E-FIELD T	RANSDUCER HT.= 3	8.3FT, B-F	IELD TRANS	DUCER H	T.= 3.3FT					
LATERAL D	IST AUDIBLE	NOISE	RADIO INTE	RFERENC	E TV:	Ľ	OZON	IE		

FROM	(RAIN)	(FAIR)	(RAIN)	(FAIR)	TOTAL	FOR RAIN RATE OF	ELECTRIC	MAGNETIC
	((((

REFERENCE	L50	L50	L50	L50	RAIN	0.04 IN/HR AT 0. FT LEVEL	FIELD	FIELD
(FEET)	DBA	DBA	DBUV/M	DBUV/M	DBUV/M	PPB	KV/M	GAUSS
0.0	50.4	25.4	62.6	45.6	25.5	0.00000	1.928	0.10553
5.0	50.7	25.7	63.8	46.8	26.2	0.00000	2.275	0.11770
10.0	50.9	25.9	65.0	48.0	26.9	0.00000	2.696	0.13185
15.0	51.3	26.3	66.4	49.4	27.7	0.00000	3.203	0.14832
20.0	51.6	26.6	67.8	50.8	28.4	0.00000	3.809	0.16748
25.0	51.9	26.9	69.2	52.2	29.3	0.00000	4.518	0.18966
30.0	52.3	27.3	70.7	53.7	30.1	0.00000	5.322	0.21508
35.0	52.6	27.6	72.2	55.2	31.0	0.00000	6.185	0.24363
40.0	53.0	28.0	73.5	56.5	31.8	0.00000	7.031	0.27465
45.0	53.3	28.3	74.7	57.7	32.5	0.00000	7.735	0.30666
50.0	53.6	28.6	75.5	58.5	33.0	0.00000	8.132	0.33733
55.0	53.8	28.8	75.9	58.9	33.3	0.00000	8.078	0.36385
60.0	54.0	29.0	75.7	58.7	33.2	0.038612	7.523	0.38388
65.0	54.1	29.1	75.1	58.1	32.8	0.229640	6.579	0.39635
70.0	54.2	29.2	74.0	57.0	32.8	0.242667	5.561	0.40157
75.0	54.3	29.3	75.1	58.1	33.7	0.218170	4.984	0.40048
80.0	54.4	29.4	76.4	59.4	34.4	0.192325	5.263	0.39375
85.0	54.5	29.5	77.4	60.4	35.1	0.170455	6.097	0.38142
90.0	54.5	29.5	78.0	61.0	35.5	0.152601	6.925	0.36315
95.0	54.4	29.4	78.2	61.2	35.6	0.138007	7.396	0.33904
100.0	54.3	29.3	77.8	60.8	35.4	0.335239	7.383	0.31024
105.0	54.0	29.0	77.0	60.0	34.9	0.498339	6.937	0.27888
110.0	53.7	28.7	75.9	58.9	34.1	0.505667	6.210	0.24734
115.0	53.4	28.4	74.5	57.5	33.3	0.475963	5.370	0.21752
120.0	53.0	28.0	73.0	56.0	32.5	0.439133	4.544	0.19057
125.0	52.7	27.7	71.6	54.6	31.6	0.403863	3.807	0.16691
130.0	52.3	27.3	70.1	53.1	30.8	0.372372	3.187	0.14653
135.0	52.0	27.0	68.7	51.7	30.0	0.344851	2.685	0.12920
140.0	51.7	26.7	67.4	50.4	29.2	0.320905	2.289	0.11459
145.0	51.3	26.3	66.1	49.1	28.5	0.300018	1.980	0.10237
150.0	51.0	26.0	64.9	47.9	27.9	0.281706	1.737	0.09217

INPUT DATA LIST

(ENGLISH UNITS OPTION)

(GRADIENTS ARE COMPUTED BY PROGRAM)

PHYSICAL SYSTEM CONSISTS OF 5 CONDUCTORS, OF WHICH 3 ARE ENERGIZED PHASES

OPTIONS: COMB,,,,,,,,,,

5.000, 6.600, 9.800, 0.000, 1.000, 75.000, 3.280, 10.000, 3.280 'C-PHASE'', 'A', 75.00, 107.00, 3, 1.108, 18.000, 288.675, 0.000, 2.500, 0.000 'A-PHASE'', 'A', 75.00, 71.00, 3, 1.108, 18.000, 288.675, 120.000, 2.500, 0.000 'B-PHASE'', 'A', 75.00, 35.00, 3, 1.108, 18.000, 288.675, -120.000, 2.500, 0.000 'OHGW' ', 'A', 62.00, 138.40, 1, 0.495, 0.000, 0.000, 0.000, 0.000, 0.000 'OPGW' ', 'A', 88.00, 138.40, 1, 0.551, 0.000, 0.000, 0.000, 0.000, 0.000 100 0.0 5.0 1COMBINED OUTPUT OF AUDIBLE NOISE, RADIO NOISE, TVI, OZONE CONCENTRATION, GROUND GRADIENT AND MAGNETIC FIELD CROSS SECTION 1,,,,,,,,,,

DEADEND MONOPOLE SINGLE CIRCUIT WITH 1 500KV LINE,,,,,,,,,

	DIST. FROM		MAXIMUM	SUBCON	NO. OF	SUBCON	VOLTAGE	PHASE	CURRENT	CORONA
	CENTER OF TOWER	HEIGHT	GRADIENT	DIAM.	SUBCON	SPACING	L-N	ANGLE		LOSSES
	(FEET)	(FEET)	(KV/CM)	(IN)		(IN)	(KV)	(DEGREES)	(kAmps)	(KW/MI)
C-PHASE'	75.00	107.00	16.74	1.11	3	18.00	288.67	0.00	2.50	6.934
A-PHASE'	75.00	71.00	17.80	1.11	3	18.00	288.67	120.00	2.50	10.311
B-PHASE'	75.00	35.00	17.70	1.11	3	18.00	288.67	-120.00	2.50	9.955
OHGW '	62.00	138.40	9.88	0.50	1	0.00	0.00	0.00	0.00	0.000
OPGW'	88.00	138.40	9.01	0.55	1	0.00	0.00	0.00	0.00	0.000
AN MICROPH	HONE HT.= 5.0 FT	, RI ANT	. HT.= 6.6	5 FT, TV	ANT. HT.=	9.8 FT, AL	TITUDE=	3000.0 FT	Г	
RI FREQ=	1.000 MHZ, TV FR	EQ= 75.0	000 MHZ, WI	ND VEL.	(OZ) = 0.500	MPH, GROUN	ID CONDUC	TIVITY =	10.0 MMHO	S/M
E-FIELD TH	RANSDUCER HT.= 3	.3FT, B-I	IELD TRANS	DUCER H	T.= 3.3FT	-				
LATERAL D	IST AUDIBLE	NOISE	RADIO INTE	RFERENC	E TVI	[OZON	IE		

-	-		-	-				
FROM	(RAIN)	(FAIR)	(RAIN)	(FAIR)	TOTAL	FOR RAIN RATE OF	ELECTRIC	MAGNETIC

REFERENCE	L50	L50	L50	L50	RAIN	0.04 IN/HR AT 0. FT LEVEL	FIELD	FIELD
(FEET)	DBA	DBA	DBUV/M	DBUV/M	DBUV/M	PPB	KV/M	GAUSS
0.0	49.6	24.6	62.7	45.7	24.1	0.00000	0.341	0.09909
5.0	49.8	24.8	63.3	46.3	24.6	0.00000	0.459	0.10756
10.0	50.0	25.0	63.8	46.8	25.2	0.00000	0.619	0.11704
15.0	50.3	25.3	64.4	47.4	25.8	0.00000	0.828	0.12767
20.0	50.5	25.5	65.0	48.0	26.4	0.00000	1.095	0.13960
25.0	50.8	25.8	65.6	48.6	27.1	0.00000	1.435	0.15302
30.0	51.1	26.1	66.2	49.2	27.8	0.00000	1.864	0.16808
35.0	51.3	26.3	67.4	50.4	28.5	0.00000	2.398	0.18492
40.0	51.6	26.6	68.8	51.8	29.3	0.00000	3.055	0.20363
45.0	51.9	26.9	70.2	53.2	30.2	0.00000	3.846	0.22410
50.0	52.2	27.2	71.7	54.7	31.0	0.00000	4.766	0.24597
55.0	52.5	27.5	73.2	56.2	31.9	0.00000	5.785	0.26839
60.0	52.7	27.7	74.5	57.5	32.7	0.00000	6.823	0.28987
65.0	52.9	27.9	75.6	58.6	33.4	0.00000	7.753	0.30820
70.0	53.1	28.1	76.3	59.3	33.8	0.00000	8.411	0.32073
75.0	53.1	28.1	76.6	59.6	34.0	0.00000	8.650	0.32522
80.0	53.1	28.1	76.3	59.3	33.8	0.102731	8.411	0.32073
85.0	52.9	27.9	75.6	58.6	33.4	0.302828	7.753	0.30820
90.0	52.7	27.7	74.5	57.5	32.7	0.373184	6.823	0.28987
95.0	52.5	27.5	73.2	56.2	31.9	0.395161	5.785	0.26839
100.0	52.2	27.2	71.7	54.7	31.0	0.392779	4.767	0.24597
105.0	51.9	26.9	70.2	53.2	30.2	0.378835	3.846	0.22410
110.0	51.6	26.6	68.8	51.8	29.3	0.360256	3.055	0.20363
115.0	51.3	26.3	67.4	50.4	28.5	0.340512	2.398	0.18492
120.0	51.1	26.1	66.2	49.2	27.8	0.321233	1.864	0.16808
125.0	50.8	25.8	65.6	48.6	27.1	0.303116	1.436	0.15302
130.0	50.5	25.5	65.0	48.0	26.4	0.286404	1.096	0.13960
135.0	50.3	25.3	64.4	47.4	25.8	0.271123	0.828	0.12767
140.0	50.0	25.0	63.8	46.8	25.2	0.257199	0.620	0.11704
145.0	49.8	24.8	63.3	46.3	24.6	0.244522	0.460	0.10756
150.0	49.6	24.6	62.7	45.7	24.1	0.232970	0.342	0.09909

Attachment B: Structure Framing Configurations

STRUCTURE 1: LATTICE TOWER



STRUCTURE 2: DELTA MONOPOLE



STRUCTURE 3: DEADEND MONOPOLE



Attachment C: Conductor Properties

Conductor Word Lynn (A/S1) Lynn Auminum Total Size (A/S1) Lynn Auminum Steel of A Complete Bis Complete Cable Auminum Bis Steel Bis Complete Bis Westing 266.8 B/L1 0.2005 0.2211 0.2117 0.2117 0.2117 0.5021 201.8 38.9 182.5 288.5 Westing 206.8 B/L1 0.2005 0.2218 2 0.1217 0.2117 0.2117 0.2121 0.0265 281.8 182.6 281.5 182.6 281.5 182.6 <th></th> <th></th> <th></th> <th>Cross-Se An</th> <th>ectional ea</th> <th></th> <th></th> <th>Diam</th> <th>eter</th> <th></th> <th colspan="4">Weight/1000 ft</th>				Cross-Se An	ectional ea			Diam	eter		Weight/1000 ft			
Word Steel Forder Auronicus Steel Core	Code	Conductor				-	Individua	Wires	Steel	Complete				
Wessen 200.8 10/1 0.0296 2 0.1217	Word	Size kcmil	Stranding (Al/St)	Aluminum	Total	Layers of Al	Aluminum in	Steel in	Core	Cable in	Aluminum Ibs	Steel Ibs	Total Ibs	
Partsign	Waxwing	266.8	18/1	0.2094	0.2210	2	0.1217	0.1217	0.1217	0.609	249.9	39.2	289.1	
Owner 350 20/7 0.2858 0.2788 2 0.1774 0.0187 0.1881 0.1723 114.4 4800 Checkedes 257.5 11/1 0.3122 0.3285 2 0.1488<	Partridge	266.8	26/7	0.2095	0.2436	2	0.1013	0.0788	0.2364	0.842	251.3	115.6	366.9	
Nermin 359.4 10/1 0.2422 0.2187 0.1387 0.1384 131.5 46.5 1884 Linding 3.4.4 20/1 0.2180 0.0184 0.0267 0.1284 0.1184 <t< td=""><td>Ostrich</td><td>300</td><td>26/7</td><td>0.2095</td><td>0.2585</td><td>2</td><td>0.1074</td><td>0.0835</td><td>0.2505</td><td>0.680</td><td>282.5</td><td>195.5</td><td>4112.2</td></t<>	Ostrich	300	26/7	0.2095	0.2585	2	0.1074	0.0835	0.2505	0.680	282.5	195.5	4112.2	
Limeri 336.4 29/7 0.2802 0.3070 2 0.1137 0.0895 0.2902 0.120 316.6 940.4 962.0 Parmiger 397.5 24/7 0.3122 0.3295 2 0.1267 0.0808 0.2974 0.778 37.4 13.6 940.4 940.0 Parmiger 397.5 24/7 0.3122 0.3295 2 0.1415 0.0627 0.1881 0.778 37.4 13.6 941.4 13.7 134/1 0.3177 0.3124 0.3797 0.1121 0.3184 0.778 37.4 13.6 941.4 Parmiger 397.5 24/7 0.3122 0.3896 2 0.1581 0.159 0.3453 0.868 37.5 344.5 942.4 14.7 134/1 0.3747 0.3744 0.4295 2 0.1581 0.159 0.3453 0.848 37.5 344.5 942.4 14.7 134/1 0.3747 0.4295 2 0.1528 0.1528 0.1528 0.0484 443.1 70.2 951.5 14.8 477 24/7 0.3744 0.4295 2 0.1596 0.0598 0.2598 0.2588 0.444 443.4 87.6 359.5 Parmiger 477 24/7 0.3747 0.4491 2 0.1514 0.0658 0.2598 0.848 448.1 87.6 359.5 Parmiger 477 24/7 0.3747 0.4491 2 0.1514 0.0558 0.3558 0.3588 460.4 298.6 176.4 Parmiger 477 24/7 0.3747 0.4491 2 0.1524 0.1558 0.3578 0.3788 460.4 298.6 176.4 Parmiger 477 0.4491 0.3474 0.4491 2 0.1524 0.1558 0.3578 0.3788 460.4 298.6 176.4 Parmiger 477 0.4491 0.3474 0.4491 2 0.1529 0.1588 0.3785 0.3988 460.4 298.6 176.4 Parmiger 477 0.4491 0.4491 2 0.1593 0.3175 0.3948 460.4 298.6 176.4 Parmiger 478 30/1 0.3747 0.4491 2 0.1593 0.1598 0.3175 0.3948 460.4 298.6 176.4 Parmiger 478 0.30/1 0.3748 0.4497 2 0.1593 0.1598 0.3175 0.3948 460.4 298.4 186.3 196.4 Parmiger 486.6 24/7 0.4493 2 0.1593 0.1598 0.3176 0.998 97.1 298.7 89.7 Parmiger 486.6 24/7 0.4493 0.0491 2 0.1593 0.3176 0.998 97.1 298.7 89.7 Parmiger 486.8 24/7 0.4493 0.0491 2 0.1593 0.3177 0.998 97.1 298.7 89.8 Parmiger 486.8 24/7 0.4493 0.0598 2 0.1598 0.3176 0.998 97.1 298.7 99.3 99.6 Parmiger 496.8 24/7 0.4493 0.0598 2 0.1599 0.3177 0.998 97.1 298.7 99.3 99.6 Parmiger 496.8 24/7 0.4498 0.0144 2 0.1420 0.0498 0.0494 97.2 39.7 4.998.4 99.8 Parmiger 496 90.7 0.4498 0.0498 2 0.1599 0.0149 0.0598 0.999 99.9 Parmiger 496.8 24/7 0.4498 0.0498 2 0.1420 0.0499 0.0499 99.9 Parmiger 496.8 24/7 0.4498 0.0498 2 0.1599 0.0149 0.0598 0.0499 99.9 Parmiger 496 90.7 0.4498 0.0498 2 0.1420 0.0499 0.0499 99.9 Parmiger 496 90.7 0.4498 0.04	Merlin	336.4	18/1	0.2642	0.2789	2	0.1367	0.1367	0.1367	0.684	315.3	49.5	364.8	
One- berneger B30.4 B30.7 D.3422 D.3282 D.3178 D.3178 D.718 B31.7 B20.7 Brentiger B77.5 20.7 D.3322 D.3329 D.3429 D.0482 D.2181 D.718 D.718 D.714 B31.7 D.718 D.714 D.778 D.714 D.715 D.215 D.215 D.2284 D.215 D.2284 D.2128	Linnet	336.4	26/7	0.2640	0.3070	2	0.1137	0.0884	0.2652	0.720	316.0	145.4	462.0	
Processor Processor <t< td=""><td>Oriole</td><td>336,4</td><td>30/7</td><td>0.2642</td><td>0.3259</td><td>2</td><td>0.1059</td><td>0.1059</td><td>0.3177</td><td>0.741</td><td>317.7</td><td>208.7</td><td>526.4</td></t<>	Oriole	336,4	30/7	0.2642	0.3259	2	0.1059	0.1059	0.3177	0.741	317.7	208.7	526.4	
Bran 197.5 247.7 0.3122 0.3227 2 0.1287 0.0498 0.372 17.4 137.5 151.4 1mb 37.7 317.1 0.3120 0.3227 0.3228 0.04981 0.7483 374.1 37.5 57.5 57.5 57.5 57.5 57.5 57.7 57.8 57	Ptarmidan	397.5	20/1	0.3123	0.3235	5	0.1480	0.1466	0.1881	0.743	374.5	79.2	431.0	
an. 397.5 287.7 0.3120 0.3280 2 0.1236 0.02811 0.2883 0.783 377.1 171.8 543.0 and ministry 477 207.7 0.3324 0.4045 0.2584 0.4548 0.2684 4441.1 87.6 533.7 Televier 477 207.7 0.3745 0.4233 2 0.1444 0.0686 0.2686 440.4 1.854.5 633.5 Fielder 477 207.7 0.3744 0.4323 2 0.1456 0.1578 0.3758 0.858 440.0 206.4 653.3 Spepsore 966.5 227.7 0.4366 0.4797 2 0.1590 0.0178 0.9783 024.4 348.8 663.0 Spepsore 966.5 207.7 0.4368 0.4471 2 0.1590 0.0478 0.933 024.4 348.8 770.7 Spepsore 966.5 207.7 0.4373 0.5379 2 0.1580 0.1590 0.948 <t< td=""><td>Brant</td><td>397.5</td><td>24/7</td><td>0.3122</td><td>0.3527</td><td>2</td><td>0.1287</td><td>0.0858</td><td>0.2574</td><td>0.772</td><td>374.4</td><td>137.0</td><td>511.4</td></t<>	Brant	397.5	24/7	0.3122	0.3527	2	0.1287	0.0858	0.2574	0.772	374.4	137.0	511.4	
int. 307.5 307.7 0.3121 0.3121 0.3152 0.1152 0.1153 0.3458 0.3658 373.3 746.5 621.8 Biboriti 477 207.7 0.3787 0.4205 2 0.1154 0.2508 0.3258 0.3454 4441.1 67.6 352.7 Fieler 477 207.7 0.3787 0.4325 2 0.1154 0.1553 0.3685 4440.4 352.8 62.1.8 62.1.8 0.378 0.237.8 62.1.8	bis	397.5	26/7	0.3120	0.3628	2	0.1236	0.0961	0.2883	0.783	374.1	171.9	546.0	
Tablem 1477 200,7 0.314/s C.2000 2 0.1042	Lark.	397.5	30/7	0.3121	0.3849	2	0.1151	0.1551	0.3453	0.805	375.3	246.5	621.8	
Trisker 477 24/7 0.3747 0.4323 2 0.1410 0.02845 0.2845 448.4 191.5 1233 Hen 477 30/7 0.3747 0.4421 2 0.1281 0.1291 0.2845 0.4853 486.4 200.4 655.3 Jen 477 30/7 0.3747 0.4421 2 0.1281 0.2191 0.2328 0.2848 0.2848 0.2848 0.2848 0.2848 0.2848 0.2848 0.2148 502.3 1.451.8 1.853.8 1.451.8 1.853.8 1.451.8 1.853.8 1.451.8 1.853.8 1.452.8 1.452.8 1.452.8 1.452.8 1.452.8 1.452.8 1.452.8 1.452.8 1.453.8 1.452.8 1.453.8	Tallomint	477	18/1	0.3745	0.3955	2	0.1528	0.1628	0.1628	0.814	447.1	70,2 87.6	536.7	
Henk 477 20/7 0.3744 0.4954 2 0.1254 0.1253 0.1253 0.0586 448.0 208.0 764.4 Deprive 556.5 167 0.4336 0.4437 2 0.1280 0.2783 0.0371 0.233.3 4.1.6 650.5 Dev 566.5 24/7 0.4336 0.2791 2 0.1390 0.2783 0.2011 0.233.3 4.1.6 650.5 Dev 566.5 24/7 0.4371 0.0581 2 0.1253 0.1118 0.3414 0.242.3 24.1.6 766.5 Seudo 0.665 30/7 0.4710 0.5822 2 0.1233 0.1140 0.356.8 980.8	Flicker	477	24/7	0.3747	0.4233	2	0.1410	0.0940	0.2820	0.846	449.4	164.5	613.9	
Hen 477 30/7 0.3747 0.4921 2 0.1291 0.1293 0.3738 0.883 48.6.4 220.6.1 Depring 55.5 24/7 0.4372 0.4372 0.1338 0.3738 0.3738 0.3747 521.4 41.6 602.3 Province 565.5 24/7 0.4372 0.5081 2 0.1523 0.1318 0.3148 0.0314 0.0314 302.4 334.2 341.6 765.2 Eagle 556.5 30/7 0.43715 0.5081 2 0.1362 0.1362 0.03167 0.9253 302.4 345.2 373.3 346.5 Provide 068 20/7 0.4710 0.5715 0.5860 2 0.1420 0.0425 0.4200 0.994 071.2 375.3 346.5 345.6 838.8 480.4 388.6 480.4 388.6 480.4 388.6 480.4 388.6 480.4 388.6 480.4 388.6 480.4 388.6 480.4 38	Hawk	477	26/7	0.3744	0.4354	2	0.1354	0.1053	0.3159	0.858	449.0	205.4	655.3	
Deprime Box 5 18/7 0.4389 0.4387 2 0.1738 0.1738 0.1738 0.1738 0.1738 0.1738 0.1738 0.1738 0.1738 0.1738 0.1738 0.1738 0.1738 0.1738 0.1738 0.1738 0.1138 0.0144 0.0273 1014	Hen	477	30/7	0.3747	0.4621	2	0.1261	0.1261	0.3783	0.883	45C.4	296.0	746.4	
product 166.5 24.7 0.3422 0.4028 2 0.1135 0.0135 0.0136 0.0136 0.0136 0.0136 0.0137 0.0138 0.0137 0.0138	Deprey	500.5	18/1	0.4369	0.4612	2	0.1758	0.1758	0.1758	0.879	521.4 633.0	81.8	603.3	
Dever 956.5 20/7 0.4371 0.5081 2 0.1483 0.1188 0.3484 0.1027 152.42 944.0 787.3 Peacock 605 20/7 0.4373 0.5370 2 0.1382 0.1389 0.4076 0.933 152.43 345.2 945.6 877.7 0.933 157.1 0.967 773.8 343.7 0.475.3 0.5370 2 0.1388 0.1090 0.0475 0.0691 677.2 207.4 984.6 184.3 184.3 184.3 184.3 184.3 184.3 184.3 184.3 184.3 184.3 184.3 184.4 187.2 187.4 188.4 <	Parakeet	556.5	24/7	0.4308	0.4938	2	0.1523	0.1015	0.3045	0.901	524.3	391.8	716.1	
Engle 656,5 30,7 0.4371 0.5391 2 0.1382 0.0408	Dove	556.5	26/7	0.4371	0.5083	2	0.1463	0.1138	0.3414	0.927	524.2	241.0	765.2	
Peacock 605 24/7 0.4753 0.6370 2 0.1389 0.1397 0.983 570.1 2087 778.8 South ack 606 30/19 0.4751 0.9844 2 0.1420 0.1420 0.9844 071.2 367.4 938.6 Teal Mail 0.4897 0.2457 2.01420 0.9844 0.2400 0.9944 071.2 367.4 938.6 Sent 636 36/.1 0.4994 0.1333 0.1229 0.1399 0.9040 966.3 46.8 642.8 Scoter 636 26/7 0.4995 0.6184 2 0.1564 0.1218 0.0485 0.9977 998.1 105.1 116.5 Scoter 636 26/7 0.4995 0.6180 2 0.1466 0.1246 0.0377 1.119 600.5 386.7 987.2 Scoter 636 30/17 0.4995 0.6186 2 0.1456 0.0370 1.119.4 600.5 386.7	Eagle	556.5	30/7	0.4371	0.5391	2	0.1362	0.1362	0.4086	0.953	525,4	345.2	870.7	
Sourn 0.06 20/7 0.04/9 0.9202 2 0.1202 0.1202 0.9203 0.9203 201.8 831.3 Teal 605 30/19 0.4751 0.6844 2 0.1420 0.0852 0.4202 0.9944 0.77.2 37.7 433.6 Senth 636 BK/1 0.4997 0.5273 2 0.1880 0.9944 0.994.6 646.6 642.8 Galdmin- 636 BZ/1 0.4994 0.5133 0.0120 0.0944 0.2832 0.907 994.6 643.5 646.7 643.6 643.8 646.7 643.6 643.8 646.7 643.6 <td>Peacock</td> <td>605</td> <td>24/7</td> <td>0.4753</td> <td>0.5370</td> <td>2</td> <td>0.1588</td> <td>0.1059</td> <td>0.3177</td> <td>0.953</td> <td>570.1</td> <td>208.7</td> <td>778.8</td>	Peacock	605	24/7	0.4753	0.5370	2	0.1588	0.1059	0.3177	0.953	570.1	208.7	778.8	
Teal OOS 30/19 0.4751 0.5854 2 0.1420 0.4920 0.9544 07112 307.4 332.6 Serfi G3B 30/1 0.4997 0.5275 2 0.1380 0.1392 0.9301 996.0 468.6 468.9 Serfi G3B 2/7 0.4994 0.5133 3 0.1329 0.1325 0.9031 996.6 468.6 462.8 Rook G3B 2/7 0.4996 0.6188 2.01202 0.9034 0.977 2991.1 220.1 895.5 Scoter G3B 30/7 0.4995 0.6118 2 0.1456 0.4368 0.4313 1.019 600.5 384.6 985.4 995.6 219.7 785.9 91.2 29.7 785.9 91.2 29.7 785.9 91.2 29.7 286.7 92.9 91.7 20.1667 0.1111 0.3333 1.001.9 60.05.5 384.6 90.4 90.7 92.9 90.116.0 11111 <td< td=""><td>Siguan Woos Duck</td><td>605</td><td>20/7</td><td>0,4749</td><td>0.5522</td><td>2</td><td>0.1525</td><td>0.1186</td><td>0.3558</td><td>0.965</td><td>569.5 671.2</td><td>201.8</td><td>831.3</td></td<>	Siguan Woos Duck	605	20/7	0,4749	0.5522	2	0.1525	0.1186	0.3558	0.965	569.5 671.2	201.8	831.3	
Hingher G.38 12/1 0.4997 0.5275 2 0.1880 0.1880 0.9401 996.3 99.8 6842.8 Galdinen G.38 22/7 0.4994 0.5313 3 0.1329 0.1329 0.0323 0.963 998.8 186.8 764.7 Roke G.36 22/7 0.4994 0.5348 2 0.1328 0.0393 0.963 998.8 186.8 764.7 Roke G.36 20/7 0.4995 0.61160 2 0.1466 0.1494 0.4371 0.190 600.6 384.6 676.7 Stope 0.61160 2 0.1466 0.1371 0.333 1.000 628.2 229.7 875.3 Stope 0.617 0.21601 0.1310 0.3333 1.000 639.4 2.01604 0.1310 0.3463 1.031 674.4 2.92.4 6.85.7 915.2 Stope 0.617 0.6917 0.2100 0.3160 0.3160 0.3460 0.46.8 <td>Teal</td> <td>605</td> <td>30/19</td> <td>0.4751</td> <td>0.5834</td> <td>2</td> <td>0.1420</td> <td>0.0852</td> <td>0.4260</td> <td>0.994</td> <td>671.2</td> <td>367.4</td> <td>938.6</td>	Teal	605	30/19	0.4751	0.5834	2	0.1420	0.0852	0.4260	0.994	671.2	367.4	938.6	
Sorift 608 38/14 0.4394 0.5333 3 0.1329 0.1329 0.0301 996.0 468.6 642.8 Row 638 24/7 0.4494 0.5844 2 0.1224 0.1084 0.2325 0.907 299.1 235.1 476.7 Row 638 2/7 0.4495 0.5448 2 0.1264 0.1325 0.907 299.1 235.1 476.7 Scoter 638 30/7 0.4495 0.6115 2 0.1466 0.0376 0.191 600.5 384.6 997.7 Berner 696.6 24/7 0.5234 0.5917 2 0.1607 0.1111 0.0373 1.014 627.7 286.5 916.5 Contert 666.6 24/7 0.5234 0.6917 3 0.1155 0.3173 1.014 627.7 286.5 916.5 Conter 715.5 34/7 0.50317 0.01635 2 0.1263 0.3176 0.0407 1.615.8	Kinghirti	630	18/1	0.4997	0.5275	2	0.1880	0.1880	0.1880	0,940	596.3	93.6	689.9	
Galdmen 6.46 22/7 0.4094 0.2404 2 0.1700 0.0912 0.9914 1.02.3 7.04.9 Bookssak 0.356 30/7 0.4995 0.6160 2 0.1466 0.1214 0.1232 0.090 991.1 1.02.3 2.747.2 Scoter 636 30/7 0.4995 0.6155 2 0.1466 0.4136 0.4137 1.019 600.5 384.6 995.7 Bremmp 666.6 24/7 0.5234 0.600m 2 0.1466 0.1373 1.014 677.2 2816.2 981.2 Connet 0.3661.7 0.1377 0.1364 0.3333 1.030 678.3 344.6 920.3 Stat 7.55.5 30/19 0.5617 0.6619 0.6317 2 0.1353 0.1351 0.3450 1.061 678.3 344.6 920.3 Cobs 7.55.5 30/19 0.5617 0.6617 0.1352 0.1351 0.3450 1.061 678.3	Swift	636	36/1	0.4994	0.5133	3	0.1329	0.1329	0.1329	0.930	896.0	46.8	642.8	
non-set Scorer 036 037/7 0.4995 0.5109 2 0.1364 0.13628 0.040 99.4 2012 137.2	Galdfinch	636	22/7	0,4994	0.5484	2	0.1700	0.0944	0.2832	0.963	598.8	165.8	764.7	
Scote 936 20/19 0.4995 0.6185 2 0.1486 0.488 1.019 600.5 194.6 995.1 Fluering 666.6 24/7 0.5238 0.1991 2 0.1867 0.1311 0.3373 1.019 600.5 387.7 987.5 916.5 916.2 228.7 887.5 916.2 228.7 887.5 916.2 24.7 0.857.5 916.2 24.7 28.8 916.2 24.6 920.8 920.8 920.8 920.8 920.8 920.8 920.4	Grosbeck	6.96	26/7	0.4995	0.5808	2	0.1564	0.1218	0.3648	0.990	596.0	275.2	874.2	
Egreth 0.30(19) 0.4995 0.61135 2 0.1456 0.6374 0.4374 0.6333 1.019 00.05 386.7 987.2 Gamme 066.6 24/7 0.5234 0.09917 2 0.1601 0.1333 1.014 627.7 286.5 916.2 Silt 1.15 0.447 0.5224 0.0086 2 0.1601 0.1135 0.0433 1.014 627.7 286.5 916.2 Com 715.5 34/7 0.5612 0.0387 2 0.1135 0.1131 0.04430 1.046 677.8 346.5 100.4 Cobo 715.5 36/1 0.6244 0.0417 3 0.1466 0.4480 1.046 1.0481 677.8 346.5 100.3 Cobo 795 36/1 0.6246 0.702 2 0.1233 0.706 0.4246 0.702 0.223 0.369 1.007 443.3 1.304.3 1.304.3 Denduit 796 42/7 <t< td=""><td>Scoter</td><td>636</td><td>30/7</td><td>0.4995</td><td>0.6160</td><td>2</td><td>0.1456</td><td>0.1456</td><td>0.4358</td><td>1.019</td><td>600.5</td><td>394.6</td><td>995.1</td></t<>	Scoter	636	30/7	0.4995	0.6160	2	0.1456	0.1456	0.4358	1.019	600.5	394.6	995.1	
Planmage 066.6 24/7 0.5224 0.0907 2 0.1113 0.03333 1.000 628.2 228.7 875.3 Suit 715.5 24/7 0.5622 0.6306 2 0.1727 0.1131 0.4483 1.034 627.7 248.5 916.2 Suit 715.5 24/7 0.5622 0.6307 2 0.1290 0.0307 1.064 674.8 927.7 983.7 Rebring 715.5 30/19 0.6324 0.0417 2 0.1544 0.04926 0.4630 1.064 674.8 927.4 1.06.6 803.6 Cool 785 30/1 0.6324 0.7734 2 0.1749 0.1319 0.4635 1.061 748.8 273.9 1022.4 Stemmer 795 43/7 0.6242 0.0567 0.1376 0.04080 1.108 748.4 34.3 1043.3 144.3 1043.3 1044.3 1041.3 1041.4 105.4 1049.4 1049.4 1049.4	Egret	636	30/19	0.4995	0.6135	2	0.1456	0.0874	0.4370	1.019	600.5	386.7	987.2	
General Object Output Control Control <thcontrol< th=""> <thcontrol< th=""> <thcon< td=""><td>Flamingo</td><td>666.6</td><td>24/7</td><td>0.5238</td><td>0.5917</td><td>2</td><td>0.1867</td><td>0.1111</td><td>0.3333</td><td>1.000</td><td>628.2</td><td>229.7</td><td>857.9</td></thcon<></thcontrol<></thcontrol<>	Flamingo	666.6	24/7	0.5238	0.5917	2	0.1867	0.1111	0.3333	1.000	628.2	229.7	857.9	
Silaring 715.5 20/7 0.56319 0.08387 0.1290 0.13870 1.001 674.0 3205.7 988.7 Redwing 715.5 30/19 0.5617 0.06347 3 0.1155. 0.1151. 0.1460 0.04610 1.0461 677.8 244.0 1003.0 Cost 796 36/1 0.6324 0.7264 2 0.1340 0.1400 0.44630 1.0481 677.8. 244.7 0.6247 0.7264 2 0.1320 0.4639 1.002 748.8 273.9 1002.7 Deske 795 26/7 0.6246 0.7702 2 0.1320 0.40359 1.002 748.8 273.9 1022.7 Mecm 796 42/7 0.6246 0.7702 2 0.1328 0.1023 0.3359 1.002 748.4 273.9 1022.2 Melare 795 45/7 0.6240 0.7049 3 0.1223 0.3239 1.002 748.4 273.9 1022.2 1.	Stor	715.5	20/7	0.5234	0.6350	2	0.1001	0.1151	0.3735	1.036	674.2	200.0	910.2	
Cova 715.5 54/7 C.5819 0.6347 3 0.1151 0.3450 1.040 673.8 244.5 920.4 Coot 735 30/19 0.6344 0.0497 2 0.1460 0.1466 1.040 745.1 56.6 833.6 Coot 735 30/19 0.6344 0.0497 2 0.1460 0.1466 1.040 745.1 56.6 833.6 Coot 735 30/1 0.6324 0.7063 2 0.1376 0.4080 1.108 749.5 344.3 1022.2 Siemme 795 42/7 0.6246 0.0764 2.202.2 1.065 748.6 146.3 134.2 Micow 795 45/7 0.6342 0.0667 3 0.1376 0.4089 1.012 148.4 148.1 344.3 1022.1 10.3839 1.002 748.4 273.9 1022.2 123.3 Mainer 795 54/7 0.6342 0.0769.5 3 0.121.3	Starling	715.5	26/7	0.5620	0.6535	2	0.1659	0.1290	0.3870	1.061	674.0	309.7	983.7	
Redwing 735.5 30/18 0.6827 0.0897 2 0.3446 0.0480 1.061 675.3 434.0 1.1083 Cochon 785 24/7 0.6244 0.0631 2 0.1446 0.1446 0.1466 1.0092 748.8 273.9 10222 Drake 795 32/7 0.6246 0.7702 2 0.1376 0.0744 0.1600 0.4080 1.108 748.8 273.9 10222 Simmer 795 32/7 0.6246 0.7702 2 0.1376 0.0764 0.2282 1.065 748.0 108.6 857.6 Condor 795 34/7 0.6242 0.6674 3 0.1376 0.0776 0.2688 1.003 748.6 146.1 894.7 Malard 795 34/7 0.6242 0.6674 3 0.1238 0.1231 0.8265 1.130 674.7 130.2 1137.3 Malard 795 34/7 0.6248 0.7992	Crow	715.5	54/7	C.5619	0.6347	3	0.1151	0.1151	0,3450	1.040	673.8	246.5	920.4	
Colt 719 34/3 0.0244 0.0417 3 0.1480 0.1486 1.040 745. 58.5 98.36 Cubics 7195 24/7 0.6247 0.7944 2 0.1480 0.1480 0.1486 1.08 744.5 344.3 303.4 Stemme 795 42/7 0.6246 0.1667 3 0.1372 0.0486 0.2625 1.08 744.0 108.6 857.6 Condor 795 42/7 0.6246 0.0667 3 0.1372 0.0486 0.2252 1.055 744.6 123.2 <t< td=""><td>Redwing</td><td>715.5</td><td>30/19</td><td>0.5617</td><td>0.6897</td><td>2</td><td>0.1544</td><td>0.0926</td><td>0,4630</td><td>1.061</td><td>675.3</td><td>434.0</td><td>1109.3</td></t<>	Redwing	715.5	30/19	0.5617	0.6897	2	0.1544	0.0926	0,4630	1.061	675.3	434.0	1109.3	
Dome 196 30/7 0.190/7 0.190/7 0.121/7 0.0255 1.063 1.40/7 0.121/7 0.0255 1.063 1.40/7 0.00/7 1.40/7 0.00/7 1.40/7 0.00/7 0.448/7 0.00/7 0.448/7 0.00/7 0.448/7 0.00/7 0.448/7 0.00/7 0.448/7 0.00/7 0.448/7 0.00/7 0.448/7 0.00/7 0.448/7 0.00/7 0.448/7 0.00/7 0.448/7 0.00/7 0.448/7 0.00/7 0.448/7 0.00/7 0.448/7 0.00/7 0.448/7 0.00/7 0.448/7 0.00/7 0.448/7 0.00/7 0.448/7 0.00/7 0.448/7 0.00/7 0.448/7	Cost	795	36/1	0.6244	0.6417	3	0,1480	0.1486	0.1496	1,040	745.1	58.5	803.0	
Stemmer 796 30,7 0.6246 0.700 2 0.1678 0.1076 0.2020 1.065 740.0 190.7 493.3 1244.6 Tern 796 45,7 0.6242 0.6674 3 0.1376 0.7740 0.2020 1.0655 740.0 148.6 146.1 894.7 Concior 796 54,7 0.6242 0.7649 2 0.1213 0.9389 1.002 748.4 273.9 1022.2 Mellerd 796 30/19 0.8245 0.7649 2 0.1281 0.3873 1.162 847.7 310.2 1157.5 Concorr 954 20,7 0.7495 0.4046 2 0.1291 0.3873 1.165 896.5 125.5 1074.4 Bell 954 20,7 0.7495 0.4462 2 0.1399 0.3906 1.165 896.5 125.5 1074.4 Cardinal 954 20,7 0.7491 0.4462 2 0.1399 0.390	Drake	705	26/7	0.6247	0.7264	2	0.1749	0.1360	0.4080	1.108	749.5	344.3	1093.4	
Mucaw 795 42/7 0.0246 0.0567 3 0.1376 0.0764 0.2262 1.065 749.0 108.6 887.0 Concior 795 54/7 0.6240 0.7049 3 0.1213 0.3393 1.002 748.4 273.9 1022.7 Rudry 900 45/7 0.7056 0.7755 3 0.1414 0.0943 0.22529 1.311 847.4 165.6 10133 Camery 900 54/7 0.7066 0.7595 3 0.1291 0.2873 1.318 847.4 165.6 10133 Bedind 954 20/7 0.7492 0.8010 2 0.2394 0.2390 1.365 898.5 175.5 1074.0 Candrad 954 20/7 0.7492 0.8010 3 0.1329 0.2913 1.165 898.5 175.5 1074.0 Candrad 964 30/19 0.7481 0.9199 2 0.1329 0.2913 1.65 498.7 </td <td>Skimmer</td> <td>795</td> <td>30/7</td> <td>0.6246</td> <td>0.7702</td> <td>2</td> <td>0.1628</td> <td>0.1628</td> <td>0.4884</td> <td>1.140</td> <td>790.7</td> <td>493.3</td> <td>1244.0</td>	Skimmer	795	30/7	0.6246	0.7702	2	0.1628	0.1628	0.4884	1.140	790.7	493.3	1244.0	
Tern 705 89/7 0.6242 0.0674 3 0.1213 0.0886 0.2638 1.003 748.6 146.1 890.7 Mallerd 705 30/19 0.6245 0.7069 2 0.1213 0.1213 0.3839 1.002 748.4 273.5 1.02 Mallerd 705 30/12 0.7069 0.7069 2 0.1213 0.38373 1.132 847.7 310.2 1157.5 Commany 900 84/7 0.7069 0.8466 2 0.1294 0.1221 0.3873 1.132 847.7 310.2 1157.5 Redird 944 24/7 0.7492 0.8466 2 0.3294 0.1329 0.3987 1.196 898.8 328.7 1227.5 Cammaniati 964 54/7 0.7491 0.8462 3 0.1329 0.3987 1.195 898.8 328.7 1227.5 Cammaniati 964 54/7 0.8121 0.8679 3 0.1329	Macaw.	795	42/7	0.6246	0.8567	3	0.1376	0.0764	0.2292	1,055	749.0	108.6	857.6	
Dono Typ Dot 2/04 Dot 2/04 S Dizzis Dizzis <thdizzis< th=""> <thdizzis< th=""> <thdizzis< th=""></thdizzis<></thdizzis<></thdizzis<>	Tern	795	45/7	0.6242	0.6674	3	0,1329	0.0886	0.2658	1.063	748.6	146,1	894.7	
Padty 900 45/7 0.7056 0.7555 3 0.1414 0.0543 0.2829 1.131 447.4 165.5 11333 Damary 900 54/7 0.7069 0.7985 3 0.1291 0.3873 1.165 898.5 175.5 1074.3 Redind 954 2.07 0.7492 0.8010 2 0.21944 0.0291 0.2210 1.165 898.6 328.7 1227.5 Redind 954 24/7 0.7492 0.8010 3 0.1329 0.3390 1.196 898.6 328.7 1227.5 Camashnet 954 34/7 0.8462 3 0.1329 0.3887 1.196 898.3 328.7 1227.5 Stowbird 1033.5 42/7 0.812 0.0673 3 0.1329 0.3887 1.96 898.3 328.7 122.5 Ortion 1033.5 44/7 0.812 0.0673 3 0.1515 0.010 0.3335 0.4487	Mailard	795	30/19	0.6245	0.7689	2	0.1213	0.0977	0.3639	1.140	750.7	483.2	1233.9	
Canary 900 54/7 0.7089 0.7985 3 0.1291 0.3873 1.162 64.7.7 310.2 1175.3 Dendbird 964 24/7 0.7495 0.8406 2 0.1294 0.1329 0.3990 1.165 898.5 175.5 1074.0 Rail 954 45/7 0.7492 0.8010 3 0.1329 0.3990 1.165 898.5 175.5 1074.0 Candinal 954 54/7 0.7492 0.8010 3 0.1329 0.3990 1.165 898.5 175.5 1074.0 Cananshark 954 54/7 0.7491 0.9442 3 0.1329 0.3990 1.248 900.5 579.6 1440.0 1153.4 0.1383.5 141.5 115.4 115.4 115.4 115.4 115.4 115.4 115.4 115.4 115.4 103.5 54/7 0.8112 0.918.3 0.1515 0.1010 0.3030 1212.4 972.8 189.9 1152.4 1	Ruddy	900	45/7	0.7066	0.7555	3	0.1414	0.0943	0.2829	1.131	847.4	165.6	1013.0	
Commune 954 20,7 0.7492 0.8010 2 0.2314 0.0971 0.2390 1.165 898.5 175.5 1074.6 Retili 954 45,7 0.7495 0.8466 2 0.1396 0.3980 1.165 898.5 1227.4 1274.6 Rail 954 54,7 0.7491 0.8462 3 0.1329 0.3980 1.165 898.5 127.5 1074.6 Candmain 954 30/19 0.7491 0.8462 3 0.1329 0.3987 1.48 900.5 579.6 14801 Snowblind 1033.5 45/7 0.8112 0.8673 3 0.1515 0.1010 0.3630 1.212 972.8 199.9 1132 Outlaw 1033.5 54/7 0.8112 0.9853 3 0.1373 0.1049 0.3147 1.269 1048.7 204.8 203.9 376.1 1430.3 Bueling 1192.5 54/7 0.9867 1.0678 3	Canary	900	54/7	0.7069	0.7985	3	0.1291	0.1291	0.3873	1.162	847.7	310.2	1157.9	
Pecuato gen 24/1 0.7490 3.0000 2 0.1299 0.3890 1.1300 2886.5 326.7 1274.6 Candinal 994 45.7 0.7492 0.8010 3 0.1329 0.3390 0.3890 1.165 898.5 328.7 127.5 Candinal 994 30/19 0.7491 0.9199 2 0.1329 0.3390 0.3890 1.165 898.5 328.7 127.5 Snowhid 1033.5 42/7 0.8121 0.4539 3 0.1515 0.1010 0.3300 1.212 972.8 189.9 116.5 Curlew 1033.5 54/7 0.8112 0.4673 3 0.1383 0.1449 1.245 972.8 356.0 1328.8 Orteian 1113 54/19 0.8746 0.3850 3 0.1349 0.3467 1.293 1003.9 376.1 1430.5 Burting 1192.5 54/19 0.9985 1.0552 3 0.1486 0.0362 </td <td>Comorake</td> <td>954</td> <td>20/7</td> <td>0.7492</td> <td>0.8010</td> <td>2</td> <td>0.2184</td> <td>0.0971</td> <td>0.2910</td> <td>1.165</td> <td>898.5</td> <td>175.5</td> <td>1074.0</td>	Comorake	954	20/7	0.7492	0.8010	2	0.2184	0.0971	0.2910	1.165	898.5	175.5	1074.0	
Cardinal 964 54/7 0.7491 0.8462 3 0.1329 0.1329 0.3987 1.196 898.3 328.7 1227.1 Camushards 954 30/19 0.7491 0.9199 2 0.1329 0.1329 0.29867 1.196 898.3 328.7 1227.1 Camushards 954 30/19 0.7491 0.9199 2 0.3783 0.1070 0.2516 1.203 973.9 141.5 1440.1 Ortolan 1033.5 45/7 0.8112 0.9164 3 0.1515 0.1016 0.3030 1.212 972.8 189.9 1132.45 Bueing 1113 45/7 0.8746 0.9855 3 0.1573 0.1049 0.3147 1.259 1048.7 204.8 123.4 Bunting 1192.5 45/7 0.9867 1.0626 0.3255 1.302 1123.4 219.1 13420.5 Gavalue 1192.5 45/7 0.9867 1.0628 0.1085 0.3255	Redbird	994	45/7	0.7490	0.8406	2	0.1450	0.0971	0.3940	1.195	808.5	328.7	1074.0	
Cannashack 954 30/19 0.7491 0.9199 2 0.1783 0.1070 0.5350 1.248 900.5 579.6 1480.1 Snowbird 1033.5 42/7 0.8121 0.8539 3 0.1569 0.0872 0.2616 1.203 973.9 141.5 1115.4 Ortolan 1033.5 45/7 0.8112 0.9873 3 0.1519 0.3010 0.3030 1.212 972.8 356.0 1328.8 Bureiay 1113 45/7 0.6746 0.9855 3 0.1436 0.0862 0.4430 1.293 1053.9 376.1 1430.3 Bunting 1192.5 54/19 0.8746 0.9855 3 0.1486 0.0862 0.4460 1.338 1128.4 212.4 214.3 242.8 1342.5 Bunting 1192.5 54/19 0.3965 1.0552 3 0.1486 0.0862 0.4460 1.338 1128.4 402.8 1531.5 Diacokie 1.1272	Cardinal	954	54/7	0.7491	0.8462	3	0.1329	0.1329	0.3987	1.196	898.3	328.7	1227.1	
Snowhid 1033.5 42/7 0.8521 0.8639 3 0.1569 0.0672 0.2616 1.203 973.9 141.5 113.5 Ottoian 1033.5 45/7 0.8112 0.9154 3 0.1515 0.1010 0.3030 1212 972.8 136.0 1325.4 Bueigy 1113 45/7 0.8746 0.9355 3 0.1573 0.1049 0.3147 1.259 1048.7 204.8 1223.4 Buning 1192.5 45/7 0.9367 1.0014 3 0.1628 0.1065 0.3255 1.302 1123.4 219.1 1342.5 Grackle 1192.5 54/19 0.9365 1.0652 3 0.1648 0.1085 0.3255 1.302 1123.4 219.1 1334.2 Grackle 1192.5 54/19 0.9967 1.06578 3 0.1628 0.3082 0.4460 1.338 1128.4 402.8 1531.4 Phessant 1272 45/19 0.9933	Canvasback	954	30/19	0.7491	0.9199	2	0.1783	0.1070	0.5350	1.248	900.5	579.6	1480.1	
Ortown 103.3 D 45/7 0.8112 0.04073 3 0.1315 0.1310 0.3335 0.1425 972.8 1356.0 1328.5 Brueiay 1113 45/7 0.8745 0.9350 3 0.1383 0.1384 1.2345 972.8 356.0 1328.5 Finch 1113 54/19 0.8746 0.9855 3 0.1496 0.0862 0.4310 1.299 1093.9 376.1 1430.3 Bunting 1192.5 54/19 0.9365 1.0552 3 0.1486 0.0862 0.4460 1.338 1123.4 219.1 1342.5 Grookie 1192.5 54/19 0.9967 1.0678 3 0.1581 0.1121 0.3665 1.382 1204.3 429.4 1633.7 Pheasant 1272 54/19 0.9993 1.1259 3 0.1535 0.0921 0.4605 1.382 1204.3 429.4 1633.7 Dipper 1351.5 45/7 1.081.4 1.1397	Snowbird	1033.5	42/7	0.8121	0.8539	3	0.1569	0.0872	0.2616	1.203	973.9	141.5	1215.4	
Bueiay 1113 45/7 0.8745 0.9350 3 0.1573 0.1049 0.3147 1.259 1048.7 234.8 1253.8 Finch 1113 54/19 0.8746 0.9855 3 0.1573 0.1049 0.3147 1.259 1048.7 234.8 1253.8 Bunting 1192.5 45/7 0.9967 1.0014 3 0.1528 0.1085 0.3255 1.302 1123.4 219.1 1342.5 Grackle 1192.5 54/19 0.9365 1.0552 3 0.1486 0.0892 0.4460 1.338 1107.7 233.9 1431.6 Bittorn 1272 45/7 0.9967 1.0678 3 0.3735 0.1965 1.382 1204.3 429.4 1633.7 Dipper 1381.5 45/7 1.0614 1.1347 3 0.3735 0.1165 0.3465 1.386 1272.9 248.3 1521.2 Mariin 1.301.5 54/19 1.0213 3 0.	Curlew	1033.5	54/7	0.8112	0.9164	3	0.1315	0.1383	0.4149	1.245	972.8	356.0	1329.5	
Finch 1113 54/19 0.8746 0.9855 3 0.1436 0.0862 0.4310 1.293 1053.9 376.1 1430.3 Bunting 1192.5 45/7 0.3967 1.0014 3 0.1628 0.1085 0.3255 1.302 1123.6 402.8 1531.4 Bunting 1272 45/7 0.9967 1.0678 3 0.1681 0.1121 0.3863 1.365 402.8 1531.4 Buntin 1272 54/19 0.9993 1.1259 3 0.1535 0.0921 0.4605 1.386 1197.7 233.9 1431.6 Dipper 1351.5 54/19 1.0614 1.1347 3 0.1733 0.1186 1.424 1279.1 455.9 1736.6 Bobolink 1431 45/7 1.1236 1.2013 3 0.1582 0.9949 0.4745 1.424 1279.1 455.9 1736.6 Bobolink 1431 45/7 1.1236 1.2013 3 0.15	Brueiay	1113	45/7	0.8745	0.9350	3	0.1573	0.1049	0.3147	1.259	1048.7	204.8	1253.6	
Bunting 1192.5 45/7 0.3967 1.0014 3 0.1526 0.1085 0.3255 1.302 1123.4 219.1 1342.5 Grackle 1192.5 54/19 0.9967 1.0678 3 0.1486 0.0892 0.4460 1.338 1128.6 402.8 1531.4 Bittern 1272 54/19 0.9993 1.1259 3 0.1535 0.0921 0.4605 1.382 1224.3 429.4 1633.3 Dipper 1351.5 54/19 1.0614 1.1347 3 0.1753 0.1155 0.4665 1.382 1224.3 429.4 1633.3 Martin 1351.5 54/19 1.0614 1.1358 3 0.1582 0.0949 0.4745 1.424 1279.1 455.9 1735.0 Power 1.431 45/7 1.1230 1.2013 3 0.1582 0.0977 0.4587 1.465 1354.6 483.2 1857.4 Subhith 1.3135 3 0.1628	Finch	1113	54/19	0.8746	0.9855	3	0.1436	0.0862	0.4310	1.293	1053.9	376.1	1430.1	
Ordexie 1192.5 54/19 0.3365 1.0552 3 0.1496 0.0892 6.4460 1.338 1128.6 402.8 131.4 Pheasant 1272 45/7 0.9993 1.1259 3 0.1535 0.0921 0.4605 1.382 1204.3 429.4 1633.7 Dipper 1351.5 45/7 1.061.4 1.1397 3 0.1535 0.0921 0.4605 1.386 1272.9 248.3 1521.2 Mariin 1351.5 56/19 1.061.4 1.1397 3 0.1582 0.0949 0.4745 1.424 1272.9 248.3 1521.2 Mariin 1.451.5 56/19 1.061.4 1.1397.8 3 0.1582 0.0949 0.4745 1.424 1272.9 248.3 1521.2 Bobolink 1431 45/7 1.1236 1.2013 3 0.1783 0.1189 0.3567 1.427 1347.5 263.1 11510.5 Power 1431.5 54/19 1.3862	Bunting	1192.5	45/7	0.9367	1.0014	3	0.1528	0.1085	0.3255	1.302	1123.4	219.1	1342.5	
Distort 1272 54/1 0.5987 1.0978 3 0.1081 0.1121 0.3553 1.362 1121 1.362 1121 12017 1235.9 1131.2 Dipper 1351.5 45/1 0.6993 1.1259 3 0.1353 0.0921 0.4605 1.382 1204.3 429.4 1633.7 Dipper 1351.5 45/7 1.0614 1.1367 3 0.1733 0.1155 0.3465 1.386 1272.9 248.3 1521.2 Martin 1201.5 56/19 1.0614 1.1958 3 0.1582 0.0949 0.4745 1.424 1279.1 455.9 1135.0 Biobolink 1431 54/19 1.1241 1.2665 3 0.1628 0.0977 0.4885 1.465 1354.6 483.2 1837.8 Nuthatch 1510.5 45/7 1.3856 1.2682 3 0.1622 0.1021 0.3663 1.466 1422.5 27.5 1700.0 Parot <t< td=""><td>Grackle</td><td>1192.5</td><td>54/19</td><td>0.9365</td><td>1.0552</td><td>3</td><td>0.1496</td><td>0.0892</td><td>0.4460</td><td>1.338</td><td>1128.6</td><td>402.8</td><td>1531.4</td></t<>	Grackle	1192.5	54/19	0.9365	1.0552	3	0.1496	0.0892	0.4460	1.338	1128.6	402.8	1531.4	
Dipper 1381.5 45/7 1.081.4 1.1347 3 0.3733 0.1185 0.3465 1.386 1272.9 248.3 1521.2 Martin 1.301.5 54/19 1.061.4 1.1367 3 0.3733 0.1185 0.3465 1.424 1272.9 248.3 1521.2 Martin 1.301.5 54/19 1.061.4 1.1058 3 0.1582 0.0949 0.4745 1.424 1279.1 455.9 1735.0 Bobolink 1.431 45/7 1.1236 1.2013 3 0.3783 0.1189 0.3657 1.424 1279.1 455.9 1735.0 Power 1.431 54/19 1.1241 1.2665 3 0.1628 0.0977 0.4885 1.466 1422.5 27.5 1700.0 Partot 1510.5 54/19 1.8866 1.3355 3 0.1880 0.1253 0.3759 1.504 1498.1 292.2 1790.3 Lapwing 1390 54/19 1.2489	Pheasant	1272	54/19	0.9993	1.1259	3	0.1535	0.0921	0,4605	1.382	1204.3	429.4	1639.7	
Marsin 1.301.5 54/19 1.061.4 1.1958 3 0.1582 0.0946 0.4745 1.424 1.279.1 455.9 1735.6 Bobolink 1431 45/7 1.1236 1.2013 3 0.1582 0.0946 0.4745 1.424 1279.1 455.9 1735.6 Bobolink 1431 45/7 1.1236 1.2013 3 0.1582 0.04745 1.427 1347.5 263.1 1810.8 Nuthatch 1510.5 45/7 1.1866 1.20882 3 0.1832 0.1221 0.3663 1.466 1422.5 27.5 1700.6 Parot 1510.5 54/19 1.866 1.3355 3 0.1880 0.2123 0.3759 1.504 1498.1 292.2 1390.3 Falcon 1590 54/19 1.2489 1.4072 3 0.1716 0.3030 0.5150 1.545 15050.0 537.0 2042.1 1900.4 Falcon 1590 54/19 1.2489	Dipper	1351.5	45/7	1.0614	1.1.347	3	0.1733	0.1155	0.3465	1.386	1272.9	248.3	1521.2	
moconent 1431 45/7 1.1238 1.2013 3 G,1783 0.1389 0.3867 1.427 1347.5 263.1 1313.6 Power 1431 54/19 1.1241 1.2665 3 0.1628 0.0977 0.4885 1.465 1354.6 483.2 1837.8 Muthatch 1510.5 54/19 1.1866 1.3357 3 0.1672 0.1021 0.3663 1.466 1422.5 277.5 1700.3 Parrot 1510.5 54/19 1.866 1.3355 3 0.1672 0.1003 0.5018 1.505 1428.8 909.2 1998.3 Lapwing 1990 43/7 1.2499 1.4072 3 0.1716 0.3030 0.5018 1.505 1428.8 909.2 1998.3 Lapwing 1780 84/19 1.3986 1.5120 4 0.1456 0.0874 0.4370 1.602 1685.4 386.7 2072.1 Chukar 1780 84/19 1.3986 <t< td=""><td>Martin</td><td>1301.5</td><td>54/19</td><td>1.0614</td><td>1.1.958</td><td>3</td><td>0.1582</td><td>0.0949</td><td>0.4745</td><td>1.424</td><td>1279.1</td><td>455.9</td><td>1736.0</td></t<>	Martin	1301.5	54/19	1.0614	1.1.958	3	0.1582	0.0949	0.4745	1.424	1279.1	455.9	1736.0	
Large Large <thlarge< th=""> Large <thl< td=""><td>Bobolink</td><td>1431</td><td>45/7</td><td>1.1236</td><td>1.2013</td><td>3</td><td>0.1783</td><td>0.1189</td><td>0.3567</td><td>1,427</td><td>1347.5</td><td>263.1</td><td>1810.6</td></thl<></thlarge<>	Bobolink	1431	45/7	1.1236	1.2013	3	0.1783	0.1189	0.3567	1,427	1347.5	263.1	1810.6	
Parrot 1510.5 54/19 1.1856 1.3357 3 0.1672 0.1003 0.5015 1.505 1428.8 509.2 1998.3 Lapseng 1990 48/7 1.2492 1.3355 3 0.1672 0.1003 0.5015 1.505 1428.8 509.2 1998.3 Paron 1590 44/19 1.2492 1.3355 3 0.1880 0.1253 0.3759 1.504 1498.1 292.2 1790.3 Paron 1590 54/19 1.2489 1.4072 3 0.1716 0.1030 0.5150 1.545 1905.0 537.0 2042.3 Chukar 1780 84/19 1.5086 1.5120 4 0.1456 0.0874 0.4370 1.602 1685.0 2072.3 2072.3 2072.3 2072.3 2072.3 2072.3 2072.3 2072.3 2072.3 2072.3 2072.3 2072.3 2072.3 2072.3 2072.3 2072.3 2072.3 2072.3 2072.3 2072.4 2072	Nuthatch	1510.5	45/7	1,1862	1.2665	3	0.1832	0.1221	0.3663	1,405	1422.6	277.5	1700.0	
Lapwing 1990 45/7 1.2492 1.3355 3 0.1880 0.1253 0.3759 1.504 1498.1 292.2 1790.3 Falcon 1590 54/19 1.2489 1.4072 3 0.1716 0.1030 0.5150 1.545 1505.0 537.0 2042.3 Chukar 1780 84/19 1.3986 1.612.0 4 0.4566 0.0874 0.4370 1.002 1085.4 386.7 2072.3 2072.3 2072.3 2072.3 2085.4 386.7 2072.3 2072.3 2072.3 2072.3 2085.4 386.7 2072.3 2072.4 2072.5 2072.3	Parrot.	1510.5	54/19	1.1856	1.3357	3	0.1672	0.1003	0.5018	1.505	1428.8	509.2	1938.1	
Felsion 1590 54/19 1.2489 1.4072 3 0.1716 0.1030 0.5150 1.545 1505.0 537.0 2042.1 Chukar 1780 84/19 1.3986 1.5120 4 0.1456 0.0874 0.4370 1.602 1505.4 586.7 2072.3 Mockingbid 2034.5 72/7 1.5679 1.6671 4 0.1456 0.0874 0.4370 1.602 1595.4 324.3 21602.5 727.3 2163.5 727.2 34.3 21602 1.6921 1.692.4 2163.5 727.2 34.3 21602 1.6921 1.692.5 724.3 21602.5 724.3 21602.5 724.3 21602.5 724.3 21602.5 724.3 21602.5 724.3 21602.5 724.3 21602.5 724.3 21602.5 724.5 2160.5 2164.5 2160.5 2164.5 2160.5 2145.3 2160.5 2145.3 2160.5 2145.3 2160.5 2145.3 2160.5 2145.3 2160.5	Lapsing	1390	45/7	1.2492	1.3355	3	0.1880	0.1253	0.3759	1.504	1498.1	292.2	1790.3	
United 1.600 84/19 1.5386 1.0120 4 0.1450 0.0874 0.4370 1.002 1.085.4 386.7 2072.1 Mockingbird 2034.5 72/7 1.5979 1.6671 4 0.1681 0.1122 0.3360 1.082 1.085.4 386.7 2042.1 Mockingbird 2034.5 72/7 1.5979 1.6671 4 0.1681 0.122 0.3360 1.081 198.5 234.3 2160.5 Bunbling 2156 84/19 1.0031 1.8309 4 0.1645 0.0961 0.4805 1.762 2040.4 487.5 2507.5 Nwi 2167 72/7 1.7022 1.7158 4 0.3735 0.1157 0.3471 1.739 2051.4 249.2 2100.5 Thrasher 2312 76/19 1.8155 1.9144 4 0.1744 0.0814 0.4070 1.802 2187.9 361.4 2423.3 Jonee 2155 76/19 1.9750	Falcon	1590	54/19	1.2489	1.4072	3	0.1716	0.1030	0.5150	1.545	1505.0	537.0	2042.1	
Enactivative 2057 76/19 1.0152 1.7032 4 0.1645 0.0745 1.0157 1.945.5 298.6 2245.5 Bueblini 2156 84/10 1.0031 1.8309 4 0.1645 0.0766 0.3840 1.702 1945.5 298.6 2245.3 Bueblini 2156 84/10 1.0031 1.8309 4 0.1602 0.0961 0.4805 1.762 2040.4 487.5 2507.3 Niwi 2167 72/7 1.7022 1.7158 4 0.3735 0.1157 0.3471 1.739 2051.4 249.2 2100.5 Thrasher 2312 76/19 1.8155 1.9144 4 0.1744 0.0814 0.4070 1.802 2187.9 361.4 249.2 2300.5 Joree 2151 76/19 1.8156 1.9144 4 0.1744 0.0814 0.4070 1.802 2187.9 361.4 249.2 230.4 249.2 230.5 242.3 364.4	Morkinghad	1/80	84/19	1.3986	1.0120	1	0.1456	0.0874	0.4370	1.602	1085.4	386.7	2072.1	
Bushlitt 2156 84/19 1.0031 1.8309 4 0.1602 0.0961 0.4805 1.762 2040.4 487.5 2507.5 Niwi 2167 72/7 1.7022 1.7158 4 0.3735 0.1157 0.3471 1.739 2051.4 249.2 2300.5 Thrasher 2312 76/19 1.8155 1.9144 4 0.1744 0.0814 0.4070 1.802 2187.9 335.4 2323.3 Joree 2515 76/19 1.9750 2.0826 4 0.1849 0.0245 1.802 2380.1 364.9 2765.0	Readmaner	2057	76/19	3.6152	1,7092	4	0.1645	0.0768	0.3840	1,700	1946.5	298.6	2245.1	
Num 2167 72/7 1.7022 1.7158 4 0.3735 0.1157 0.3471 1.739 2051.4 249.2 2300.5 Thrasher 2312 76/1.9 1.8155 1.9144 4 0.1744 0.0814 0.4070 1.802 2187.9 336.4 2233.3 Joree 2515 76/1.9 1.9750 2.0826 4 0.3819 0.0849 0.4245 1.802 2380.1 364.4 2362.3	Blumbint	2156	84/19	1.6931	1,8309	4	0.1602	0.0961	0,4805	1.762	2040.4	487.5	2507.9	
100000 2515 70/19 1.0510 1.9144 4 0.1744 0.0834 0.4070 1.602 2187.9 330.4 2223.3 Jone 2515 70/19 1.9750 2.0825 4 0.3819 0.0846 0.4245 1.860 2380.1 264.0 2765	Kiwi	2167	72/7	1.7022	1.7758	4	0.1735	0.1157	0.3471	1.735	2051.4	249.2	2300.5	
	Joree	2515	76/10	1.9750	2.0826	4	0.1810	0.0849	0.4246	1.880	2380.1	364.9	2745.0	

TABLE 1-29 ALUMINUM CONDUCTOR STEEL REINFORCED (ACSR)

Notes: (1) Data based on a nominal cable manufactured in accordance with ASTM 8 232.

(2) Resistance and ampacity based on an aluminum conductivity of 61.2% IACS at 20°C and a steel conductivity of 8% IACS at 20°C.

(3) Ampacity based on a 75°C conductor temperature, 25°C ambient temperature, 2 ft/sec wind, in sun, with an emissivity of 0.5 and a coefficient of solar absorption of 0.5, at sea level.

(4) Rated strengths based on Class A galvanized steel core wire in accordance with ASTM B 498.

Attachment D: OPGW Properties

able Data											88
File	C:\Users\0r	7277\Docum	ents_Aypa\F	LS Model(Cables\CC-38	-48-551.wir					
Description	AFL OPGW	/ DNO-10162	CC-38/48/55	1							
Manufacturer						Stock Number	er				
Cable Type	Unknown	~	Size Labe			3	Disp	lay Colo	r 📃		
hysical Electri	ical Notes	í.									
Bimetallic Co	onductor					Strends	Numb	er	Diameter (in)		
Cable Model			The par	ameters be	low are used t	to model sag and tens	ion for this ca	ble.			
Nonlinear c Linear elast	cable model (s fic with permar	eparate poly sent stretch d	nomials for in ue to creep p	itial and cre roportional t	ep behavior f to creep weat	or inner and outer mate her case tension	erials)				
Cross section ar	rea (in^2)	0.1801	Outside die	meter (in) 0.551	Unit weight	(lbs/ft) 0.355		Ultimate tension Detault Tension	(ibs)	16464
Temperature at	which strend d	lata below ob	tained	(deg	F) 75	Number of independent other wires with a Conductor is a supporting all	andent wires (spacer) a J-Power Syn tension.	1 unless stems GA	messenger supporting	ig with c	1 core
Final modulus of	f elasticity			(osi/100)	160000						
Thermal expans	sion coeff.			(/100 deg)	0.00075						
Polynomial coet	fficients (all str	ains in %, stra	lise in psi)								
	a0	al	a2	a3	a4						
Stress-strain	-403.4	163393	-50293.4	-382250	599957						
	c0	c1	c2	c3	c4	1					
Creep	553.4	104063	54901.6	-268157	563386	L.					
Gen	erate Coefficie	ints for strand	s from points	on stress-st	train or creep	curves	Graph	Cable F	roperties	able De	sta Report
										OK	Cancel

Attachment E: OHGW Properties

			Dia	meter			Resistance			Reactance @ 1 ft Spacing, 60 Hz						
					1.			ac-60 Hz				Inductive, Xa				
Size	Stranding	Area Sq. in	Strand in	Complete Cable in	Weight lbs/1000 ft	Rated Strength Ibs	dc 20°C Ω/mile	10 Amps Ω/mile	40 Amps Ω/mile	70 Amps Ω/mile	100 Amps Ω/mile	10 Amps Ω/mile	40 Amps Ω/mile	70 Amps Ω/mile	100 Amps Ω/mile	Capacitive X'a MΩ-mile
High-Strength Steel-Class A Galvanizing (1)																
5/8*	7	0.2356	0.207	0.621	813	29,600	2.15	2.22	2.27	2.44	2.60	0.97	1.12	1.26	1.39	0.1083
1/2*	7	0.1497	0.165	0.495	517	18,800	3.38	3.48	3.57	3.84	4.08	1.01	1.24	1.44	1.63	0.1150
7/16*	7	0.1156	0.145	0.435	399	14,500	4.38	4.51	4.62	4.97	5.28	1.04	1.33	1.58	1.81	0.1188
3/8"	7	0.0792	0.120	0.360	273	10,800	6.40	6.59	6.75	7.26	7.71	1.10	1.50	1.84	2.15	0.1244
							Utilities	s Grade Stee	I (1) (2)							
7/16"	7	0.1156	0.145	0.435	399	18,000	4.53	4.66	4.74	5.01	5,36	1.00	1.28	1.52	1.74	0.1188
3/8"	7	0.0792	0.120	0.360	273	11,500	6.40	6.59	6.75	7.26	7.71	1.10	1.50	1.84	2.15	0.1244
						Extra	High-Strengt	th Steel-Clas	s A Galvanizi	ing (1)						
5/8"	7	0.2356	0.207	0.621	813	42,400	2.22	2.28	2.32	2.46	2.62	0.93	1.08	1.21	1.35	0.1083
1/2"	7	0.1497	0.165	0.495	517	26,900	3.50	3.60	3.66	3.87	4.13	0.98	1.20	1.39	1.57	0.1150
7/16"	7	0.1156	0.145	0.435	399	20,800	4.53	4.66	4.74	5.01	5.36	1.00	1.28	1.52	1.74	0.1188
3/8"	7	0.0792	0.120	0.360	273	15,400	6.63	6.81	6.93	7.33	7.83	1.06	1.44	1.77	2.07	0.1244
						Extra	High-Strengt	th Steel-Clas	s C Galvanizi	ing (1)						
7/16*	7	0.1156	0.145	0.435	399	20,800	-	3.68	3.69	3.73	3.77	0.83	0.85	0.89	0.95	0.1188
3/8"	7	0.0792	0.120	0.360	273	15,400	_	5.42	5.43	5.45	5.51	0.82	0.84	0.88	0.93	0.1244
5/16*	7	0.0595	0.104	0.312	205	11,200	_	6.84	6.84	6.87	6.89	0.85	0.87	0.94	1.04	0.1287

TABLE 1-43 HIGH-STRENGTH, UTILITIES GRADE, AND EXTRA-HIGH-STRENGTH STEEL CONDUCTORS

Notes: (1) Data based on a nominal cable manufactured in accordance with ASTM A 363 and ASTM A 475.

(2) Data accumulated by EPRI, and published in "The EPRI Transmission Line Reference Book - 345 KV and Above / Second Edition."

(3) — Data not available.

Appendix 2E Corona Losses Report

Corona Losses

Prairie Song Reliability Project 500kV Transmission Line

Prepared for Prairie Song Reliability Project LLC

Prepared by Sargent & Lundy

Report SL-15474-001-EAD-001 Revision 1 May 12, 2025 ISSUED FOR PERMIT

55 East Monroe Street Chicago, IL 60603-5780 USA 312-269-2000 www.sargentlundy.com



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Corona Losses



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Corona Losses


VERSION LOG

Version	Issue Date	Sections Modified
0	4/1/2025	Preliminary – Issued for Review
1	5/12/2025	Issued for Permit

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ISSUE SUMMARY AND APPROVAL PAGE

This is to certify that this document has been prepared, reviewed, and approved in accordance with Sargent & Lundy's Standard Operating Procedure SOP-0405, which is based on ANSI/ISO/ASSQC Q9001 Quality Management Systems.

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1. INTRODUCTION

1.1. PURPOSE

The Prairie Song Reliability Project is a proposed BESS facility located in Acton, California, that will be connected to a Southern California Edison (SCE) Substation via single circuit 500kV overhead transmission lines. The purpose of the calculation is to evaluate the corona losses for those 500kV transmission lines based on the tower structure used and their corresponding conductor related properties.

1.2. SCOPE

The scope of this calculation involves the evaluation of the corona losses for different tower configurations of the 500kV transmission line using SESEnviroPlus. The corona losses are calculated using EPRI Method (Ref. 7.1).

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2. INPUT DATA

2.1. TOWER CONFIGURATIONS

The 500kV transmission lines have three different configurations which are: suspension delta monopole, vertical monopole, and an SCE lattice tower. All towers' configurations are shown in Figures 2-1 to 2-3.

2.2. CONDUCTOR & SHIELD WIRES

The 500kV transmission line utilizes a triple bundle "Drake" ACSR conductor for the first two towers (suspension delta monopole and vertical monopole). However, the SCE lattice tower utilizes a double bundle "Bluebird" ACSR conductor. The line also consists of two (2) shield wires which are ½" 7 Strand EHS steel and AFL DNO-10162 CC-38/48/551 OPGW.

2.3. CONDUCTOR AND SHIELD WIRES SAG

The conductors and the shield wires sags used in this calculation were at max operating temperatures and at maximum span (worst-case sags). Table 2-1 shows the sags for each tower configuration and for each conductor and shield wire.

Tower Configuration	Sag (ft)						
	Conductor	½" EHS Steel	38/48/551 OPGW				
Suspension Delta Monopole	Drake ACSR: 17.57 ft @ 212 °F	13.09 ft @ 120 °F	13.58 ft @ 120 °F				
Vertical Monopole	Drake ACSR: 22.91 ft @ 212 °F	17.08 ft @ 120 °F	15.35 ft @ 120 °F				
SCE Lattice Tower	Bluebird ACSR: 60.57 ft @ 212 °F	45.98 ft @ 120 °F	44.58 ft @ 120 °F				

Table 2-1: Worst-Case Conductor and Shield Wires Sags for each Tower Configuration

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Figure 2-3: SCE Lattice Tower Characteristics

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2.4. CONDUCTOR & SHIELD WIRES PHASING



The phasing for each tower configuration is shown below.

Figure 2-4: Conductors and Shield Wires Phasing for each Tower Configuration

2.5. ATMOSPHERIC CONDITIONS AND ALTITUDE

The altitude, pressure at sea level, and the temperature used to calculate the corona losses are 3010 ft, 760 mm/HG, and 21.11 °C. Heavy rain and fair weather are the two weather conditions that are used to calculate the corona losses.



3. ASSUMPTIONS

3.1. ASSUMPTIONS REQUIRING VERIFICATION

There are no assumptions that require verification.

3.2. ASSUMPTIONS/ENGINEERING JUDGMENTS NOT REQUIRING VERIFICATION

A. A uniform soil resistivities of 100 Ω -m is assumed.

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4. METHODOLOGY

This corona losses are based on computations performed by SESEnviroPlus (part of CDEGS version 17.1) software program.

The methodology for determining the corona losses for each tower configuration are as follow:

- A. Create the circuit/s for the tower.
- B. Enter the phase conductors and shield wire characteristics and locations.
- C. Choose the voltage magnitude and angle for each phase.
- D. Choose the appropriate atmospheric conditions, altitude, and weather conditions.
- E. Calculate corona losses for the tower using the calculation method chosen.

Computer Usage

The computer programs used to produce this calculation are Microsoft Word, and CDEGS, version 17.1 (S&L Program Number 03.7.764-17.1.9978). The main text portion of the calculation has been produced with Microsoft Word. The CDEGS program is used to calculate the corona losses.

5. RESULTS

A summary of the corona losses for each tower configuration under fair weather and heavy rain weather conditions are shown in Tables 6-1 and 6-2, respectively.

Table 5-1: Corona Losses for each Tower Configuration under Fair Weather Condition

Towor Configuration	Losses (Watts/m)						
	Line 1 Bundle 1	Line 1 Bundle 2	Line 1 Bundle 3	Total			
Suspension Delta Monopole	0.213	0.142	0.165	0.52			
Vertical Monopole	0.131	0.211	0.181	0.523			
SCE Lattice Tower	0.229	0.412	0.272	0.913			

Table 5-2: Corona Losses for each Tower Configuration under Heavy Rain Weather Condition

Tower Configuration	Losses (Watts/m)						
	Line 1 Bundle 1	Line 1 Bundle 2	Line 1 Bundle 3	Total			
Suspension Delta Monopole	30.5	20.4	23.6	74.5			
Vertical Monopole	18.7	30.2	25.9	74.6			
SCE Lattice Tower	32.7	58.9	38.9	130.5			

Corona Losses

6. CONCLUSION

The purpose of this calculation was to calculate the corona losses for the 500kV transmission lines connecting the Prairie Song Reliability Project to an SCE substation for each tower configuration. The results showed that the total corona losses for each tower configuration (Suspension Delta Monopole, Vertical Monopole, SCE Lattice Tower) under fair weather condition were 0.52 W/m, 0.523 W/m, and 0.913 W/m, respectively. Moreover, the total losses for each tower configuration and under heavy rain weather condition were 74.5 W/m, 74.6 W/m, and 130.5 W/m, respectively.

Mitigation techniques are recommended when the corona losses are high, or when they cause other issues such as Radio & TV interference or audible noise. These losses vary with the transmission line design as shown earlier.

Corona Losses



7. REFERENCES

7.1. EPRI AC Transmission Line Reference Book – 200 kV and Above, Third Edition, Electric Power Research Institute.

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ATTACHMENTS

Attachment A – SESEnviroPlus Results

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DATE OF RUN (Start)= DAY 25 / Month 3 / Year 2025 STARTING TIME= 11:57:12:17

	GEN	ERAT EPF	「ING FUN RI/GE's method Losses W/m	СТІОNS		
			AC VOLTAGE			
Line	No.	Bundle	No. RI	AN	Losses	
			(dB)	(dBA)	(Watts/m)	
	1	1	NA	NA	30.5	
	1	2	NA	NA	20.4	
	1	3	NA	NA	23.6	
	1	901	NA	NA	0.00	
	1	902	NA	NA	0.00	
	Weat	her cond	ditions: HEAVY R	AIN		
1W/m	To [.]	tal AC d	corona losses:	74.471 Watts/m	or 18.720	dB above

SES-ENVIRO package - PAGE 114

RUN:

	G	E	Ν	E	R	A ⁻ EPI	FI RI/	N GE's	5 5 m	F iet	=ι the	U od	N	C	Т	I	0	١	N S				
							AC	VOL	. TA	GE	Ξ												
Line	No.			Βι	ind	lle	No	•		R]	C								AN			Losses	
									(dE	3)							((dBA)		(Watts/	m)
	1					1				NA	4								NA			0.213	
	1					2				NA	1								NA			0.142	
	1					3				NA	1								NA			0.165	
	1				90)1				NA	1								NA			0.00	
	1				90	12				NA	7								NA			0.00	

Weather conditions: FAIR (dry conductors)

dB above

1W/m

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Total AC corona losses: 0.52065

RUN:

END OF MODULE SES-ENVIRO

Watts/m or -2.8345

Vertical Monopole

DATE OF RUN (Start)= DAY 25 / Month 3 / Year 2025 STARTING TIME= 12:10:07:59

	GEN	E R A T EPRI	ING FUN I/GE's method Losses W/m	СТІОNS		
Line	No.	Bundle N	No. RI (dB)	AN (dBA)	Losses (Watts/m)	
	1	1	NA	NA	18.7	
	1	2	NA	NA	30.2	
	1	3	NA	NA	25.9	
	1	901	NA	NA	0.00	
	1	902	NA	NA	0.00	
	Weat	her condi	itions: HEAVY I	RAIN		
1W/m	To	tal AC co	orona losses:	74.758 Watts/m o	r 18.737	dB above

SES-ENVIRO package - PAGE 114

RUN:

	G	Ε	Ν	Ε	R	A EP	T I RI/	N (GE':	3 s me	F l tha	J N 5d	C	Т	I	0	NS				
							Lo	sse	5 W/	m										
							AC	VO	TAG	Е										
Line	No.			Вι	und	lle	No		R	Ι						AN		L	osses	
									(d	B)						(dBA)	(W	atts/m)
	1					1			Ν	А						NA			0.131	
	1					2			N	А						NA			0.211	
	1					3			Ν	А						NA		8	0.181	
	1				96	91			Ν	А						NA			0.00	
	1				96	92			Ν	A						NA			0.00	

Weather conditions: FAIR (dry conductors)

Total AC corona losses: 0.52266 Watts/m or -2.8178 dB above

1W/m

SES-ENVIRO package - PAGE 115

RUN:

END OF MODULE SES-ENVIRO

DATE OF RUN (Start)= DAY 25 / Month 3 / Year 2025 STARTING TIME= 13:42:57:63

	GEN	E R A T EPR	ING FUN I/GE's method Losses W/m	ICTIONS		
Line	No.	Bundle	No. RI	AN	Losses	
			(dB)	(dBA)	(Watts/m)	
	1	1	NA	NA	32.7	
	1	2	NA	NA	58.9	
	1	3	NA	NA	38.9	
	1	901	NA	NA	0.00	
	1	902	NA	NA	0.00	
1W/m	Weat To	her cond tal AC c	litions: HEAVY	RAIN 130.46 Watts/m o	or 21.155	dB above

SES-ENVIRO package - PAGE 108

RUN:

	G	Е	Ν	Е	R	А	т	Ι	N	3	F	=	U	Ν	С	Т]	0	ΝS						
						ΕP	RI	/0	Ε' :	5 m	et	th	00	t											
							L	os	se	5 W	/n	n													
							А	С	VOI	TA	GE	Ξ													
Line	No.			Bι	und	lle	Ν	ο.			R]	Γ							AN				Losse	es	
										(dE	3)							(dBA)		(Watts	s/m)	
	1					1					NA	4							NA				0.22	29	
	1					2					N٨	4							NA				0.41	12	
	1					3					N٨	4							NA				0.27	72	
	1				96	91					NA	4							NA				0.6	90	
	1				96	92					NA	4							NA				0.0	90	

Weather conditions: FAIR (dry conductors)

Total AC corona losses: 0.91207 Watts/m or -0.39972 dB above

1W/m

SES-ENVIRO package - PAGE 109

RUN:

END OF MODULE SES-ENVIRO

Appendix 2F Decommissioning Plan

Draft Decommissioning Plan

Prairie Song Reliability Project

JUNE 2025

Prepared for:

PRAIRIE SONG RELIABILITY PROJECT LLC

Project Applicant

CALIFORNIA ENERGY COMMISSION

Lead Agency

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Acronyms and Abbreviations

Acronym/Abbreviation	Definition
Applicant	Prairie Song Reliability Project LLC
BESS	battery energy storage system
gen-tie	generation interconnection
LFP	lithium iron phosphate
LORS	laws, ordinances, regulations, or standards
POI	Point of Connection
Project	Prairie Song Reliability Project
SCE	Southern California Edison

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1 Introduction

This Draft Decommissioning Plan establishes the framework to conduct decommissioning activities for the permanent closure of all or a portion of the Project. This Draft Decommissioning Plan describes the approach for removal and/or proper abandonment of facilities and equipment associated with the Project and describes potential land restoration activities. In the event of unexpected, or planned, permanent cessation of operations, the Applicant will submit a Final Decommissioning Plan to the California Energy Commission for approval prior to planned decommissioning activities that will incorporate then-applicable laws, ordinances, regulations, and standards (LORS).

1.1 Project Overview and Location

Prairie Song Reliability Project LLC, a Delaware limited liability company (Applicant), a subsidiary of Coval Infrastructure DevCo LLC, a Delaware limited liability company, proposes to construct, operate, and eventually repower or decommission the up to 1,150-megawatt Prairie Song Reliability Project (Project) located on up to approximately 100 acres in unincorporated Los Angeles County. The primary components of the Project include a containerized battery energy storage system (BESS) facility utilizing lithium-iron phosphate cells, or similar technology, operations and maintenance (O&M) buildings, an on-site Project substation, a 500-kilovolt (kV) overhead generation interconnection (gen-tie) transmission line, and interconnection facilities within the existing Southern California Edison (SCE) owned and operated Vincent Substation.

Electrical energy will be transferred from the existing power grid to the Project for storage and from the Project to the power grid when additional electricity is needed. The Project will provide additional capacity to the electrical grid to assist with serving load during periods of peak demand by charging when demand is low and discharging when demand is high. This operating principle increases the integration of additional intermittent renewable energy, such as wind and solar, in California's energy mix and reduces the need to operate natural gas power plants. The Project will also serve as an additional local/regional capacity resource that will enhance grid reliability, particularly to the Los Angeles Basin local reliability area and may allow for the deferral or avoidance of regional transmission facilities.

The Project will be remotely operated and monitored year-round as well as supported by on-site O&M staff seven (7) days a week. The Project will be available to receive or deliver energy 24 hours a day and 365 days a year. During the operational life of the Project, qualified technicians will inspect the Project facilities and conduct necessary maintenance to ensure reliable and safe operational readiness.

The Project will be located in unincorporated Los Angeles County (County), California, south of State Route 14, approximately three (3) miles northeast of the unincorporated community of Acton. The Project is within the U.S. Geological Survey 7.5-minute Acton and Pacifico Mountain Quadrangles, Township 5N, Range 12W, Sections 27, 28, 33 and 34. The BESS site is comprised of Assessor's Parcel Numbers 3056-017-007, 3056-017-020, 3056-017-021, 3056-019-013, 3056-019-026, 3056-019-037, and 3056-019-040. Development of the BESS facility will occur on an area of land situated between two existing transportation corridors, the Antelope Valley Freeway (State Route 14) to the north and Southern Pacific Railroad lines and Carson Mesa Road to the south, that are approximately 1,200 feet apart.

The Project will utilize one (1) of two (2) potential gen-tie routes. Either route will extend south and east from the Project substation, crossing Southern Pacific Railroad tracks and West Carson Mesa Road, and then proceed

northeast to the Point of Interconnection (POI) at the Vincent Substation. The Northern Gen-Tie Route is approximately 1.1 miles long, and will be sited on Assessor's Parcel Numbers 3056-015-008, 3056-015-023, 3056-017-026, 3056-017-904, and 3056-017-905, 3056-005-816, 3056-005-817, 3056-005-818, 3056-015-801, and 3056-015-802. The Southern Gen-Tie Route is approximately 1.8 miles long, and will be sited on Assessor's Parcel Numbers 3056-015-008, 3056-015-023, 3056-017-016, 3056-017-022, 3056-017-026, 3056-017-027, 3056-017-028, 3056-015-008, 3056-017-023, 3056-017-016, 3056-017-022, 3056-017-026, 3056-017-027, 3056-017-028, 3056-027-007, 3056-027-031, 3056-005-816, 3056-005-817, 3056-005-818, 3056-015-801, and 3056-015-802. The Project will also include three (3) fiber optic telecommunications lines: one will be installed aboveground on the gen-tie structures (along whichever gen-tie route is ultimately selected), and the other two will be installed underground within the Southern Gen-Tie Route corridor. The two other fiber optic lines will be installed underground within the Southern Gen-Tie Route corridor regardless of which Gen-Tie Route corridor option is selected. The Project's interconnection facilities will be located within the SCE Vincent Substation. Land uses in the immediate vicinity of the Project include undeveloped and rural lands, multiple high-voltage transmission lines and an electrical substation, paved and rural roads, State Route 14, and railroad lines.

2

2 Plan Purpose and Objectives

The purpose of this Draft Decommissioning Plan is to provide an initial framework for decommissioning activities for the permanent closure of all or a portion of the Project. This Draft Decommissioning Plan describes the approach for removal and/or proper abandonment of facilities and equipment associated with the Project and describes anticipated land restoration activities in accordance with applicable regulatory codes and mitigation commitments.

The decommissioning phase of the project will include an Emergency Response Plan. The Emergency Response Plan includes the plan development as well as regular training and updates. The Emergency Response Plan takes into account common items, including a description of the equipment; procedures on how to safely shutdown, deenergize, or isolate the equipment to reduce the risk of fire, electric shock, and personal injuries; emergency procedures to be followed in case of fire, explosion, release of vapors, or other emergency; safety data sheet procedures and schedules for on-site training; and any other procedures or critical safety issues specific to the BESS installation. The Applicant will submit a Final Decommissioning Plan to the California Energy Commission for approval prior to planned decommissioning activities that will incorporate then-applicable LORS.

This Draft Decommissioning Plan identifies the following:

- 1. Components involved with the construction of the Project.
- 2. Decommissioning activities for the Project, which may include removal of industrial facilities and compliance with then-applicable LORS, including recycling of equipment, hazardous waste, and sampling and cleanup issues; and disposal of all solid and hazardous waste.

Laws, Ordinances, Regulations, and Standards Related to Decommissioning

There are no federal, state, or local LORS specific to standalone BESS. Decommissioning of the Project would be completed in conformance with the LORS that are in effect at the time of decommissioning, and/or conditions of compliance from the California Energy Commission.

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3 Project Components

The Project will include construction, O&M, and eventual decommissioning of an up to 1,150-megawatt BESS. A 500kV gen-tie connecting the Project substation to the POI within the existing SCE Vincent Substation, will facilitate charging and discharging to the electrical grid. The BESS Facility will include the following primary components:

- BESS Enclosures
- Power Conversion Systems
- Medium Voltage Collection System
- Project Substation, Control Building, and Telecommunications Facilities
- Access Roads
- Laydown Yards
- Stormwater Detention Facilities
- Site Security
- Fire Detection and Suppression System
- O&M Buildings

The Project's components that are anticipated to be subject to decommissioning are summarized below.

3.1 Grading and Civil Work

Following site preparation activities, grading and civil work would commence. Construction activities during this phase would include excavation and grading of the Project site.

Conventional grading would be performed throughout the Project site but minimized to the maximum extent feasible to reduce unnecessary soil movement that may result in dust. Land-leveling equipment, such as a smooth steel drum roller, would be used to even the ground surface and compact the upper layer of soil to a value recommended by a geotechnical engineer for structural support. Following major civil work within the BESS facility site, site access roads and driveways, the perimeter and substation access roads, and interior roadways to access the laydown areas and BESS yards would be graded, compacted, and surfaced with gravel or aggregate. Suitable base material would be imported to create necessary compaction under the equipment, as determined by geotechnical testing and Project specifications. Once the roadways have been constructed, the Project perimeter wall and access gates would be constructed.

3.2 Battery Energy Storage System Facility

The energy storage facility will utilize a modular and containerized BESS. There are several battery cell technologies commercially available, with one of the most common presently being lithium iron phosphate (LFP) cells, or similar. LFP technology is considered one of the safest, most efficient, and commercially financeable energy storage technologies available on the market. The initial Project concept has been developed assuming an LFP technology. By the time the Project reaches the procurement stage, it is possible for other battery cell technology with proven safety and performance records to be suitable for the Project. Although the number and dimensions of the



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containers may change (as it does between LFP technology providers), the technology ultimately procured will result in potential environmental impacts substantially similar to, or less than, those analyzed based on this Project Description. The Project will provide defensible space by setting back all BESS enclosures at least 100 feet from the property boundary.

The BESS enclosures will be prefabricated off site and arrive at the site ready to be installed and commissioned. Each modular BESS enclosure will include battery packs on racks, a battery management system, fire detection systems, and ancillary power electronics within a specialized steel-framed, non-occupiable container. The BESS enclosures will not exceed 15 feet in height.

Over the life of the project the storage capacity of the battery cells will naturally degrade. The project will implement an augmentation strategy to maintain the contractually required capacity of the system. Augmentation will entail either a capacity maintenance approach of adding/replacing individual battery modules in the existing BESS yard or designing the BESS system to incorporate space for additional BESS enclosures for later augmentation.

Additional components of the BESS facility include a Project substation and O&M buildings. The on-site Project substation would include main power transformers. When the BESS facility is charging, power from the regional electric transmission grid would be stepped down from 500kV to 34.5kV and sent from the Project substation through the medium voltage collection system and Power Conversion System units into the battery packs within the BESS enclosures. When the BESS facility is discharging, power from the battery packs within the BESS enclosures would be sent to the Power Conversion System units, stepped up to 34.5kV by a medium voltage transformer, and transported to the Project substation through the medium voltage collection system before being stepped up to 500kV at the main power transformers and delivered back to the regional electric transmission grid. A control building would be installed within the Project substation area and contain an energy management system, metering, and telecommunication equipment for communication with SCE/California Independent System Operator facilities and to support remote Project operations monitoring.

The O&M buildings would be constructed concurrently with the BESS facility and would include parking, outside equipment and laydown areas, basic offices, meeting rooms, washroom facilities and climate-controlled storage for certain equipment and materials for the Project's anticipated 16 full-time staff.

3.3 Gen-Tie Line

The 500kV gen-tie line would originate at the Project substation, within the BESS facility site, and extend south and east overhead, crossing Southern Pacific Railroad tracks and West Carson Mesa Road, as close to perpendicular as possible, and then proceed northeast to the POI at the Vincent Substation. The Project proposes a Northern Gen-Tie Route; the selected route would be determined pending detailed project design.

The Point of Change of Ownership will be located on Assessor's Parcel Number 3056-015-023. The Point of Change Ownership is the point where the conductors of the gen-tie line are attached to the Last Structure, which will be connected on the side of the last Project owned structure (Last Structure) facing Vincent Substation. The Project will own and maintain the Last Structure, the conductors, insulators and jumper loops from such Last Structure to the Interconnection Customer's Large Generating Facility. SCE will own and maintain the Vincent Substation, as well as all towers, transmission lines, circuit breakers, disconnects, relay facilities and metering within the Vincent Substation, together with the line drop, in their entirety, from the Last Structure to Vincent Substation. SCE will own the insulators that are used to attach the Project-owned conductors to the Last Structure.



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Telecommunications equipment will be installed between the control building at the Project substation and the Vincent Substation to facilitate communication with SCE/California Independent System Operator facilities. SCE interconnection policies for 500kV systems require three (3) redundant fiber optic cables to be installed on diverse paths without a single point of failure (i.e., both fiber optic lines cannot be installed on a single set of structures). Between the control building within the Project substation area and the Vincent Substation, the Applicant and SCE will install one (1) of the three (3) fiber optic lines above ground on the gen-tie structures. The two other fiber optic lines will be installed underground within the Southern Gen-Tie Route corridor and separated by 25 feet.

A transmission structure access path would be located within portions of the transmission corridor outside of the BESS facility and Vincent Substation footprints and generally follow the centerline of the gen-tie.

3.4 Security

The BESS facility site will be enclosed with an 8-foot-tall block wall topped with 1 foot of three-strand barbed wire or razor wire. The wall will be installed on the outside of the perimeter roads. The wall will be required to prevent unauthorized access and to comply with human health and safety regulations. Gates will be installed at various access points along the wall and equipped with locks and knox boxes to allow for authorized personnel (e.g., transmission service provider, O&M staff, emergency response) to access appropriate portions of the BESS facility site.

Lighting will only be in areas where it is required for safety, security, or operations. Controlled security lighting, no more than 28 feet tall, will be installed at the Project substation and around the BESS yards, in accordance with applicable requirements and regulations. Permanent motion-sensitive, directional security lights will be installed to provide adequate illumination around the substation area and points of ingress/egress. All lighting will be shielded and directed downward to minimize the potential for glare or spillover onto adjacent properties, compliant with applicable codes and regulations. Security cameras will be placed on site and monitored 24/7.
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PRAIRIE SONG RELIABILITY PROJECT / DRAFT DECOMMISSIONING PLAN

4 Closure

Facility closure can be temporary or permanent. Temporary closure is defined as a shutdown for a period exceeding the time required for normal maintenance, with an intent to restart in the future. Causes for temporary closure may include equipment upgrades and repowering the project or damage to the project components from earthquake, fire, storm, or other natural acts. Permanent closure is defined as a cessation in operations with no intent to restart operations.

Temporary closures are not discussed in this Decommissioning Plan because it assumes that the Project will be restarted once repairs are made or the condition causing the temporary closure is corrected. As used here, "closure" is synonymous with decommissioning and includes removal of the facilities and materials that were employed to support the operation of the facility.

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5 Decommissioning and Recycling

At the time of decommissioning, the Decommissioning Plan would be finalized and submitted to California Energy Commission for approval that describes the proposed equipment to be removed and equipment that would remain for future use, based on expected future use of the site. Decommissioning of BESS components involves dismantling the energy storage system and removing it from the site in compliance with applicable federal and local rules that govern the safe transport and disposition of used equipment or waste. Transmission interconnection facilities would remain in place for the life of the facility. At the time of full Project decommissioning, if the transmission interconnection and distribution lines and communications lines would not be further used by a public or private utility or power generator, the lines would be decommissioned. Decommissioning of the transmission and communications lines would take place only after the substation and lines are fully de-energized and made safe for removal. The above ground portion of the line would entail removal of the overhead conductors, wiring, and poles. The below ground communications lines would entail removal of the underground lines and conduit, where possible. Decommissioning would attempt to maximize recycling of all facility components. All steel and concrete would be recycled to the maximum extent possible, and the foundations would be removed to a depth of at least 3 feet below the ground surface. Aluminum, copper, and other metals from the overhead conductors would be recycled to the maximum extent possible. The key Project components to be affected by decommissioning activities are discussed below. The general decommissioning approach would be the same whether a portion of the Project or the entire Project would be decommissioned.

5.1 Decommissioning Preparation

The first step in the decommissioning process would be to assess existing site conditions and prepare the site for demolition. All site decommissioning would occur within the existing security wall; the security wall would be the last component to be removed. Preparation activities may include electrical inspections, as well as inspections of access routes, security walls/fences, and gates. Repairs or improvements may occur if inspections identify electrical, road, fencing, or gate improvements or repairs that must be made prior to decommissioning activities. Demolition debris would be placed in temporary on-site storage area(s) pending final transportation and disposal/recycling according to the procedures listed below.

5.2 BESS Removal and Recycling

During decommissioning, Project components that are no longer needed would be removed from the site and recycled. All underground cables would be excavated and removed or abandoned in place three (3) feet below grade for all underground conductors. Inverters and BESS containers would be removed from concrete foundations or piling and the foundations removed or abandoned in place 3 feet below grade. All wiring, cables, heating, cooling, and ventilation equipment would be disconnected from the BESS containers and batteries. Demolition debris and removed equipment may be cut or dismantled into pieces that can be safely lifted or carried by the on-site equipment being used.

5.2.1 Battery Recycling

Batteries would be recycled at a specialized recycling plant, and the remaining BESS components would be recycled or disposed of in accordance with the procurement documents provided by the battery manufacturer.

5.2.1.1 Battery Recycling Technology

It is anticipated that the availability of end-of-life battery recycling centers will increase along with battery production. As of late 2021, there were 32 lithium battery recycling facilities globally, with the majority located in China and four in North America. Five (5) additional plants are planned for the United States and Mexico (ACS 2022). Strategic global demand for precious metals, along with the fledgling green-energy market, continue to drive technological advances in recycling (WBUR 2022). Recycling enhancements and innovation are anticipated to be in place by the projected end of life of the proposed BESS, estimated to be approximately 40 years after the start of operations.

5.3 Access Roads and Fencing

Access roads would be disked for decompaction purposes, and the perimeter wall would be removed, if it will not be used for a future development, using rubber tired dozers, tractors, loaders, and backhoes.

5.4 Hazardous Materials and Waste

During the decommissioning process, there is a chance that hazardous waste may be generated. In the event that decommissioning activities generate hazardous waste, it would be stored, handled, and disposed of according to local, state, and federal regulations (refer to Section 3.5, Hazardous Material Handling, for additional details).

6 Site Reclamation

The decommissioning process would remove BESS-related structures and infrastructure as described in the previous chapters. The Project owner would contract with a qualified reclamation contractor to evaluate and prescribe specific reclamation measures. The reclamation contractor would coordinate with the Project owner to ensure that the prescriptions are implemented as written.

Reclamation may restore landform features, vegetative cover, and hydrologic function after closure of the facility. The process may involve either replacement of topsoil, brush, rocks, and natural debris over disturbed areas so that the site blends with the surrounding landscape, or stabilizing the soil to prepare the site for a future use.



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7 References

- ACS (American Chemical Society Publications). 2022. "Lithium-Ion Battery Recycling—Overview of Techniques and Trends." January 19, 2022. Accessed May 29, 2025. https://pubs.acs.org/doi/ 10.1021/acsenergylett.1c02602.
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