

## **APPENDIX E NOISE MODELLING**

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**Traffic Noise Prediction Model, (FHWA RD-77-108)**  
**Model Input Sheet**



**Project Name :** 60656629 - SMUD281-TA15-Country Acres  
**Project Number :** 60656629  
**Modeling Condition :** Existing and Construction Traffic  
**Ground Type :** Soft  
**Metric (L<sub>eq</sub>, L<sub>dn</sub>, CNEL) :** Leq  
**K Factor :** NA  
**Traffic Desc. (Peak or ADT) :** Peak

Segment	Roadway	Segment		Traffic Vol.	Speed (Mph)	Distance to CL	% Autos	%MT	% HT	Day %	Eve %	Night %	Offset (dB)
		From	To										
1	Baseline Road	Watt Avenue	East and West of Watt Avenue	450	35	50	100	0	0	87	0	13	
2	South Brewer Rd	Baseline Road	Philip Road	200	30	50	100	0	0	87	0	13	
3	Philip Road	South Brewer Rd	Project Site	200	25	300	100	0	0	87	0	13	
4	Baseline Road	Watt Avenue	East and West of Watt Avenue	30	25	50	0	0	100	87	0	13	
5	South Brewer Rd	Baseline Road	Philip Road	10	25	50	0	0	100	87	0	13	
6	Philip Road	South Brewer Rd	Project Site	10	25	300	0	0	100	87	0	13	

**Traffic Noise Prediction Model, (FHWA RD-77-108)**  
**Predicted Noise Levels**



**Project Name :** 60656629 - SMUD281-TA15-Country Acres

**Project Number :** 60656629

**Modeling Condition :** Existing and Construction Traffic

**Metric (Leq, Ldn, CNEL) :** Leq

Segment	Roadway	Segment		Noise Levels, dB Leq				Distance to Traffic Noise Contours, Feet				
		From	To	Auto	MT	HT	Total	70 dB	65 dB	60 dB	55 dB	50 dB
1	Baseline Road	Watt Avenue	East and West of V	59.6	72.9	0.0	73.1	80	173	373	805	1733
2	South Brewer Rd	Baseline Road	Philip Road	54.2	56.0	0.0	58.2	8	18	38	82	176
3	Philip Road	South Brewer Rd	Project Site	40.2	43.0	0.0	44.8	6	14	29	63	136
4	Baseline Road	Watt Avenue	East and West of V	0.0	72.9	62.9	73.3	83	179	386	831	1791
5	South Brewer Rd	Baseline Road	Philip Road	0.0	56.0	58.1	60.2	11	24	52	111	239
6	Philip Road	South Brewer Rd	Project Site	0.0	43.0	46.4	48.1	10	22	48	103	223

# Project-Generated Construction Source Noise Prediction Model

60656629 - SMUD281-TA15-Country Acres



Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L <sub>eq</sub> dBA)		Assumptions:	Reference Emission Noise Levels (L <sub>max</sub> ) at 50 feet <sup>1</sup>	Usage Factor <sup>1</sup>
		Daytime	Nighttime		feet <sup>1</sup>	
Threshold*	611	Daytime	60	Dump Truck	76	0.4
	2,433	Nighttime	45		78	
Solar Construction	50	87		Backhoe	78	0.4
	100	80		Dozer	82	0.4
Nearest Residence South	750	58		Excavator	81	0.4
Nearest Residence North	950	55		Tractor	84	0.4
Nearest Residence West	1600	50		Man Lift	75	0.2
				Generator	81	0.5
				Front End Loader	79	0.4
				Vacuum Street Sweeper	82	0.1
				Roller	80	0.2
				Vacuum Street Sweeper	82	0.1
				Excavator	81	0.4
				Pickup Truck	75	0.4
				Dump Truck	76	0.4
				Welder / Torch	74	0.4

Ground Type                      Soft  
 Ground Factor                    0.50

Predicted Noise Level <sup>2</sup>	L <sub>eq</sub> dBA at 50 feet <sup>2</sup>
Dump Truck	72.0
Backhoe	74.0
Backhoe	74.0
Dozer	78.0
Excavator	77.0
Tractor	80.0
Man Lift	68.0
Generator	78.0
Front End Loader	75.0
Vacuum Street Sweeper	72.0
Roller	73.0
Vacuum Street Sweeper	72.0
Excavator	77.0
Pickup Truck	71.0
Dump Truck	72.0
Welder / Torch	70.0

**Combined Predicted Noise Level (L<sub>eq</sub> dBA at 50 feet)**

87.2

Sources:

<sup>1</sup> Obtained from the FHWA Roadway Construction Noise Model, Janu

<sup>2</sup> Based on the following from the Federal Transit Noise and Vibration

$$L_{eq}(\text{equip}) = E.L. + 10 \cdot \log(U.F.) - 20 \cdot \log(D/50) - 10 \cdot G \cdot \log(D/50)$$

Where: E.L. = Emission Level;

U.F. = Usage Factor;

G = Constant that accounts for topography and ground effects; and

D = Distance from source to receiver.

\*Project specific threshold

**Project-Generated Construction Source Noise Prediction Model**

60656629 - SMUD281-TA15-Country Acres



Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L <sub>eq</sub> dBA)		Assumptions:	Reference Emission Noise Levels (L <sub>max</sub> ) at 50 feet <sup>1</sup>		Usage Factor <sup>1</sup>
		Daytime	Nighttime		feet <sup>1</sup>	Factor <sup>1</sup>	
Threshold*	679	Daytime	60	Crane	81	0.16	
	2,703	Nighttime	45	Backhoe	78	0.4	
Storage Construction	50		88	Backhoe	78	0.4	
	100		81	Man Lift	75	0.2	
Nearest Residence South	750		59	Man Lift	75	0.2	
Nearest Residence North	950		56	Dump Truck	76	0.4	
Nearest Residence West	1600		51	Jackhammer	89	0.2	
				Roller	80	0.2	
				Compressor (air)	78	0.4	
				Generator	81	0.5	
				Vibrating Hopper	87	0.5	
				Pumps	81	0.5	

Ground Type                      Soft  
 Ground Factor                    0.50

Predicted Noise Level <sup>2</sup>	L <sub>eq</sub> dBA at 50 feet <sup>2</sup>
Crane	73.0
Backhoe	74.0
Backhoe	74.0
Man Lift	68.0
Man Lift	68.0
Dump Truck	72.0
Jackhammer	82.0
Roller	73.0
Compressor (air)	74.0
Generator	78.0
Vibrating Hopper	84.0
Pumps	78.0

**Combined Predicted Noise Level (L<sub>eq</sub> dBA at 50 feet)**

88.3

Sources:

<sup>1</sup> Obtained from the FHWA Roadway Construction Noise Model, Janu

<sup>2</sup> Based on the following from the Federal Transit Noise and Vibration

$$L_{eq}(\text{equip}) = E.L. + 10 \cdot \log(U.F.) - 20 \cdot \log(D/50) - 10 \cdot G \cdot \log(D/50)$$

Where: E.L. = Emission Level;

U.F. = Usage Factor;

G = Constant that accounts for topography and ground effects; and

D = Distance from source to receiver.

\*Project specific threshold

**Project-Generated Construction Source Noise Prediction Model**

60656629 - SMUD281-TA15-Country Acres



Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L <sub>eq</sub> dBA)		Assumptions:	Reference Emission	Usage
		Daytime	Nighttime		Noise Levels (L <sub>max</sub> ) at 50 feet <sup>1</sup>	Factor <sup>1</sup>
Threshold*	78	83		Generator	81	0.5
	2,588	45		Dozer	82	0.4
Substation Construction	50	88		Man Lift	75	0.2
	100	80		Man Lift	75	0.2
Nearest Residence South	750	58		Backhoe	78	0.4
Nearest Residence North	950	56		Backhoe	78	0.4
Nearest Residence West	1600	50		Excavator	81	0.4
				Compactor (ground)	83	0.2
				Jackhammer	89	0.2
				Dump Truck	76	0.4
				Welder / Torch	74	0.4
				Excavator	81	0.4
				Auger Drill Rig	84	0.2
				Concrete Mixer Truck	79	0.4
				Pickup Truck	75	0.4

Ground Type                      Soft  
 Ground Factor                    0.50

Predicted Noise Level <sup>2</sup>	L <sub>eq</sub> dBA at 50 feet <sup>2</sup>
Generator	78.0
Dozer	78.0
Man Lift	68.0
Man Lift	68.0
Backhoe	74.0
Backhoe	74.0
Excavator	77.0
Compactor (ground)	76.0
Jackhammer	82.0
Dump Truck	72.0
Welder / Torch	70.0
Excavator	77.0
Auger Drill Rig	77.0
Concrete Mixer Truck	75.0
Pickup Truck	71.0

**Combined Predicted Noise Level (L<sub>eq</sub> dBA at 50 feet)**

87.9

Sources:

<sup>1</sup> Obtained from the FHWA Roadway Construction Noise Model, Janu

<sup>2</sup> Based on the following from the Federal Transit Noise and Vibration

$$L_{eq}(\text{equip}) = E.L. + 10 \cdot \log(U.F.) - 20 \cdot \log(D/50) - 10 \cdot G \cdot \log(D/50)$$

Where: E.L. = Emission Level;

U.F. = Usage Factor;

G = Constant that accounts for topography and ground effects; and

D = Distance from source to receiver.

\*Project specific threshold

**Project-Generated Construction Source Noise Prediction Model**

60656629 - SMUD281-TA15-Country Acres



Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L <sub>eq</sub> dBA)		Assumptions:	Reference Emission Noise Levels (L <sub>max</sub> ) at 50 feet <sup>1</sup>		Usage Factor <sup>1</sup>
		Daytime	Nighttime		feet <sup>1</sup>	Factor <sup>1</sup>	
Threshold*	617	Daytime	60	Crane	81	0.16	
	2,456	Nighttime	45		Generator	81	0.5
Switchyard Construction	50		87	Backhoe	78	0.4	
	100		80	Man Lift	75	0.2	
Nearest Residence South	750		58	Man Lift	75	0.2	
Nearest Residence North	950		55	Backhoe	78	0.4	
Nearest Residence West	1600		50	Excavator	81	0.4	
				Compactor (ground)	83	0.2	
				Jackhammer	89	0.2	
				Dump Truck	76	0.4	
				Welder / Torch	74	0.4	
				Excavator	81	0.4	
				Auger Drill Rig	84	0.2	
				Pickup Truck	75	0.4	

Ground Type                      Soft  
 Ground Factor                    0.50

Predicted Noise Level <sup>2</sup>	L <sub>eq</sub> dBA at 50 feet <sup>2</sup>
Crane	73.0
Generator	78.0
Backhoe	74.0
Man Lift	68.0
Man Lift	68.0
Backhoe	74.0
Excavator	77.0
Compactor (ground)	76.0
Jackhammer	82.0
Dump Truck	72.0
Welder / Torch	70.0
Excavator	77.0
Auger Drill Rig	77.0
Pickup Truck	71.0

**Combined Predicted Noise Level (L<sub>eq</sub> dBA at 50 feet)**

87.3

Sources:

<sup>1</sup> Obtained from the FHWA Roadway Construction Noise Model, Janu

<sup>2</sup> Based on the following from the Federal Transit Noise and Vibration

$$L_{eq}(\text{equip}) = E.L. + 10 \cdot \log(U.F.) - 20 \cdot \log(D/50) - 10 \cdot G \cdot \log(D/50)$$

Where: E.L. = Emission Level;

U.F. = Usage Factor;

G = Constant that accounts for topography and ground effects; and

D = Distance from source to receiver.

\*Project specific threshold

**Project-Generated Maintenance Source Noise Prediction Model**

60657391 - MSS Phase 2A



Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L <sub>eq</sub> dBA)		Assumptions:	Reference Emission	Usage
		Daytime	Nighttime		Noise Levels (L <sub>max</sub> ) at 50 feet <sup>1</sup>	Factor <sup>1</sup>
Threshold*	368	Daytime	60	Pickup Truck	75	0.8
	1,466	Nighttime	45		Flat Bed Truck	74
Project Maintenance	50		82	Front End Loader	79	0.8
	100		74	Man Lift	75	0.2
Nearest Residence South	750		52	Dump Truck	76	0.4
Nearest Residence North	950		50	Dump Truck	76	0.4
Nearest Residence West	1600		44			

Ground Type                      Soft  
 Ground Factor                    0.50

Predicted Noise Level <sup>2</sup>	L <sub>eq</sub> dBA at 50 feet <sup>2</sup>
Pickup Truck	74.0
Flat Bed Truck	73.0
Front End Loader	78.0
Man Lift	68.0
Dump Truck	72.0
Dump Truck	72.0

**Combined Predicted Noise Level (L<sub>eq</sub> dBA at 50 feet)**

81.7

Sources:

<sup>1</sup> Obtained from the FHWA Roadway Construction Noise Model, Janu

<sup>2</sup> Based on the following from the Federal Transit Noise and Vibration

$$L_{eq}(\text{equip}) = E.L. + 10 \cdot \log(U.F.) - 20 \cdot \log(D/50) - 10 \cdot G \cdot \log(D/50)$$

Where: E.L. = Emission Level;

U.F. = Usage Factor;

G = Constant that accounts for topography and ground effects; and

D = Distance from source to receiver.

\*Project specific threshold



**Long-Term 24 Hour Continuous Noise Monitoring  
Model Input Sheet**



**Project:** 60656629 - SMUD281-TA15-Country Acres

**Date:** Tuesday, February 08, 2022 to Wednesday, February 09, 2022

**Site:** LT-01

Hour	Leq	Lmax	L50	L90
14:00	48.2	70.0	41.3	38.2
15:00	44.5	58.5	43.1	39.7
16:00	51.5	58.4	49.2	42.0
17:00	54.1	69.5	52.8	50.3
18:00	50.7	62.9	50.3	47.0
19:00	48.3	60.5	47.4	43.1
20:00	47.7	57.5	47.2	43.2
21:00	47.6	57.6	46.2	41.0
22:00	46.3	58.9	44.3	37.7
23:00	43.2	57.2	40.4	28.1
0:00	44.1	56.5	40.5	27.3
1:00	44.9	59.7	38.3	27.2
2:00	45.1	59.6	41.3	31.0
3:00	45.7	57.1	43.7	33.0
4:00	48.7	58.3	47.4	39.4
5:00	52.6	59.7	51.7	46.7
6:00	56.7	62.7	56.2	52.5
7:00	57.8	67.8	57.2	54.6
8:00	57.3	70.5	55.7	50.0
9:00	51.9	68.2	47.0	44.1
10:00	47.2	63.1	45.5	41.6
11:00	44.3	63.9	39.7	38.2
12:00	48.1	74.0	41.2	38.8
13:00	51.2	78.7	39.0	37.3

		Averages			
		Leq	Lmax	L50	L90
Daytime (7 a.m. - 10 p.m.)		52.0	65.4	46.9	43.3
Nighttime (10 p.m. - 7 a.m.)		50.1	58.9	44.9	35.9

		Uppermost-Level			
		Leq	Lmax	L50	L90
Daytime (7 a.m. - 10 p.m.)		57.8	78.7	57.2	54.6
Nighttime (10 p.m. - 7 a.m.)		56.7	62.7	56.2	52.5

Percentage of Energy	
Daytime	72%
Nighttime	28%

Calculated L <sub>dn</sub> , dBA
56.8

**Long-Term 24 Hour Continuous Noise Monitoring**  
Model Input Sheet



**Project:** 60656629 - SMUD281-TA15-Country Acres  
**Date:** Tuesday, February 08, 2022 to Wednesday, February 09, 2022  
**Site:** LT-01

Hour	Leq	Lmax	L50	L90
14:00	48.2	83.8	41.3	38.2
15:00	44.5	80.0	43.1	39.7
16:00	51.5	87.0	49.2	42.0
17:00	54.1	89.7	52.8	50.3
18:00	50.7	86.3	50.3	47.0
19:00	48.3	83.9	47.4	43.1
20:00	47.7	83.3	47.2	43.2
21:00	47.6	83.2	46.2	41.0
22:00	46.3	81.9	44.3	37.7
23:00	43.2	78.8	40.4	28.1
0:00	44.1	79.7	40.5	27.3
1:00	44.9	80.4	38.3	27.2
2:00	45.1	80.7	41.3	31.0
3:00	45.7	81.3	43.7	33.0
4:00	48.7	84.3	47.4	39.4
5:00	52.6	88.1	51.7	46.7
6:00	56.7	92.2	56.2	52.5
7:00	57.8	93.4	57.2	54.6
8:00	57.3	92.9	55.7	50.0
9:00	51.9	87.5	47.0	44.1
10:00	47.2	82.8	45.5	41.6
11:00	44.3	79.9	39.7	38.2
12:00	48.1	83.7	41.2	38.8
13:00	51.2	86.8	39.0	37.3

Daytime (7 a.m. - 7 p.m.)  
 Evening (7 p.m. - 9 p.m.)  
 Nighttime (9 p.m. - 7 a.m.)

Averages			
Leq	Lmax	L50	L90
52.6	86.2	46.8	43.5
47.9	83.5	46.9	42.4
50.1	83.0	44.9	35.9

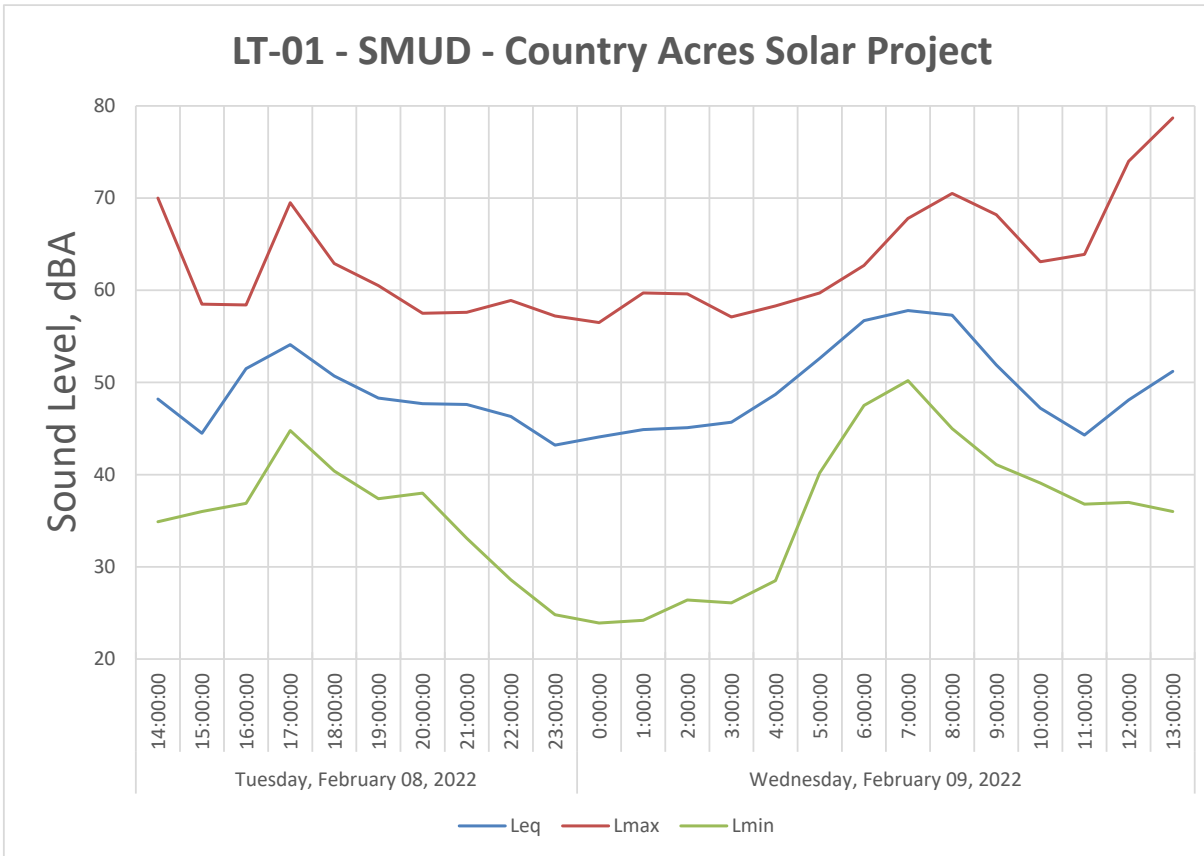
Daytime (7 a.m. - 7 p.m.)  
 Evening (7 p.m. - 9 p.m.)  
 Nighttime (9 p.m. - 7 a.m.)

Uppermost-Level			
Leq	Lmax	L50	L90
57.8	93.4	57.2	54.6
48.3	83.9	47.4	43.2
56.7	92.2	56.2	52.5

Percentage of Energy	
Daytime	67%
Evening	6%
Nighttime	28%

**Calculated CNEL, dBA**  
56.9

Date	Time	Leq	Lmax	Lmin
Tuesday, February 08, 2022	14:00:00	48.2	70	34.9
	15:00:00	44.5	58.5	36
	16:00:00	51.5	58.4	36.9
	17:00:00	54.1	69.5	44.8
	18:00:00	50.7	62.9	40.4
	19:00:00	48.3	60.5	37.4
	20:00:00	47.7	57.5	38
	21:00:00	47.6	57.6	33.1
	22:00:00	46.3	58.9	28.6
	23:00:00	43.2	57.2	24.8
Wednesday, February 09, 2022	0:00:00	44.1	56.5	23.9
	1:00:00	44.9	59.7	24.2
	2:00:00	45.1	59.6	26.4
	3:00:00	45.7	57.1	26.1
	4:00:00	48.7	58.3	28.5
	5:00:00	52.6	59.7	40.2
	6:00:00	56.7	62.7	47.5
	7:00:00	57.8	67.8	50.2
	8:00:00	57.3	70.5	45
	9:00:00	51.9	68.2	41.1
	10:00:00	47.2	63.1	39.1
	11:00:00	44.3	63.9	36.8
	12:00:00	48.1	74	37
13:00:00	51.2	78.7	36	
		51.4		



**Long-Term 24 Hour Continuous Noise Monitoring  
Model Input Sheet**



**Project:** 60656629 - SMUD281-TA15-Country Acres

**Date:** Tuesday, February 08, 2022 to Wednesday, February 09, 2022

**Site:** LT-02

Hour	Leq	Lmax	L50	L90
15:00	43.0	68.2	33.1	31.1
16:00	46.9	71.4	36.0	33.4
17:00	38.0	57.2	32.4	30.2
18:00	35.3	53.5	32.5	30.4
19:00	41.4	62.1	32.3	30.0
20:00	33.2	53.6	32.2	30.1
21:00	32.0	48.3	30.4	28.3
22:00	32.2	49.3	30.3	28.1
23:00	31.2	49.0	29.4	27.1
0:00	36.3	54.0	26.8	23.6
1:00	28.0	44.1	25.1	23.5
2:00	29.7	44.2	27.2	24.6
3:00	28.1	46.9	26.6	24.3
4:00	27.9	42.3	25.9	24.4
5:00	34.4	52.2	30.3	27.7
6:00	42.8	67.4	34.4	31.1
7:00	45.7	75.9	41.1	36.8
8:00	44.8	62.2	43.1	39.6
9:00	49.2	75.6	40.2	37.2
10:00	41.5	59.5	39.6	36.8
11:00	39.6	64.5	37.1	35.0
12:00	43.9	66.1	36.9	34.5
13:00	35.9	48.5	34.1	32.1
14:00	38.8	58.3	35.3	33.2

Averages				
	Leq	Lmax	L50	L90
Daytime (7 a.m. - 10 p.m.)	43.1	61.7	35.8	33.2
Nighttime (10 p.m. - 7 a.m.)	35.5	49.9	28.4	26.0

Uppermost-Level				
	Leq	Lmax	L50	L90
Daytime (7 a.m. - 10 p.m.)	49.2	75.9	43.1	39.6
Nighttime (10 p.m. - 7 a.m.)	42.8	67.4	34.4	31.1

Percentage of Energy	
Daytime	91%
Nighttime	9%

Calculated L <sub>dn</sub> , dBA
44.2

**Long-Term 24 Hour Continuous Noise Monitoring**  
Model Input Sheet



**Project:** 60656629 - SMUD281-TA15-Country Acres  
**Date:** Tuesday, February 08, 2022 to Wednesday, February 09, 2022  
**Site:** LT-02

Hour	Leq	Lmax	L50	L90
15:00	43.0	78.5	33.1	31.1
16:00	46.9	82.5	36.0	33.4
17:00	38.0	73.6	32.4	30.2
18:00	35.3	70.9	32.5	30.4
19:00	41.4	77.0	32.3	30.0
20:00	33.2	68.8	32.2	30.1
21:00	32.0	67.6	30.4	28.3
22:00	32.2	67.8	30.3	28.1
23:00	31.2	66.8	29.4	27.1
0:00	36.3	71.8	26.8	23.6
1:00	28.0	63.6	25.1	23.5
2:00	29.7	65.3	27.2	24.6
3:00	28.1	63.7	26.6	24.3
4:00	27.9	63.5	25.9	24.4
5:00	34.4	70.0	30.3	27.7
6:00	42.8	78.4	34.4	31.1
7:00	45.7	81.3	41.1	36.8
8:00	44.8	80.3	43.1	39.6
9:00	49.2	84.8	40.2	37.2
10:00	41.5	77.1	39.6	36.8
11:00	39.6	75.2	37.1	35.0
12:00	43.9	79.5	36.9	34.5
13:00	35.9	71.5	34.1	32.1
14:00	38.8	74.4	35.3	33.2

Averages				
	Leq	Lmax	L50	L90
Daytime (7 a.m. - 7 p.m.)	43.8	77.5	36.8	34.2
Evening (7 p.m. - 9 p.m.)	37.7	71.1	31.6	29.5
Nighttime (9 p.m. - 7 a.m.)	35.5	67.9	28.4	26.0

Uppermost-Level				
	Leq	Lmax	L50	L90
Daytime (7 a.m. - 7 p.m.)	49.2	84.8	43.1	39.6
Evening (7 p.m. - 9 p.m.)	41.4	77.0	32.3	30.1
Nighttime (9 p.m. - 7 a.m.)	42.8	78.4	34.4	31.1

Percentage of Energy	
Daytime	85%
Evening	5%
Nighttime	9%

**Calculated CNEL, dBA**  
44.4

Date	Time	Leq	Lmax	Lmin
Tuesday, February 08, 2022	15:00:00	43	68.2	29.2
	16:00:00	46.9	71.4	29.9
	17:00:00	38	57.2	27.7
	18:00:00	35.3	53.5	28.5
	19:00:00	41.4	62.1	28
	20:00:00	33.2	53.6	28.1
	21:00:00	32	48.3	26.6
	22:00:00	32.2	49.3	25.6
	23:00:00	31.2	49	24.2
	0:00:00	36.3	54	21.2
Wednesday, February 09, 2022	1:00:00	28	44.1	22.2
	2:00:00	29.7	44.2	22.6
	3:00:00	28.1	46.9	23
	4:00:00	27.9	42.3	23.5
	5:00:00	34.4	52.2	26.1
	6:00:00	42.8	67.4	28.8
	7:00:00	45.7	75.9	33.6
	8:00:00	44.8	62.2	36.7
	9:00:00	49.2	75.6	35.1
	10:00:00	41.5	59.5	33.4
	11:00:00	39.6	64.5	33.4
	12:00:00	43.9	66.1	32.5
	13:00:00	35.9	48.5	30.3
	14:00:00	38.8	58.3	31.2
		41.5		

