

NOISE APPENDIX

Noise Field Data

Field Noise Measurement Data

Record: 1413

Project Name	Modera Melrose
Observer(s)	Connor Burke
Date	2022-04-21

Instrument and Calibrator Information

Instrument Name List	(ENC) Rion NL-52
Instrument Name	(ENC) Rion NL-52
Instrument Name Lookup Key	(ENC) Rion NL-52
Manufacturer	Rion
Model	NL-52
Serial Number	553896
Calibrator Name	(ENC) LD CAL150
Calibrator Name	(ENC) LD CAL150
Calibrator Name Lookup Key	(ENC) LD CAL150
Calibrator Manufacturer	Larson Davis
Calibrator Model	LD CAL150
Calibrator Serial #	5152
Pre-Test (dBA SPL)	94
Post-Test (dBA SPL)	94
Windscreen	Yes
Weighting?	A-WTD
Slow/Fast?	Slow
ANSI?	Yes

Monitoring

Record #	1
Site ID	ST1
Site Location Lat/Long	33.221117, -117.255700
Begin (Time)	11:30:00
End (Time)	11:40:00
Leq	68.3
Lmax	81.2
Lmin	50.2
Other Lx?	L90, L50, L10
L90	53.2
L50	61.3
L10	73.10
Other Lx (Specify Metric)	L
Primary Noise Source	Traffic
Other Noise Sources (Background)	Distant Aircraft, Distant Traffic, Rustling Leaves
Is the same instrument and calibrator being used as previously noted?	Yes
Are the meteorological conditions the same as previously noted?	Yes

Source Info and Traffic Counts

Number of Lanes	4
Lane Width (feet)	10
Roadway Width (feet)	40
Roadway Width (m)	12.2
Distance to Roadway (feet)	10
Distance to Roadway (m)	3
Distance Measured to Centerline or Edge of Pavement?	Edge of Pavement
Estimated Vehicle Speed (MPH)	40

Traffic Counts

Vehicle Count Summary	A 134, MT 4, HT 2, B 0, MC 0
Select Method for Recording Count Duration	Enter Manually
Counting Both Directions?	Yes
Count Duration (minutes)	10
Vehicle Count Tally	
Select Method for Vehicle Counts	Enter Manually
Number of Vehicles - Autos	134
Number of Vehicles - Medium Trucks	4
Number of Vehicles - Heavy Trucks	2
Number of Vehicles - Buses	0
Number of Vehicles - Motorcycles	0

Description / Photos

Site Photos

Photo



Comments / Description

Facing north

Monitoring

Record #	2
Site ID	ST5
Site Location Lat/Long	33.220386, -117.255960
Begin (Time)	11:45:00
End (Time)	11:55:00
Leq	52
Lmax	58.5
Lmin	46.5
Other Lx?	L90, L50, L10
L90	48.1
L50	51.6
L10	54.3
Other Lx (Specify Metric)	L
Primary Noise Source	Distant traffic
Other Noise Sources (Background)	Birds, Distant Aircraft, Distant Traffic, Rustling Leaves
Other Noise Sources Additional Description	
Is the same instrument and calibrator being used as previously noted?	Yes
Are the meteorological conditions the same as previously noted?	Yes

Description / Photos

Site Photos

Photo



Comments / Description

Facing east.

Monitoring

Record #	3
Site ID	ST4
Site Location Lat/Long	33.219656, -117.256087
Begin (Time)	12:10:00
End (Time)	12:20:00
Leq	50.7
Lmax	58.6
Lmin	44.8
Other Lx?	L90, L50, L10
L90	46.80
L50	49.6
L10	52.9
Other Lx (Specify Metric)	L
Primary Noise Source	Distant Traffic
Other Noise Sources (Background)	Birds, Distant Conversations / Yelling, Distant Traffic, Rustling Leaves
Other Noise Sources Additional Description	Hammering in the distant. Distant pneumatic tools
Is the same instrument and calibrator being used as previously noted?	Yes
Are the meteorological conditions the same as previously noted?	Yes

Description / Photos

Site Photos

Photo



Comments / Description

Facing southwest.

Monitoring

Record #	4
Site ID	ST3
Site Location Lat/Long	33.220056, -117.258085
Begin (Time)	12:20:00
End (Time)	12:30:00
Leq	65.6
Lmax	72.8
Lmin	50.5
Other Lx?	L90, L50, L10
L90	53.5
L50	64
L10	69.4
Other Lx (Specify Metric)	L
Primary Noise Source	Traffic
Other Noise Sources (Background)	Birds, Distant Traffic, Rustling Leaves
Other Noise Sources Additional Description	Car wash horn
Is the same instrument and calibrator being used as previously noted?	Yes
Are the meteorological conditions the same as previously noted?	Yes

Source Info and Traffic Counts

Number of Lanes	4
Lane Width (feet)	10
Roadway Width (feet)	40
Roadway Width (m)	12.2
Distance to Roadway (feet)	30
Distance to Roadway (m)	9.2
Distance Measured to Centerline or Edge of Pavement?	Edge of Pavement
Estimated Vehicle Speed (MPH)	0

Traffic Counts

Vehicle Count Summary	A 300, MT 8, HT 4, B 0, MC 1
Select Method for Recording Count Duration	Enter Manually
Counting Both Directions?	Yes
Count Duration (minutes)	10
Vehicle Count Tally	
Select Method for Vehicle Counts	Enter Manually
Number of Vehicles - Autos	300
Number of Vehicles - Medium Trucks	8
Number of Vehicles - Heavy Trucks	4
Number of Vehicles - Buses	0
Number of Vehicles - Motorcycles	1

Description / Photos

Site Photos

Photo



Comments / Description

Facing west.

Monitoring

Record #	5
Site ID	ST2
Site Location Lat/Long	33.220897, -117.258825
Begin (Time)	12:40:00
End (Time)	12:50:00
Leq	68.9
Lmax	78.5
Lmin	56.7
Other Lx?	L90, L50, L10
L90	59.7
L50	66.4
L10	72.6
Other Lx (Specify Metric)	L
Primary Noise Source	Traffic
Other Noise Sources (Background)	Rustling Leaves
Is the same instrument and calibrator being used as previously noted?	Yes
Are the meteorological conditions the same as previously noted?	Yes

Description / Photos

Site Photos

Photo



Comments / Description

Facing north

NOISE APPENDIX

Construction Noise Modeling Data/Results

To User: bordered cells are inputs, unbordered cells have formulae

noise level limit for construction phase, per FTA guidance = **80**
 allowable hours over which Leq is to be averaged (example: 8 per FTA guidance) = **8**

Construction Phase	Equipment	Total Equipment Qty	AUF % (from FHWA RCNM)	Reference Lmax @ 50 ft. from FHWA RCNM	Client Equipment Description, Data Source and/or Notes	Source to NSR Distance (ft.)	Distance-Adjusted Lmax	Allowable Operation Time (hours)	Allowable Operation Time (minutes)	Predicted 8-hour Leq
Demolition	Dozer	2	40	82		20	90.0	1.5	90	82
	Excavator	3	40	81		20	89.0	1.5	90	82
	Concrete Saw	1	20	90		20	98.0	1.5	90	84
Total for Demolition Phase:										87.5
Site Preparation	Dozer	3	40	82		20	90.0	3	180	86
	Backhoe	2	40	78		20	86.0	3	180	81
	Front End Loader	2	40	79		20	87.0	3	180	82
Total for Site Preparation Phase:										88.5
Grading	Excavator	2	40	81		20	89.0	1	60	79
	Grader	1	40	85		20	93.0	1	60	80
	Dozer	1	40	82		20	90.0	1	60	77
	Front End Loader	1	40	79		20	87.0	1	60	74
	Backhoe	1	40	78		20	86.0	1	60	73
	Scraper	2	40	84		20	92.0	1	60	82
Total for Grading Phase:										86.3
Building Construction	Crane	1	16	81		100	75.0	2	120	61
	Man Lift	3	20	75		100	69.0	2	120	61
	Generator	1	50	72		100	66.0	2	120	57
	Backhoe	2	40	78		100	72.0	2	120	65
	Front End Loader	1	40	79		100	73.0	2	120	63
	Welder / Torch	1	40	73		100	67.0	2	120	57
Total for Building Construction Phase:										69.3
Architectural Coating	Compressor (air)	1	40	78		100	72.0	4	240	65
Total for Architectural Coating Phase:										65.0
Paving	Paver	2	50	77		20	85.0	2	120	79
	Roller	1	20	80		20	88.0	2	120	75
	Roller	1	20	80		20	88.0	2	120	75
	All Other Equipment > 5 HP	2	50	85		20	93.0	2	120	87
Total for Paving Phase:										88.0

To User: bordered cells are inputs, unbordered cells have formulae

noise level limit for construction phase, per FTA guidance = **80**
 allowable hours over which Leq is to be averaged (example: 8 per FTA guidance) = **8**

Construction Phase	Equipment	Total Equipment Qty	AUF % (from FHWA RCNM)	Reference Lmax @ 50 ft. from FHWA RCNM	Client Equipment Description, Data Source and/or Notes	Source to NSR Distance (ft.)	Distance-Adjusted Lmax	Allowable Operation Time (hours)	Allowable Operation Time (minutes)	Predicted 8-hour Leq
Demolition	Dozer	2	40	82		450	62.9	8	480	62
	Excavator	3	40	81		450	61.9	8	480	63
	Concrete Saw	1	20	90		450	70.9	8	480	64
Total for Demolition Phase:										67.7
Site Preparation	Dozer	3	40	82		450	62.9	8	480	64
	Backhoe	2	40	78		450	58.9	8	480	58
	Front End Loader	2	40	79		450	59.9	8	480	59
Total for Site Preparation Phase:										65.7
Grading	Excavator	2	40	81		450	61.9	8	480	61
	Grader	1	40	85		450	65.9	8	480	62
	Dozer	1	40	82		450	62.9	8	480	59
	Front End Loader	1	40	79		450	59.9	8	480	56
	Backhoe	1	40	78		450	58.9	8	480	55
	Scraper	2	40	84		450	64.9	8	480	64
Total for Grading Phase:										68.3
Building Construction	Crane	1	16	81		450	61.9	8	480	54
	Man Lift	3	20	75		450	55.9	8	480	54
	Generator	1	50	72		450	52.9	8	480	50
	Backhoe	2	40	78		450	58.9	8	480	58
	Front End Loader	1	40	79		450	59.9	8	480	56
	Welder / Torch	1	40	73		450	53.9	8	480	50
Total for Building Construction Phase:										62.3
Architectural Coating	Compressor (air)	1	40	78		450	58.9	8	480	55
Total for Architectural Coating Phase:										54.9
Paving	Paver	2	50	77		450	57.9	8	480	58
	Roller	1	20	80		450	60.9	8	480	54
	Roller	1	20	80		450	60.9	8	480	54
	All Other Equipment > 5 HP	2	50	85		450	65.9	8	480	66
Total for Paving Phase:										67.0

NOISE APPENDIX

Operational Noise Modeling Data/Results

Technical Basis of Dudek’s “NoisePro” Excel-based Outdoor Sound Propagation Prediction Model

In summary, the Microsoft Excel-based **NoisePro** outdoor sound propagation model developed by Dudek calculates the aggregate sound pressure level (SPL) received by each and every cell within a two-dimensional (2D) array (a product of X columns of cells by Y rows of cells). The quantity of this received SPL, in A-weighted decibels (dBA), is the logarithmic sum of acoustical contribution from each of “n” user-input sound emitting point sources located on the same 2D array, which may be written as follows:

$$SPL_{X,Y} = 10 * \log \sum_{i=1}^n 10^{0.1[L_i - A_i]}$$

where each individual source sound level (L_i) is attenuated by an algebraic sum of three attenuation factors ($A_i = A_{div} + A_{atm} + A_{gr}$) that are each dependent on the distance between the sound source position on the X by Y array and the receiving $SPL_{X,Y}$ position on a different position in the same 2D array of worksheet cells, where each cell is defined by the user as representing the center of a square area having equal sides of user-defined length in feet. The above expression is based on Equation 5 from the International Organization for Standardization (ISO) 9613-2 “Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation”, and the individual attenuation factors used by **NoisePro** emulate those in Equation 4 and may be summarized as follows:

- A_{div} = attenuation due to *geometrical divergence* (i.e., pure distance), equating to $20 * \text{LOG}(d/d_{ref})$; and where d is the horizontal distance between a source and a receiver position, while d_{ref} is the reference distance at which the sound source L_i is defined.
- A_{atm} = attenuation due to *atmospheric absorption*, which for 1,000 Hz (1 kHz) = $4.16 * d / 3280$ and is derived from Equation 5.7 in Noise & Vibration Control Engineering (Beranek and Ver, 1992).
- A_{gr} = attenuation due to *ground effects*, appearing as Equation 10 in ISO 9613-2 and can be expressed with the following Excel formula:

$$A_{gr} = \text{MAX}(0, 4.8 - [h_s + h_r] / d * [17 + 984 / d])$$

where h_s and h_r are the heights (in feet) of the sound source and receiver positions above grade, respectively. This means that for small distances, attenuation from ground effects will be small or essentially zero; and, even at great distances, the attenuation from ground effects is effectively capped at 4.8 dB.

The Excel workbook comprising **NoisePro** calculates $SPL_{X,Y}$ by using a coding loop to evaluate the acoustic contribution from each attenuated sound source ($L_i - A_i$) in sequence, and logarithmically adding the new evaluation to the previous total in a cumulative manner. When all sources have been evaluated, the loop terminates and yields an aggregate or log-summed total $SPL_{X,Y}$ value that is thus unique to a position in the 2D array of cells represented by X and Y, and can thus be “mapped”. If the user has defined a particular cell in the X by Y array as a uniquely tagged Receiver, then the corresponding $SPL_{X,Y}$ value can be indexed and displayed accordingly.

The resulting output array of cells, each having an individually calculated $SPL_{X,Y}$ numerical value, is then filled with a color (from a user-defined palette) by application of a Conditional Formatting rules set (an Excel formatting feature) that compares the dB quantity with user-defined “high” and “low” dB ranges for each available color. Each colored cell can thus be likened to a “pixel” within a 2D array that forms a composite image representing—visually—the sound propagation from all modeled sound sources.

GRID CALCULATION WORKSHEET

Example Portion of Concluded Calculations Loop

					Source	38
	grid size (ft)				Source Tag	GF04
x	3.73				Source X-coordinate	567.0
y	3.73				Source Y-coordinate	596.8
	rcvr plane height (ft)				Source Z-coordinate	40
z	5				Source Reference SPL	59
					Source Ref. Distance (ft.)	35
					Source ht above grade (ft.)	40
Grid Upper Left (C,R)						
	1	1				
Grid Lower Right (C,R)						
	384	288	Receiver Location			Cumulative
Column	Row	X-coord	Y-coord	Z-coord		SPL
1	1	3.73	3.73	5		35.84
1	2	3.73	7.46	5		35.88
1	3	3.73	11.19	5		35.92
1	4	3.73	14.92	5		35.95
1	5	3.73	18.65	5		35.99
1	6	3.73	22.38	5		36.03
1	7	3.73	26.11	5		36.07
1	8	3.73	29.84	5		36.10
1	9	3.73	33.57	5		36.14
1	10	3.73	37.3	5		36.18
1	11	3.73	41.03	5		36.21
1	12	3.73	44.76	5		36.25
1	13	3.73	48.49	5		36.29
1	14	3.73	52.22	5		36.33
1	15	3.73	55.95	5		36.36
1	16	3.73	59.68	5		36.40
1	17	3.73	63.41	5		36.44
1	18	3.73	67.14	5		36.48
1	19	3.73	70.87	5		36.51
1	20	3.73	74.6	5		36.55
1	21	3.73	78.33	5		36.59
1	22	3.73	82.06	5		36.62
1	23	3.73	85.79	5		36.66
1	24	3.73	89.52	5		36.70
1	25	3.73	93.25	5		36.74
1	26	3.73	96.98	5		36.77
1	27	3.73	100.71	5		36.81
1	28	3.73	104.44	5		36.85
1	29	3.73	108.17	5		36.88

SOURCE INVENTORY WITH MODEL GRID COORDINATE LOCATIONS AND SOUND PRESSURE REFERENCE LEVELS

grid axis feet
x 3.73
y 3.73

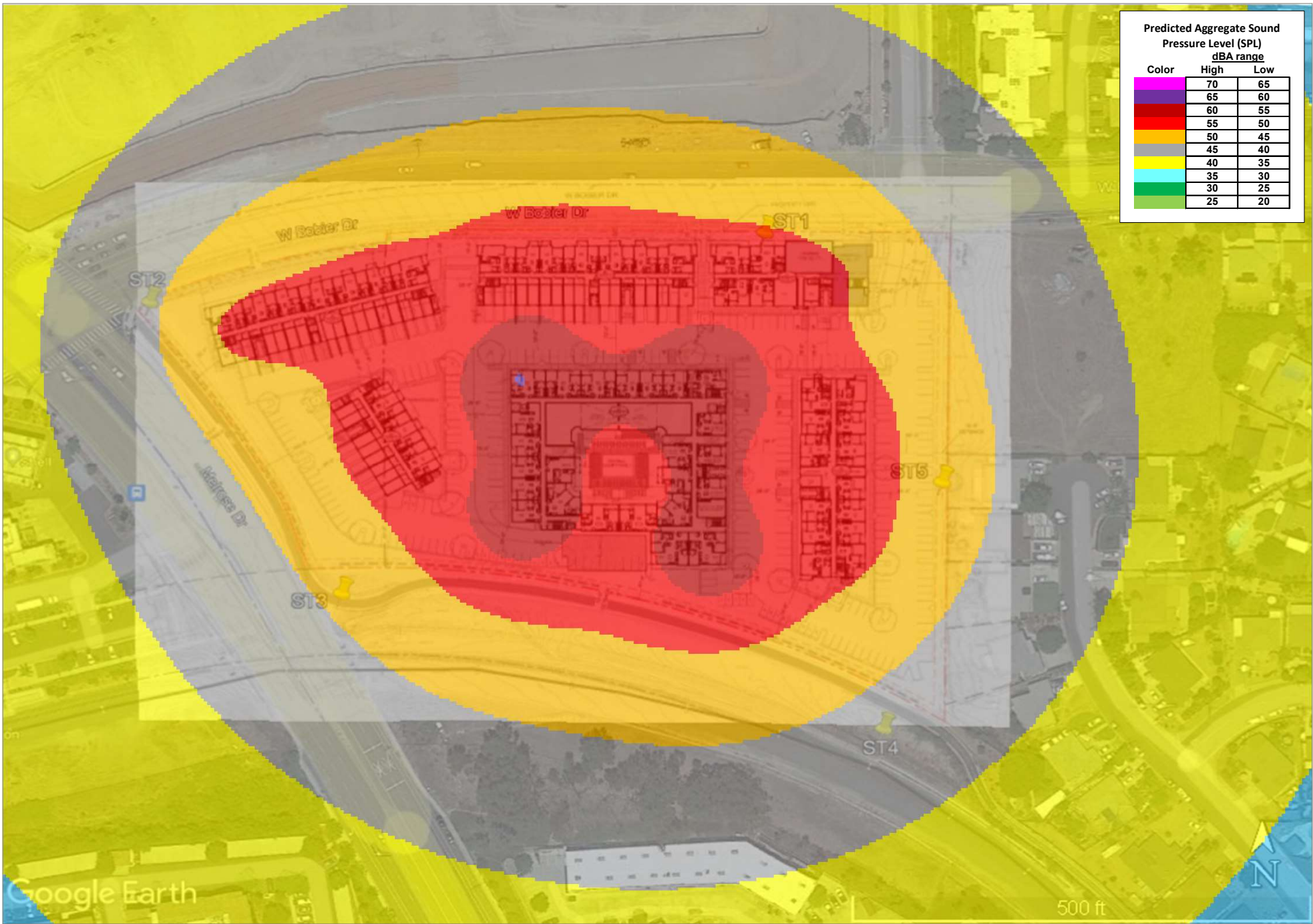
Custom Source Description	Tag	SPL(dBA)	Notes
this is intended to "clear" the cumulative+source on a "Reset" click	CLEAR	-40	additional notes below for Custom sources:
axial exhaust fan	GFAN	59	Garage exhaust fan Pressure level at 35 feet, with nominal 9.5 dB reduction for 5' high parapet wall
residential 4-ton ACC unit	HVAC6	45	Carrier 16NA-48 PWL - 8 Db (6 cluster) Pressure level at 35 feet, with nominal 9.5 dB reduction for 5' high parapet wall
residential 4-ton ACC unit	HVAC7	46	Carrier 16NA-48 PWL - 8 Db (7 cluster) Pressure level at 35 feet, with nominal 9.5 dB reduction for 5' high parapet wall
residential 4-ton ACC unit	HVAC10	48	Carrier 16NA-48 PWL - 8 Db (10 cluster) Pressure level at 35 feet, with nominal 9.5 dB reduction for 5' high parapet wall
residential 4-ton ACC unit	HVAC11	49	Carrier 16NA-48 PWL - 8 Db (11 cluster) Pressure level at 35 feet, with nominal 9.5 dB reduction for 5' high parapet wall

Source	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Source Tag	ULC	B101	B102	B103	B104	B105	B201	B202	B203	B204	B205	B301	B302	B303	B304	B305	B306	B307	B308
Source X-coordinate	3.73	790.76	820.6	835.52	869.09	906.39	910.12	910.12	910.12	910.12	910.12	775.84	775.84	775.84	775.84	704.97	641.56	574.42	574.42
Source Y-coordinate	3.73	317.05	317.05	317.05	317.05	317.05	473.71	511.01	548.31	585.61	622.91	585.61	537.12	503.55	462.52	443.87	443.87	455.06	481.17
Source Z-coordinate	6	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Source Type (enter abbrev.)	CLEAR	HVAC7	HVAC7	HVAC7	HVAC7	HVAC6	HVAC11	HVAC11	HVAC11	HVAC11	HVAC11	HVAC11	HVAC11	HVAC11	HVAC11	HVAC11	HVAC11	HVAC11	HVAC11
Source Reference SPL	-40	46	46	46	46	45	49	49	49	49	49	49	49	49	49	49	49	49	49
Source Reference Distance (ft.)	3.28	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
Source Height Above Grade (ft.)	6	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40

Source	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
Source Tag	B309	B310	B401	B402	B403	B501	B502	B503	B504	B505	B601	B602	B603	B604	B605	GF01	GF02	GF03	GF04
Source X-coordinate	574.42	574.42	406.57	421.49	436.41	261.1	305.86	354.35	402.84	436.41	548.31	574.42	619.18	663.94	704.97	775.84	775.84	566.96	566.96
Source Y-coordinate	514.74	544.58	484.9	511.01	537.12	380.46	369.27	358.08	346.89	339.43	317.05	317.05	317.05	317.05	317.05	641.56	436.41	436.41	596.8
Source Z-coordinate	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Source Type (enter abbrev.)	HVAC11	HVAC10	HVAC7	HVAC7	HVAC7	HVAC11	HVAC11	HVAC11	HVAC11	HVAC11	HVAC11	HVAC11	HVAC11	HVAC11	HVAC11	GFAN	GFAN	GFAN	GFAN
Source Reference SPL	49	48	46	46	46	49	49	49	49	49	49	49	49	49	49	59	59	59	59
Source Reference Distance (ft.)	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
Source Height Above Grade (ft.)	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40

RECEIVER INVENTORY WITH MODEL GRID COORDINATE LOCATIONS AND PREDICTED OPERATIONAL SOUND LEVEL EXPOSURE

Receiver	ST1	ST2	ST3	ST4	ST5
Receiver Tag	R1	R2	R3	R4	R5
Receiver X-coordinate	835.52	156.66	369.27	962.34	1033.21
Receiver Y-coordinate	268.56	365.54	704.97	857.9	574.42
Receiver Height Above Ground	5	5	5	5	5
SPL Predicted at Receiver	51	44	46	43	47



Predicted Aggregate Sound Pressure Level (SPL) dBA range

Color	High	Low
Red	70	65
Orange	65	60
Yellow	60	55
Light Green	55	50
Green	50	45
Light Blue	45	40
Blue	40	35
Dark Blue	35	30
Dark Green	30	25
Light Green	25	20

NOISE APPENDIX

Traffic Noise Modeling Data/Results

Noise Section Appendix - Modera Melrose EIR

Traffic Noise Modeling Calculations - Summary

Project: 13937 Modera Melrose

Number	Name	Segment Description and Location		Existing	Existing + Project	Δ Existing – Existing + Project	Near Term	Near Term + Project	Δ Near Term – Near Term + Project
		From	To						
Summary of Net Changes									
1	North Melrose	North of Meadow Brook		66.9	67.0	0.1	66.9	67.0	0.1
2	North Melrose	Meadow Brook	Oceanside	67.0	67.1	0.1	67.0	67.1	0.1
3	North Melrose	Oceanside	North Ave	68.5	68.5	0.1	68.5	68.5	0.1
4	North Melrose	South of North Ave		68.9	68.9	0.1	68.9	68.9	0.1
5	Oceanside Blvd.	West of Catalina Circle		64.2	64.3	0.1	64.4	64.5	0.1
6	Oceanside Blvd.	Catalina Circle	Melrose	68.7	68.8	0.1	69.3	69.4	0.1
7	West Bobier Way	Melrose	Sports Park	68.9	69.2	0.3	69.2	69.4	0.3
8	West Bobier Way	Sports Park	Santa Fe	67.8	67.8	0.1	67.8	67.9	0.1
9	West Bobier Way	East of Santa Fe		68.4	68.4	0.0	68.4	68.5	0.0

*All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustments. All levels are reported as A-weighted noise levels.

Noise Section Appendix - Modera Melrose EIR

Traffic Noise Modeling Calculations - Summary

Project: 13937 Modera Melrose

Number	Name	Segment Description and Location		Buildout 2030	Buildout 2030 + Project	Δ Buildout 2030 – Buildout 2030 + Project
		From	To			
Summary of Net Changes						
1	North Melrose	North of Meadow Brook		69.3	69.4	0.1
2	North Melrose	Meadow Brook	Oceanside	69.3	69.4	0.1
3	North Melrose	Oceanside	North Ave	69.9	70.0	0.1
4	North Melrose	South of North Ave		69.6	69.7	0.1
5	Oceanside Blvd.	West of Catalina Circle		65.8	65.8	0.1
6	Oceanside Blvd.	Catalina Circle	Melrose	70.2	70.3	0.1
7	West Bobier Way	Melrose	Sports Park	68.9	69.2	0.3
8	West Bobier Way	Sports Park	Santa Fe	69.1	69.2	0.1
9	West Bobier Way	East of Santa Fe		67.9	67.9	0.0

*All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustments. All levels are reported as A-weighted noise levels.

Noise Section Appendix - Modera Melrose EIR - 1

Traffic Noise Model Calculations

Project: 13937 Modera Melrose

Noise Level Descriptor: CNEL
 Site Conditions: Hard
 Traffic Input: ADT
 Traffic K-Factor: 10

Segment Description and Location				Input									Output						
Number	Name	From	To	ADT	Speed (mph)	Distance to Directional Centerline, (feet) ₄		Traffic Distribution Characteristics					CNEL, (dBA) _{5,6,7}	Distance to Contour, (feet) ₃					
						Near	Far	% Auto	% Med	% Hvy	% Day	% Eve	% Night		70 dBA	65 dBA	60 dBA	55 dBA	
Existing Conditions																			
1	North Melrose	North of Meadow Brook		20,830	35	60	105	97.0%	2.0%	1.0%	77.0%	13.4%	9.6%	66.9	38	122	385	1217	
2	North Melrose	Meadow Brook	Oceanside	21,340	35	60	105	97.0%	2.0%	1.0%	77.0%	13.4%	9.6%	67.0	39	125	394	1246	
3	North Melrose	Oceanside	North Ave	31,190	35	60	115	97.0%	2.0%	1.0%	77.0%	13.4%	9.6%	68.5	58	185	584	1846	
4	North Melrose	South of North Ave		34,290	35	60	115	97.0%	2.0%	1.0%	77.0%	13.4%	9.6%	68.9	64	203	642	2030	
5	Oceanside Blvd.	West of Catalina Circle		20,600	35	120	165	97.0%	2.0%	1.0%	77.0%	13.4%	9.6%	64.2	37	117	371	1172	
6	Oceanside Blvd.	Catalina Circle	Melrose	20,920	35	35	85	97.0%	2.0%	1.0%	77.0%	13.4%	9.6%	68.7	41	129	409	1293	
7	West Bobier Way	Melrose	Sports Park	22,650	35	40	75	97.0%	2.0%	1.0%	77.0%	13.4%	9.6%	68.9	42	134	423	1336	
8	West Bobier Way	Sports Park	Santa Fe	20,640	35	50	80	97.0%	2.0%	1.0%	77.0%	13.4%	9.6%	67.8	38	119	377	1192	
9	West Bobier Way	East of Santa Fe		23,940	35	50	80	97.0%	2.0%	1.0%	77.0%	13.4%	9.6%	68.4	44	138	437	1382	

*All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustments. All levels are reported as A-weighted noise levels.

Noise Section Appendix - Modera Melrose EIR - 2

Traffic Noise Model Calculations

Project: 13937 Modera Melrose

Noise Level Descriptor: CNEL
 Site Conditions: Hard
 Traffic Input: ADT
 Traffic K-Factor:

Segment Description and Location				Input										Output				
Number	Name	From	To	ADT	Speed (mph)	Distance to Directional Centerline, (feet) ₄		Traffic Distribution Characteristics					CNEL, (dBA) _{5,6,7}	Distance to Contour, (feet) ₃				
						Near	Far	% Auto	% Med	% Hvy	% Day	% Eve	% Night		70 dBA	65 dBA	60 dBA	55 dBA
Existing + Project Conditions																		
1	North Melrose	North of Meadow Brook		21,320	35	60	105	97.0%	2.0%	1.0%	77.0%	13.4%	9.6%	67.0	39	125	394	1245
2	North Melrose	Meadow Brook	Oceanside	21,870	35	60	105	97.0%	2.0%	1.0%	77.0%	13.4%	9.6%	67.1	40	128	404	1277
3	North Melrose	Oceanside	North Ave	31,760	35	60	115	97.0%	2.0%	1.0%	77.0%	13.4%	9.6%	68.5	59	188	594	1880
4	North Melrose	South of North Ave		34,780	35	60	115	97.0%	2.0%	1.0%	77.0%	13.4%	9.6%	68.9	65	206	651	2059
5	Oceanside Blvd.	West of Catalina Circle		20,970	35	120	165	97.0%	2.0%	1.0%	77.0%	13.4%	9.6%	64.3	38	119	377	1193
6	Oceanside Blvd.	Catalina Circle	Melrose	21,410	35	35	85	97.0%	2.0%	1.0%	77.0%	13.4%	9.6%	68.8	42	132	418	1323
7	West Bobier Way	Melrose	Sports Park	24,240	35	40	75	97.0%	2.0%	1.0%	77.0%	13.4%	9.6%	69.2	45	143	452	1430
8	West Bobier Way	Sports Park	Santa Fe	21,050	35	50	80	97.0%	2.0%	1.0%	77.0%	13.4%	9.6%	67.8	38	122	384	1216
9	West Bobier Way	East of Santa Fe		24,140	35	50	80	97.0%	2.0%	1.0%	77.0%	13.4%	9.6%	68.4	44	139	441	1394

*All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustments. All levels are reported as A-weighted noise levels.

Noise Section Appendix - Modera Melrose EIR - 3

Traffic Noise Model Calculations

Project: 13937 Modera Melrose

Noise Level Descriptor: CNEL
 Site Conditions: Hard
 Traffic Input: ADT
 Traffic K-Factor:

Segment Description and Location				Input										Output					
Number	Name	From	To	ADT	Speed (mph)	Distance to Directional Centerline, (feet) ₄		Traffic Distribution Characteristics					CNEL, (dBA) _{5,6,7}	Distance to Contour, (feet) ₃					
						Near	Far	% Auto	% Med	% Hvy	% Day	% Eve	% Night		70 dBA	65 dBA	60 dBA	55 dBA	
Near Term Conditions																			
1	North Melrose	North of Meadow Brook		20,830	35	60	105	97.0%	2.0%	1.0%	77.0%	13.4%	9.6%	66.9	38	122	385	1217	
2	North Melrose	Meadow Brook	Oceanside	21,340	35	60	105	97.0%	2.0%	1.0%	77.0%	13.4%	9.6%	67.0	39	125	394	1246	
3	North Melrose	Oceanside	North Ave	31,190	35	60	115	97.0%	2.0%	1.0%	77.0%	13.4%	9.6%	68.5	58	185	584	1846	
4	North Melrose	South of North Ave		34,290	35	60	115	97.0%	2.0%	1.0%	77.0%	13.4%	9.6%	68.9	64	203	642	2030	
5	Oceanside Blvd.	West of Catalina Circle		21,740	35	120	165	97.0%	2.0%	1.0%	77.0%	13.4%	9.6%	64.4	39	124	391	1237	
6	Oceanside Blvd.	Catalina Circle	Melrose	23,640	35	35	85	97.0%	2.0%	1.0%	77.0%	13.4%	9.6%	69.3	46	146	462	1461	
7	West Bobier Way	Melrose	Sports Park	24,260	35	40	75	97.0%	2.0%	1.0%	77.0%	13.4%	9.6%	69.2	45	143	453	1431	
8	West Bobier Way	Sports Park	Santa Fe	21,050	35	50	80	97.0%	2.0%	1.0%	77.0%	13.4%	9.6%	67.8	38	122	384	1216	
9	West Bobier Way	East of Santa Fe		24,040	35	50	80	97.0%	2.0%	1.0%	77.0%	13.4%	9.6%	68.4	44	139	439	1388	

*All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustments. All levels are reported as A-weighted noise levels.

Noise Section Appendix - Modera Melrose EIR - 4

Traffic Noise Model Calculations

Project: 13937 Modera Melrose

Noise Level Descriptor: CNEL
 Site Conditions: Hard
 Traffic Input: ADT
 Traffic K-Factor:

Segment Description and Location				Input									Output						
Number	Name	From	To	ADT	Speed (mph)	Distance to Directional Centerline, (feet) ₄		Traffic Distribution Characteristics					CNEL, (dBA) _{5,6,7}	Distance to Contour, (feet) ₃					
						Near	Far	% Auto	% Med	% Hvy	% Day	% Eve	% Night		70 dBA	65 dBA	60 dBA	55 dBA	
Near Term + Project Conditions																			
1	North Melrose	North of Meadow Brook		21,320	35	60	105	97.0%	2.0%	1.0%	77.0%	13.4%	9.6%	67.0	39	125	394	1245	
2	North Melrose	Meadow Brook	Oceanside	21,870	35	60	105	97.0%	2.0%	1.0%	77.0%	13.4%	9.6%	67.1	40	128	404	1277	
3	North Melrose	Oceanside	North Ave	31,760	35	60	115	97.0%	2.0%	1.0%	77.0%	13.4%	9.6%	68.5	59	188	594	1880	
4	North Melrose	South of North Ave		34,780	35	60	115	97.0%	2.0%	1.0%	77.0%	13.4%	9.6%	68.9	65	206	651	2059	
5	Oceanside Blvd.	West of Catalina Circle		22,110	35	120	165	97.0%	2.0%	1.0%	77.0%	13.4%	9.6%	64.5	40	126	398	1258	
6	Oceanside Blvd.	Catalina Circle	Melrose	24,130	35	35	85	97.0%	2.0%	1.0%	77.0%	13.4%	9.6%	69.4	47	149	472	1491	
7	West Bobier Way	Melrose	Sports Park	25,850	35	40	75	97.0%	2.0%	1.0%	77.0%	13.4%	9.6%	69.4	48	152	482	1525	
8	West Bobier Way	Sports Park	Santa Fe	21,460	35	50	80	97.0%	2.0%	1.0%	77.0%	13.4%	9.6%	67.9	39	124	392	1239	
9	West Bobier Way	East of Santa Fe		24,240	35	50	80	97.0%	2.0%	1.0%	77.0%	13.4%	9.6%	68.5	44	140	443	1400	

*All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustments. All levels are reported as A-weighted noise levels.

Noise Section Appendix - Modera Melrose EIR - 6

Traffic Noise Model Calculations

Project: 13937 Modera Melrose

Noise Level Descriptor: CNEL
 Site Conditions: Hard
 Traffic Input: ADT
 Traffic K-Factor:

Segment Description and Location				Input									Output						
Number	Name	From	To	ADT	Speed (mph)	Distance to Directional Centerline, (feet) ₄		Traffic Distribution Characteristics					CNEL, (dBA) _{5,6,7}	Distance to Contour, (feet) ₃					
						Near	Far	% Auto	% Med	% Hvy	% Day	% Eve	% Night		70 dBA	65 dBA	60 dBA	55 dBA	
Buildout 2030 + Project Conditions																			
1	North Melrose	North of Meadow Brook		37,090	35	60	105	97.0%	2.0%	1.0%	77.0%	13.4%	9.6%	69.4	69	217	685	2166	
2	North Melrose	Meadow Brook	Oceanside	37,130	35	60	105	97.0%	2.0%	1.0%	77.0%	13.4%	9.6%	69.4	69	217	686	2169	
3	North Melrose	Oceanside	North Ave	44,370	35	60	115	97.0%	2.0%	1.0%	77.0%	13.4%	9.6%	70.0	83	263	830	2626	
4	North Melrose	South of North Ave		41,190	35	60	115	97.0%	2.0%	1.0%	77.0%	13.4%	9.6%	69.7	77	244	771	2438	
5	Oceanside Blvd.	West of Catalina Circle		29,770	35	120	165	97.0%	2.0%	1.0%	77.0%	13.4%	9.6%	65.8	54	169	536	1694	
6	Oceanside Blvd.	Catalina Circle	Melrose	29,890	35	35	85	97.0%	2.0%	1.0%	77.0%	13.4%	9.6%	70.3	58	185	584	1848	
7	West Bobier Way	Melrose	Sports Park	24,390	35	40	75	97.0%	2.0%	1.0%	77.0%	13.4%	9.6%	69.2	45	144	455	1439	
8	West Bobier Way	Sports Park	Santa Fe	28,810	35	50	80	97.0%	2.0%	1.0%	77.0%	13.4%	9.6%	69.2	53	166	526	1664	
9	West Bobier Way	East of Santa Fe		21,500	35	50	80	97.0%	2.0%	1.0%	77.0%	13.4%	9.6%	67.9	39	124	393	1242	

*All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustments. All levels are reported as A-weighted noise levels.

Noise Section Appendix - Modera Melrose EIR

Traffic Noise Modeling Calculations - References

<u>Citation</u>	<u>Reference</u>
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| 1 | Caltrans Technical Noise Supplement. 2009 (November). Table (5-11), Pg 5-60. |
| 2 | Caltrans Technical Noise Supplement. 2009 (November). Equation (5-26), Pg 5-60. |
| 3 | Caltrans Technical Noise Supplement. 2009 (November). Equation (2-16), Pg 2-32. |
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| 5 | Caltrans Technical Noise Supplement. 2009 (November). Equation (2-26), Pg 2-55, 56. |
| 6 | Caltrans Technical Noise Supplement. 2009 (November). Equation (2-27), Pg 2-57. |
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| 12 | Caltrans Technical Noise Supplement. 2009 (November). Equation (5-14), Pg 5-49. |
| 13 | Federal Highway Administration Traffic Noise Model Technical Manual. Report No. FHWA-PD-96-010. 1998 (January). Equation (16), Pg 67 |
| 14 | Federal Highway Administration Traffic Noise Model Technical Manual. Report No. FHWA-PD-96-010. 1998 (January). Equation (20), Pg 69 |
| 15 | Federal Highway Administration Traffic Noise Model Technical Manual. Report No. FHWA-PD-96-010. 1998 (January). Equation (18), Pg 69 |