

Noise Measurement Field Surveys

FIELD NOISE MEASUREMENT DATA

PROJECT: Estrella solar projects PROJ. # 00607.20

SITE IDENTIFICATION: LT A OBSERVER(S): JCR
 ADDRESS: 51201 W Ave a-8, Lancaster, Ct 03536
 START DATE / TIME: 11/30/20 END DATE / TIME: 12/2/20

METEOROLOGICAL CONDITIONS:
 TEMP: _____ °F HUMIDITY: _____ %R.H. WIND: CALM LIGHT MODERATE VARIABLE
 WINDSPEED: _____ MPH DIR: N NE E SE S SW W NW STEADY GUSTY
 SKY: SUNNY CLEAR OVRCAST PRTLY CLOUDY FOG RAIN OTHER: _____

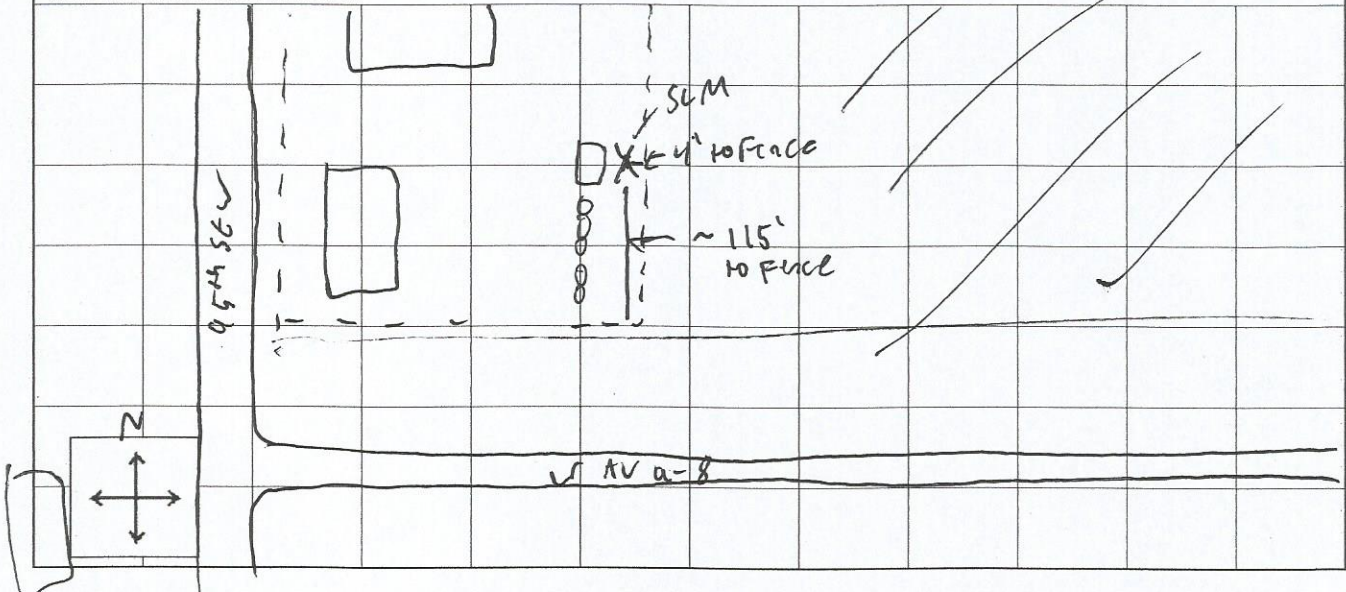
ACOUSTIC MEASUREMENTS:
 INSTRUMENT: Rion NL-21 TYPE: 1 2 SERIAL #: 6771
 CALIBRATOR: LD CAL 200 SERIAL #: 2916
 CALIBRATION CHECK, BEFORE: 119.0 AFTER: 119.1 WINDSCREEN X
 SETTINGS: A-WEIGHTED SLOW FAST FRONTAL RANDOM ANSI OTHER: _____

FILE / MEAS #	START TIME	END TIME	L _{eq}	max	1.67	8.33	25	L	50	90	99	min

COMMENTS: Started @ 12:00 pm, cleared @ 12:07 pm. (11/30/20)
Arrived @ 11:00 Am, stopped @ 11:02 Am (12/2/20)

NOISE SOURCE INFO:
 PRIMARY NOISE SOURCE: TRAFFIC AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER: _____
 ROADWAY TYPE: _____
 OTHER SOURCES: DIST. AIRCRAFT / RUSTLING LEAVES / DIST. BARKING DOGS / BIRDS / DIST. INDUSTRIAL
 DIST. CHILDREN PLAYING / DIST. TRAFFIC / DIST. LANDSCAPING ACTIVITIES / OTHER: _____

DESCRIPTION / SKETCH:
 TERRAIN: HARD SOFT MIXED FLAT OTHER: _____
 PHOTOS: _____
 OTHER COMMENTS / SKETCH: _____



Measurement LT-A

Leq to CNEL Conversion

Start time (hour)	Leq dB(A)
0:00	27.4
1:00	32.1
2:00	28.8
3:00	27.8
4:00	32.3
5:00	37.3
6:00	42.4
7:00	39.5
8:00	35.9
9:00	35.9
10:00	36.3
11:00	36.6
12:00	37.0
13:00	41.1
14:00	42.4
15:00	39.1
16:00	40.1
17:00	34.4
18:00	36.5
19:00	37.1
20:00	34.0
21:00	35.6
22:00	31.5
23:00	31.9

Night Hrs
Evening Hrs
Daytime Hrs

24 hour cumulative value (CNEL)	42.5
Daytime Average (Leq)	38.1
Nighttime Average (Leq)	35.4

FIELD NOISE MEASUREMENT DATA

PROJECT: Estrella Solar project PROJ. # 00607.20

SITE IDENTIFICATION: LT-B OBSERVER(S): SCR
 ADDRESS: Representative of 9241 W AVE A, Concord, CA 94520
 START DATE / TIME: 11/30/20 - 5:00 pm END DATE / TIME: 12/2/20 - 11:29 AM

METEOROLOGICAL CONDITIONS:
 TEMP: _____ °F HUMIDITY: _____ %R.H. WIND: CALM LIGHT MODERATE VARIABLE
 WINDSPEED: _____ MPH DIR: N NE E SE S SW W NW STEADY GUSTY
 SKY: SUNNY CLEAR OVRCAST PRTLY CLOUDY FOG RAIN OTHER: _____

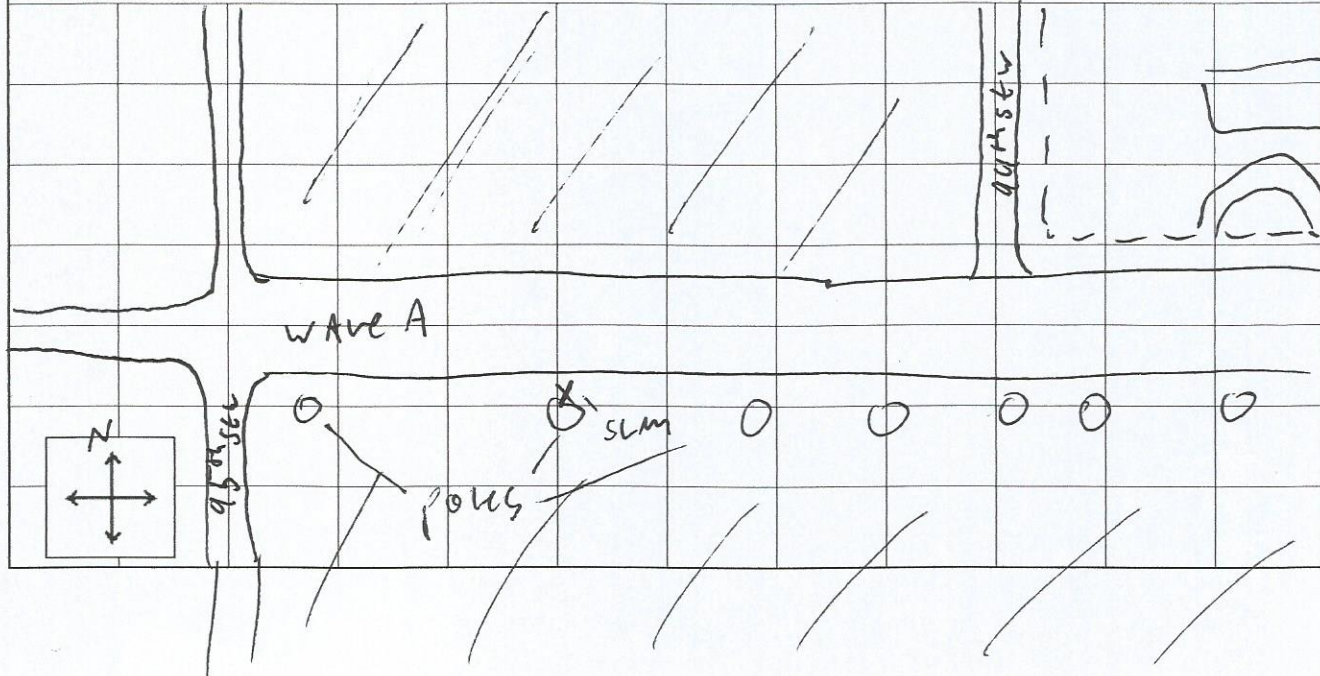
ACOUSTIC MEASUREMENTS:
 INSTRUMENT: piccolo F TYPE: 1 (2) SERIAL #: 0901
 CALIBRATOR: W CAL 200 SERIAL #: 2916
 CALIBRATION CHECK, BEFORE: 44.0 AFTER 43.7 WINDSCREEN X
 SETTINGS: A-WEIGHTED SLOW FAST FRONTAL RANDOM ANSI OTHER: _____

FILE / MEAS #	START TIME	END TIME	L _{eq}	max	1.67	8.33	25	L	50	90	99	min

COMMENTS: Started @ 5:00pm, cleared site @ 5:10pm (11/30/20)
Arrived @ 11:20 AM, stopped @ 11:29 AM (12/2/20)

NOISE SOURCE INFO:
 PRIMARY NOISE SOURCE: TRAFFIC AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER: _____
 ROADWAY TYPE: _____
 OTHER SOURCES: DIST. AIRCRAFT / RUSTLING LEAVES / DIST. BARKING DOGS / BIRDS / DIST. INDUSTRIAL
DIST. CHILDREN PLAYING / DIST. TRAFFIC / DIST. LANDSCAPING ACTIVITIES / OTHER:

DESCRIPTION / SKETCH:
 TERRAIN: HARD SOFT MIXED FLAT OTHER: _____
 PHOTOS: _____
 OTHER COMMENTS / SKETCH: _____



Measurement LT-B

Leq to CNEL Conversion

Start time (hour)	Leq dB(A)
0:00	50.6
1:00	56.9
2:00	59.0
3:00	60.8
4:00	64.9
5:00	70.1
6:00	68.9
7:00	68.4
8:00	64.5
9:00	64.9
10:00	65.1
11:00	64.1
12:00	65.0
13:00	66.6
14:00	66.4
15:00	68.6
16:00	69.0
17:00	68.1
18:00	64.8
19:00	65.8
20:00	63.9
21:00	62.6
22:00	59.5
23:00	59.1

Night Hrs
Evening Hrs
Daytime Hrs

24 hour cumulative value (CNEL)	71.4
Daytime Average (Leq)	66.3
Nighttime Average (Leq)	64.5

FIELD NOISE MEASUREMENT DATA

PROJECT: Estrella solar project PROJ. # 00607.20

SITE IDENTIFICATION: ST-A OBSERVER(S): JCR
 ADDRESS: Representative of 9627 Ave B, Lancaster, CA 93536
 START DATE / TIME: 12/2/20 - 12:13pm END DATE / TIME: 12/2/20 - 12:28pm

METEOROLOGICAL CONDITIONS:
 TEMP: 66 °F HUMIDITY: 19 %R.H. WIND: CALM LIGHT MODERATE VARIABLE
 WINDSPEED: 8-9 MPH DIR: N NE E SE S SW W NW STEADY GUSTY
 SKY: SUNNY CLEAR OVRCAST PRTLY CLOUDY FOG RAIN OTHER:

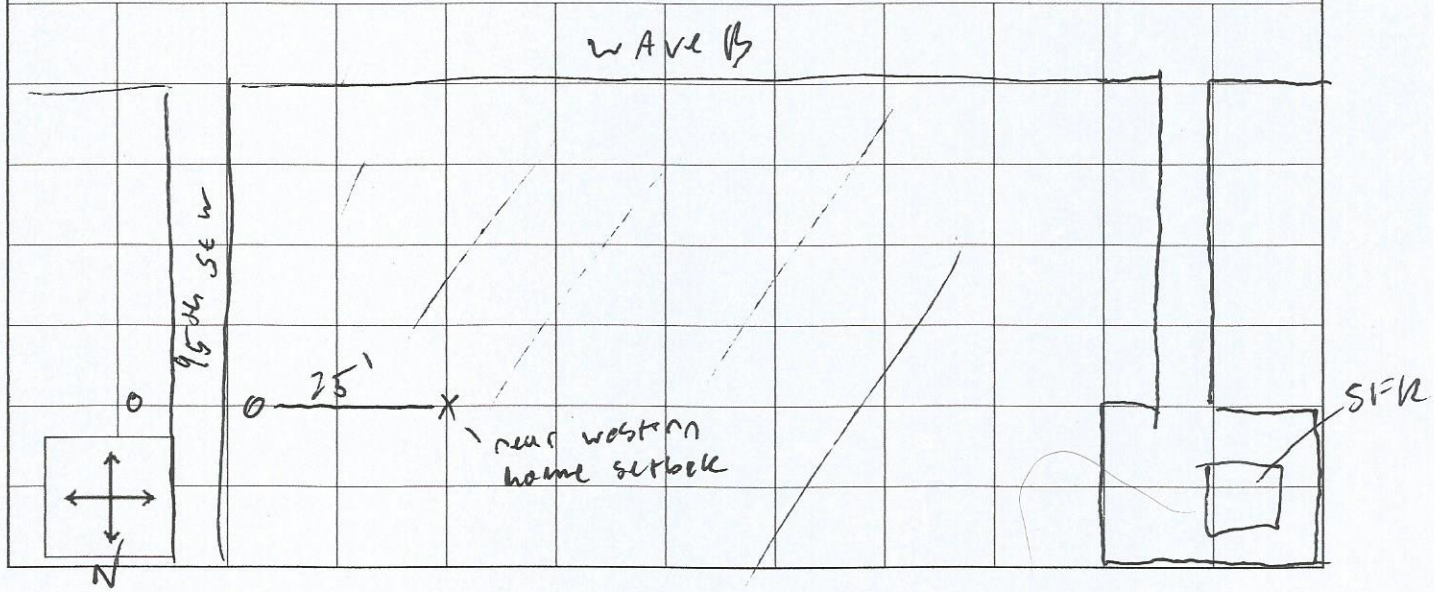
ACOUSTIC MEASUREMENTS:
 INSTRUMENT: LD LXT TYPE: 12 SERIAL #: 4006
 CALIBRATOR: LD CAL 200 SERIAL #: 2916
 CALIBRATION CHECK, BEFORE: 114.0 AFTER 114.0 WINDSCREEN X
 SETTINGS: A-WEIGHTED SLOW FAST FRONTAL RANDOM ANSI OTHER:

FILE / MEAS #	START TIME	END TIME	L									
			L _{eq}	max	1.67	8.33	25	50	90	99	min	
114	12:13pm	12:28	37.7	49.6	44.0	41.5	38.7	36.0	30.9	24.7	21.9	

COMMENTS:

NOISE SOURCE INFO:
 PRIMARY NOISE SOURCE: TRAFFIC AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER:
 ROADWAY TYPE:
 OTHER SOURCES: DIST. AIRCRAFT / RUSTLING LEAVES / DIST. BARKING DOGS / BIRDS / DIST. INDUSTRIAL
 DIST. CHILDREN PLAYING / DIST. TRAFFIC / DIST. LANDSCAPING ACTIVITIES / OTHER:

DESCRIPTION / SKETCH:
 TERRAIN: HARD SOFT MIXED FLAT OTHER:
 PHOTOS:
 OTHER COMMENTS / SKETCH:



FIELD NOISE MEASUREMENT DATA

PROJECT: Spower solar Project (Strella) PROJ. # 00607.20

SITE IDENTIFICATION: ST-13 OBSERVER(S): JCL
 ADDRESS: Near 8501 W Ave A-8, Lancaster, CA 93536
 START DATE / TIME: 12/2/20 - 11:45 AM END DATE / TIME: 12/2/20 - 12:00 PM

METEOROLOGICAL CONDITIONS:
 TEMP: 60 °F HUMIDITY: 10 %R.H. WIND: CALM LIGHT MODERATE VARIABLE
 WINDSPEED: 7-8 MPH DIR: N NE E SE S SW W NW STEADY GUSTY
 SKY: SUNNY CLEAR OVR CST PRTLY CLOUDY FOG RAIN OTHER: _____

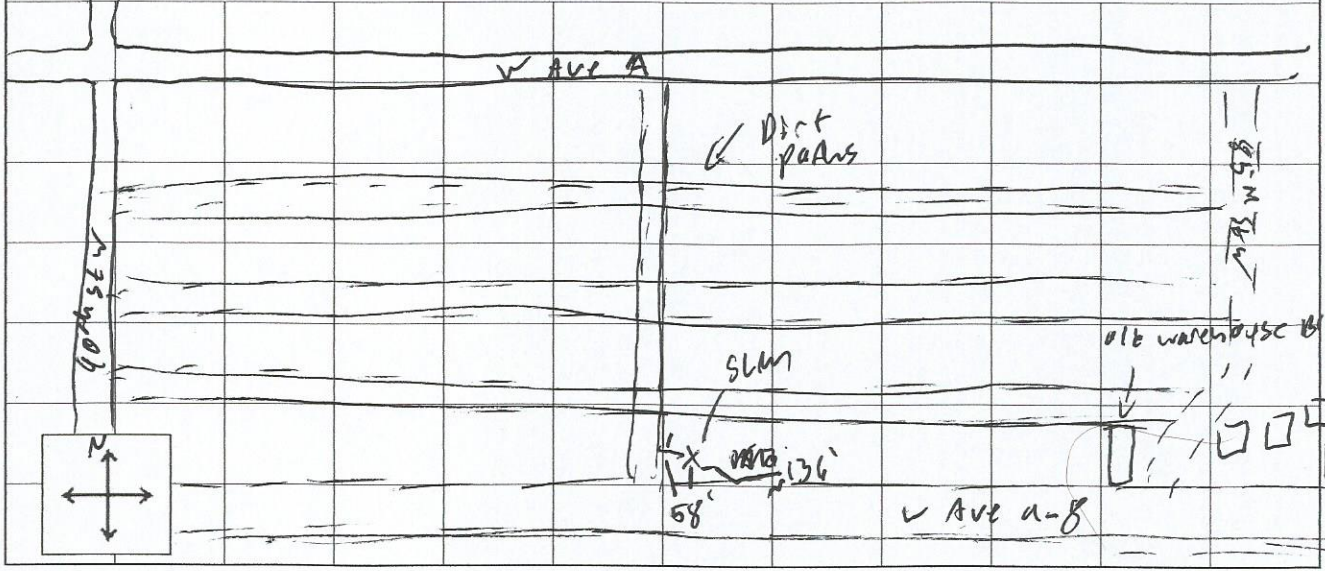
ACOUSTIC MEASUREMENTS:
 INSTRUMENT: LD LXT TYPE: 1 2 SERIAL #: 4065
 CALIBRATOR: LD CAL 200 SERIAL #: 2916
 CALIBRATION CHECK, BEFORE: 114.0 AFTER: 114.0 WINDSCREEN X
 SETTINGS: A-WEIGHTED SLOW FAST FRONTAL RANDOM ANSI OTHER: _____

FILE / MEAS #	START TIME	END TIME	L _{eq}	max	1.67	8.33	25	L	50	90	99	min
<u>113</u>	<u>11:45 AM</u>	<u>12:00</u>	<u>37.6</u>	<u>55.7</u>	<u>44.1</u>	<u>41.2</u>	<u>38.0</u>		<u>34.8</u>	<u>28.5</u>	<u>23.4</u>	<u>21.2</u>

COMMENTS: _____

NOISE SOURCE INFO:
 PRIMARY NOISE SOURCE: TRAFFIC AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER: _____
 ROADWAY TYPE: _____
 OTHER SOURCES: DIST. AIRCRAFT / RUSTLING LEAVES / DIST. BARKING DOGS / BIRDS / DIST. INDUSTRIAL
DIST. CHILDREN PLAYING / DIST. TRAFFIC / DIST. LANDSCAPING ACTIVITIES / OTHER:

DESCRIPTION / SKETCH:
 TERRAIN: HARD SOFT MIXED FLAT OTHER: _____
 PHOTOS: _____
 OTHER COMMENTS / SKETCH: _____



Construction Noise Levels

Construction Noise Analysis at Closest Receivers

Receiver	Construction Phase	Ref. Noise Level @ 50ft.	Acoustical Average Distance	Barrier Attenuation	Construction Noise Level (Leq, dBA)
SR-1	Site Prep/Grading	86	1353	0	51
SR-1	PV Installation	88	1340	0	52
SR-2	Site Prep/Grading	86	317	0	66
SR-2	PV Installation	88	328	0	68
SR-3	Site Prep/Grading	86	245	0	69
SR-3	PV Installation	88	254	0	70
SR-4	Site Prep/Grading	86	285	0	67
SR-4	PV Installation	88	281	0	69
SR-5	Site Prep/Grading	86	400	0	64
SR-5	Gen-Tie	73	115	0	64
SR-5	PV Installation	88	349	0	67
SR-6	Site Prep/Grading	86	669	0	58
SR-6	Gen-Tie	73	90	0	66
SR-6	PV Installation	88	626	0	60
SR-7	Site Prep/Grading	86	2105	0	46
SR-7	Gen-Tie	73	1050	0	40
SR-7	PV Installation	88	2092	0	47
SR-8	Site Prep/Grading	86	3150	0	41
SR-8	Gen-Tie	73	640	0	45
SR-8	PV Installation	88	3123	0	43
SR-9	Gen-Tie	73	320	0	52
SR-10	Gen-Tie	73	120	0	63
SR-11	Gen-Tie	73	180	0	59
SR-12	Gen-Tie	73	555	0	47
SR-13	Gen-Tie	73	1140	0	39
SR-14	Gen-Tie	73	125	0	63
SR-15	Gen-Tie	73	115	0	64

Construction Noise Impact Assessment at Closest Receivers

Receiver	Dist. To Project Site¹	County/City Location	Highest Estimated Average Hourly Noise Level (dBA Leq)	Applicable Noise Standard	Exceed Applicable Noise Standard?
SR-1	1120	Kern County	52	NA	NA
SR-2	140	Kern County	68	NA	NA
SR-3	85	Kern County	70	NA	NA
SR-4	115	Kern County	69	NA	NA
SR-5	115	Los Angeles County	67	75	No
SR-6	90	Los Angeles County	66	75	No
SR-7	1050	Los Angeles County	47	75	No
SR-8	640	Los Angeles County	45	75	No
SR-9	320	Los Angeles County	52	75	No
SR-10	120	Los Angeles County	63	75	No
SR-11	180	Los Angeles County	59	75	No
SR-12	555	Los Angeles County	47	75	No
SR-13	1140	Los Angeles County	39	75	No
SR-14	125	Los Angeles County	63	75	No
SR-15	115	Los Angeles County	64	75	No

¹ The distances are measured from the residential structure to the Project Site.

Operational Noise Modeling

Table 1. Noise-Producing Equipment Assumptions

Equipment Area	Equipment within each core		
	Source	Distribution of Sources	Total
Substation	25 MVA Transformer	N/A	5
	Wall-mounted HVAC Unit	N/A	5
BESS	Transformer	N/A	9
	Inverter	3 per transformer	27
	Chiller	1 per storage "cube"	272
Equipment Pads	5.5 MVA Transformer	1 per pad	8
	45 kVA Transformer	1 per pad	8
	Chillers/cooling units	2 per pad	16

Table 2. Noise Source Data

Equipment Area	Source	SPL	Distance, meters	Distance, feet
Substation	25 MVA Transformer	N/A - Sound Power Level estimated from MVA rating		
	Wall-mounted HVAC Unit	55 dBA	N/A	50 feet
BESS	Transformer	60 dBA	1 meter	3.28 feet
	Inverter	75 dBA	3 meters	9.84 feet
	Chiller	70 dBA	1 meter	3.28 feet
Equipment Pads	5.5 MVA Transformer	N/A - Sound Power Level estimated from MVA rating		
	45 kVA Transformer	N/A - Sound Power Level estimated from MVA rating		
	Inverter	64.3 dBA	10 meters	32.81 feet

Note: SPL = Sound Pressure Level = Noise Level

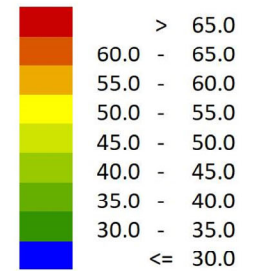
Table 3. Adjust for Noise Source Dimensions (if necessary) and Normalize to Sound Power Level

Equipment Area	Source	SPL	Approximate Distances, feet			SWL, dBA
			Closest	Farthest	Equivalent	
Substation	25 MVA Transformer		N/A			94.2
	Wall-mounted HVAC Unit	55 dBA	50.00	50.00	50.00	86.6
BESS	Transformer	60 dBA	3.28	11.20	6.06	73.3
	Inverter	75 dBA	9.84	9.84	9.84	92.5
	Chiller	70 dBA	3.28	4.28	3.75	79.1
Equipment Pads	5.5 MVA Transformer		N/A			86.0
	45 kVA Transformer		N/A			59.9
	Inverter	64.3 dBA	32.81	32.81	32.81	92.3

Note: SWL = Sound Power Level

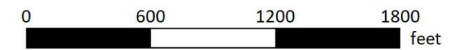
Estimated Daytime Noise Levels from Estrella Operations

Estimated Daytime L_{eq} dBA

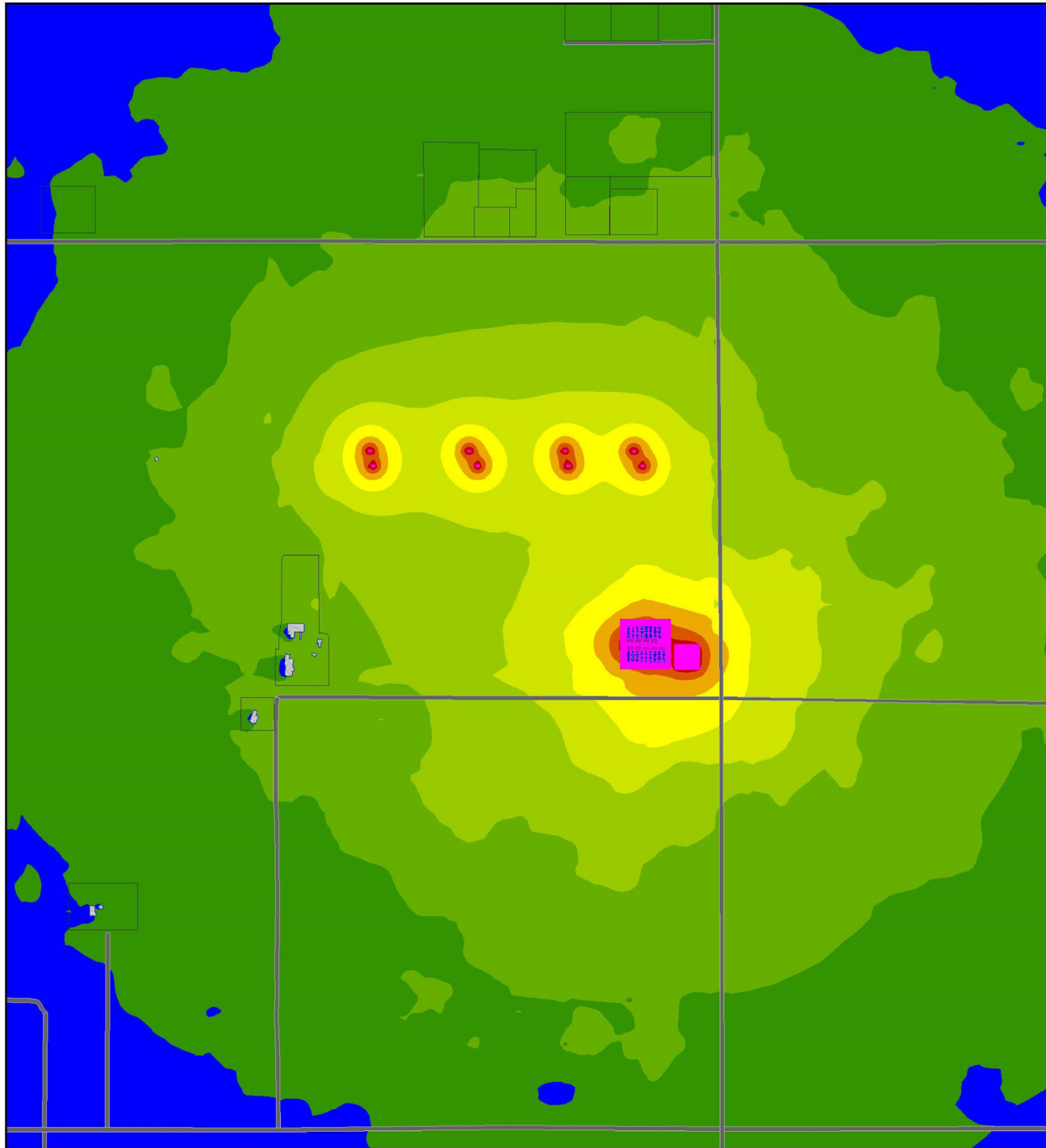


Legend

- Property Fence/Boundary
- Road
- Noise source(s)
- Building/Structure (not all structures are mapped)

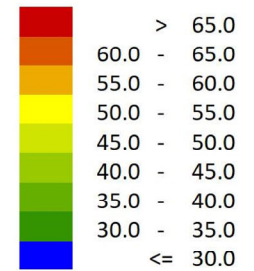


Calculation Date: March 16, 2021



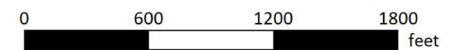
Estimated Nighttime Noise Levels from Estrella Operations

Estimated Nighttime L_{eq} dBA

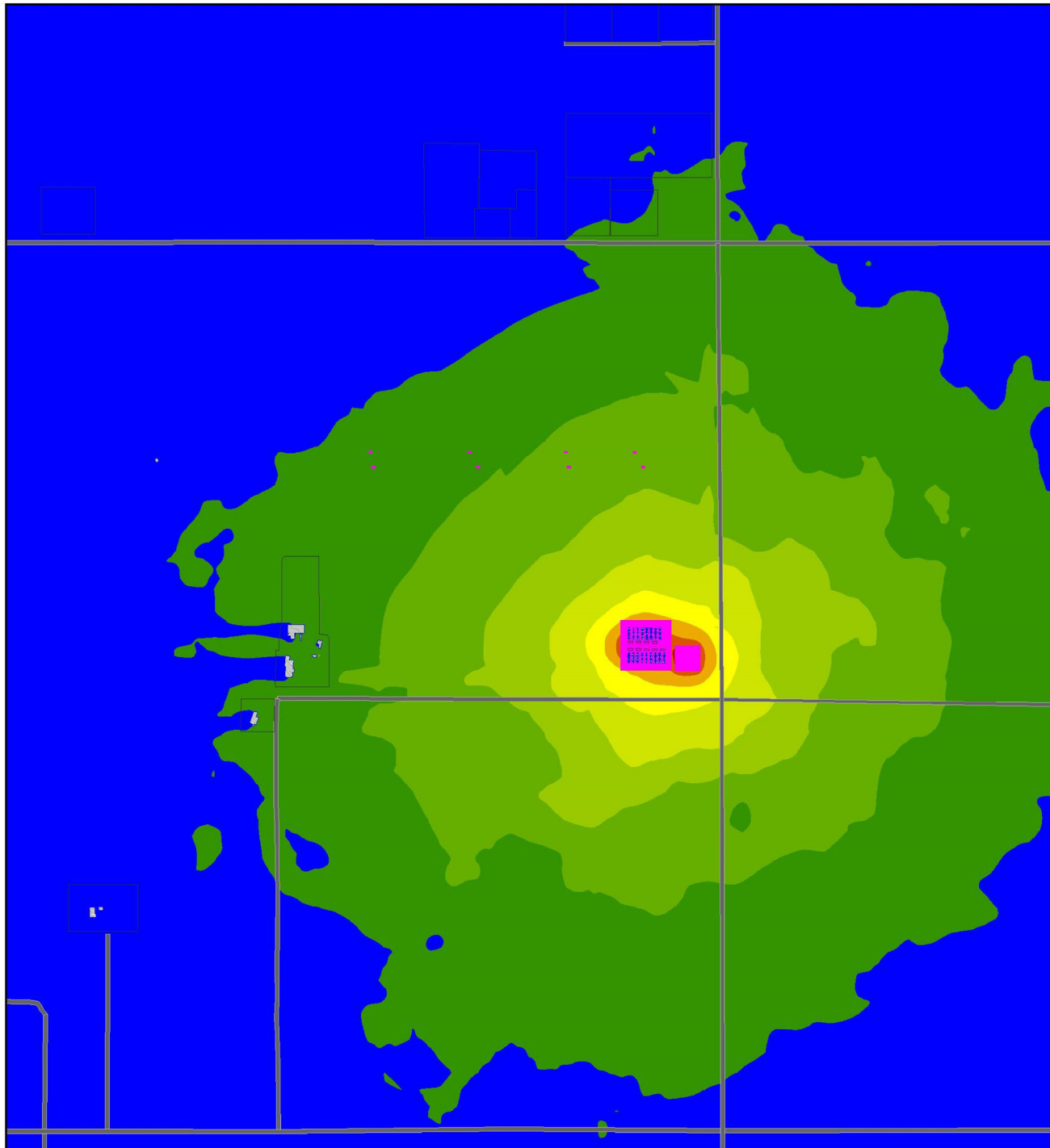


Legend

- Property Fence/Boundary
- Road
- Noise source(s)
- Building/Structure (not all structures are mapped)



Calculation Date: March 16, 2021



Construction Vibration Levels

Construction Vibration Analysis - Potential Building Damage

Vibration attenuation constant (n):		1.1						
Equipment Item	Reference PPV at 25 feet, in/s ^a	Building Category:	Extremely fragile historic buildings, ruins, ancient monuments	Fragile buildings	Historic and some old buildings	Older residential structures	New residential structures	Modern industrial/commercial buildings
		Vibration Damage Impact Criteria, PPV, in/s:	0.08	0.1	0.25	0.3	0.5	0.5
Post driver	0.161	Distance to Impact Criteria, feet:	48	39	17	15	9	9
Large bulldozer ^b	0.089		28	23	10	9	6	6
Caisson drilling	0.089		28	23	10	9	6	6
Small bulldozer ^c	0.003		2	2	1	1	1	1

^a Obtained from "Transportation and Construction Vibration Guidance Manual", Caltrans 2020

^b Considered representative of other heavy earthmoving equipment such as excavators, graders, backhoes, etc.

^c Considered representative of smaller equipment such as mini excavators.

Construction Vibration Analysis - Human Response, Distance to Criteria

Vibration attenuation constant (n):		1.1				
Equipment Item	Reference PPV at 25 feet, in/s ^a	Perceptibility:	Barely perceptible	Distinctly perceptible	Strongly perceptible	Severe
		Vibration Damage Impact Criteria, PPV, in/s:	0.01	0.04	0.1	0.4
Post driver	0.161	Distance to Impact Criteria, feet:	313	89	39	11
Large bulldozer ^b	0.089		183	52	23	7
Caisson drilling	0.089		183	52	23	7
Small bulldozer ^c	0.003		9	3	2	1

^a Obtained from "Transportation and Construction Vibration Guidance Manual", Caltrans 2020

^b Considered representative of any full size/large excavator, dozer, backhoe, etc.

^c Considered representative of any small excavator, dozer, backhoe, etc.

Construction Vibration Analysis - Human Response at Sensitive Receivers

Receiver	Construction Phase	Distance	Post Driver		Large Bulldozer ¹		Caisson Drilling		Small Bulldozer ²	
			Predicted PPV, in/sec	Human Response	Predicted PPV, in/sec	Human Response	Predicted PPV, in/sec	Human Response	Predicted PPV, in/sec	Human Response
<i>Reference Location</i>		25	0.161	<i>N/A (for reference only)</i>	0.089	<i>N/A (for reference only)</i>	0.089	<i>N/A (for reference only)</i>	0.003	<i>N/A (for reference only)</i>
SR-1	Site Prep/Grading	1140	NA	NA	0.001	Below barely perceptible	NA	NA	0.00004	Below barely perceptible
SR-1	PV Installation	1240	0.002	Below barely perceptible	0.001	Below barely perceptible	NA	NA	0.00004	Below barely perceptible
SR-2	Site Prep/Grading	160	NA	NA	0.012	Barely perceptible	NA	NA	0.00039	Below barely perceptible
SR-2	PV Installation	240	0.013	Barely perceptible	0.007	Below barely perceptible	NA	NA	0.00025	Below barely perceptible
SR-3	Site Prep/Grading	105	NA	NA	0.018	Barely perceptible	NA	NA	0.00062	Below barely perceptible
SR-3	PV Installation	170	0.020	Barely perceptible	0.011	Barely perceptible	NA	NA	0.00036	Below barely perceptible
SR-4	Site Prep/Grading	135	NA	NA	0.014	Barely perceptible	NA	NA	0.00047	Below barely perceptible
SR-4	PV Installation	195	0.017	Barely perceptible	0.009	Below barely perceptible	NA	NA	0.00031	Below barely perceptible
SR-5	Site Prep/Grading	230	NA	NA	0.008	Below barely perceptible	NA	NA	0.00026	Below barely perceptible
SR-5	Gen-Tie	115	NA	NA	0.017	Barely perceptible	0.017	Barely perceptible	0.00056	Below barely perceptible
SR-5	PV Installation	260	0.012	Barely perceptible	0.007	Below barely perceptible	NA	NA	0.00023	Below barely perceptible
SR-6	Site Prep/Grading	475	NA	NA	0.003	Below barely perceptible	NA	NA	0.00012	Below barely perceptible
SR-6	Gen-Tie	90	NA	NA	0.022	Barely perceptible	0.022	Barely perceptible	0.00073	Below barely perceptible
SR-6	PV Installation	530	0.006	Below barely perceptible	0.003	Below barely perceptible	NA	NA	0.00010	Below barely perceptible
SR-7	Site Prep/Grading	1885	NA	NA	0.001	Below barely perceptible	NA	NA	0.00003	Below barely perceptible
SR-7	Gen-Tie	1050	NA	NA	0.001	Below barely perceptible	0.001	Below barely perceptible	0.00005	Below barely perceptible
SR-7	PV Installation	1990	0.001	Below barely perceptible	0.001	Below barely perceptible	NA	NA	0.00002	Below barely perceptible
SR-8	Site Prep/Grading	2925	NA	NA	0.000	Below barely perceptible	NA	NA	0.00002	Below barely perceptible
SR-8	Gen-Tie	640	NA	NA	0.003	Below barely perceptible	0.003	Below barely perceptible	0.00008	Below barely perceptible
SR-8	PV Installation	3020	0.001	Below barely perceptible	0.000	Below barely perceptible	NA	NA	0.00002	Below barely perceptible
SR-9	Gen-Tie	320	NA	NA	0.005	Below barely perceptible	0.005	Below barely perceptible	0.00018	Below barely perceptible
SR-10	Gen-Tie	120	NA	NA	0.016	Barely perceptible	0.016	Barely perceptible	0.00053	Below barely perceptible
SR-11	Gen-Tie	180	NA	NA	0.010	Barely perceptible	0.010	Barely perceptible	0.00034	Below barely perceptible
SR-12	Gen-Tie	555	NA	NA	0.003	Below barely perceptible	0.003	Below barely perceptible	0.00010	Below barely perceptible
SR-13	Gen-Tie	1140	NA	NA	0.001	Below barely perceptible	0.001	Below barely perceptible	0.00004	Below barely perceptible
SR-14	Gen-Tie	125	NA	NA	0.015	Barely perceptible	0.015	Barely perceptible	0.00051	Below barely perceptible
SR-15	Gen-Tie	115	NA	NA	0.017	Barely perceptible	0.017	Barely perceptible	0.00056	Below barely perceptible

¹ Considered representative of any full size/large excavator, dozer, backhoe, etc.

² Considered representative of any small excavator, dozer, backhoe, etc.

Traffic Noise Levels

This spreadsheet calculates traffic noise levels based on TNM Version 2.5 Lookup Tables.

**** Type in yellow cells only.**

Traffic Data:

Enter ADT Traffic

Enter Loudest-hour Traffic

Units:

Metric

English

Calculate



Link	Roadway	Segment Location	Hard or Soft Ground (H or S)	Total Daily Traffic Volumes (ADT)	Traffic Mix		Vehicle Speed mph max. 80	Sound Levels at Receiver Locations	
					Number #	Description		Distance feet, min. 33 max. 1000	dB CNEL
1	West Avenue A (Construction Traffic)	All Segments	S	112	14	Construction Traffic	55	50	55.5
2	West Avenue G (Construction Traffic)	All Segments	S	60	14	Construction Traffic	55	50	53.3
3	90th Street West (Construction Traffic)	All Segments	S	34	14	Construction Traffic	55	50	51.5
4	110th Street West (Construction Traffic)	All Segments	S	26	14	Construction Traffic	55	50	50.8
5	All Roadways (project operations)	All Segments	S	40	15	Operational Traffic	55	50	53.4