Appendix I

Noise Modeling Calculation Data

CPUC General Construction

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L_{eq} dBA)
threshold	401	65.0
PG&E 230 kV Transmission Line	80	79.0
PG&E Lockeford Substation	440	64.2
PG&E Thurman Switching Station	600	61.5
PG&E Brighton	1000	57.1
PG&E Bellota	1050	56.6
PG&E Rio Oso	4150	44.7

Equipment	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1]
Jackhammer	85	0.2
Dump Truck	84	0.4
Backhoe	80	0.4

Ground Type	hard
Source Height	8
Receiver Height	5
Ground Factor[2]	0.00

Predicted Noise Level [3]	L_{eq} dBA at 50 feet[3]
Jackhammer	78.0
Dump Truck	80.0
Backhoe	76.0

Combined Predicted Noise Level (L_{eq} dBA at 50 feet)
83.1

Sources:

[1] Obtained from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

[2] Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

[3] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

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

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.

CPUC Mobilization

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L_{eq} dBA)
threshold	468	65.0
PG&E 230 kV Transmiss	80	80.4
PG&E Thurman Switching Station	600	62.8

Equipment	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1]
Grader	85	0.4
Dump Truck	84	0.4
Crane	85	0.16

Ground Type	hard
Source Height	8
Receiver Height	5
Ground Factor[2]	0.00

Predicted Noise Level [3]	L_{eq} dBA at 50 feet[3]
Grader	81.0
Dump Truck	80.0
Crane	77.0

Combined Predicted Noise Level (L_{eq} dBA at 50 feet)
84.4

Sources:

[1] Obtained from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

[2] Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

[3] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

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

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.

CPUC Clearing

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L_{eq} dBA)
threshold	6	100.0
PG&E 230 kV Transmiss	80	77.4
PG&E Thurman Switchi	600	59.9

Equipment	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1]
Dump Truck	84	0.4
Pickup Truck	55	0.4
Backhoe	80	0.4

Ground Type	hard
Source Height	8
Receiver Height	5
Ground Factor[2]	0.00

Predicted Noise Level[3]	L_{eq} dBA at 50 feet[3]
Dump Truck	80.0
Pickup Truck	51.0
Backhoe	76.0

Combined Predicted Noise Level (L_{eq} dBA at 50 feet)
81.5

Sources:

[1] Obtained from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

[2] Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

[3] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

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

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.

CPUC Guard Structures

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L_{eq} dBA)
threshold	5	100.0
PG&E 230 kV Transmiss	80	76.1

Equipment	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1]
Auger Drill Rig	85	0.2
Backhoe	80	0.4
Pickup Truck	55	0.4

Ground Type	hard
Source Height	8
Receiver Height	5
Ground Factor[2]	0.00

Predicted Noise Level [3]	L_{eq} dBA at 50 feet[3]
Auger Drill Rig	78.0
Backhoe	76.0
Pickup Truck	51.0

Combined Predicted Noise Level (L_{eq} dBA at 50 feet)
80.1

Sources:

[1] Obtained from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

[2] Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

[3] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

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

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.

CPUC Assembly

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L_{eq} dBA)
threshold	4	100.0
PG&E 230 kV Transmiss	80	74.4

Equipment	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1]
Pickup Truck	55	0.4
Compactor (ground)	80	0.2
Crane	85	0.16

Ground Type	hard
Source Height	8
Receiver Height	5
Ground Factor[2]	0.00

Predicted Noise Level [3]	L_{eq} dBA at 50 feet[3]
Pickup Truck	51.0
Compactor (ground)	73.0
Crane	77.0

Combined Predicted Noise Level (L_{eq} dBA at 50 feet)
78.5

Sources:

[1] Obtained from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

[2] Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

[3] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

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

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.

CPUC Installation

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L_{eq} dBA)	Equipment	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1]
threshold	12	100.0	**Paver**	85	0.5
PG&E 230 kV Transmiss	80	83.3	**Concrete Saw**	90	0.2
PG&E Thurman Switchi	600	65.8	**Roller**	85	0.2
LEU Guild Substation	600	65.8	**Grader**	85	0.4

Ground Type	hard
Source Height	8
Receiver Height	5
Ground Factor[2]	0.00

Predicted Noise Level [3]	L_{eq} dBA at 50 feet[3]
Paver	82.0
Concrete Saw	83.0
Roller	78.0
Grader	81.0

Combined Predicted Noise Level (L_{eq} dBA at 50 feet)
87.4

Sources:

[1] Obtained from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

[2] Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

[3] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

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

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.

CPUC Restoration

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L_{eq} dBA)
threshold	8	100.0
PG&E 230 kV Transmiss	80	80.2
LEU Guild Substation	600	62.7

Equipment	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1]
Grader	85	0.4
Flat Bed Truck	84	0.4
Backhoe	80	0.4

Ground Type	hard
Source Height	8
Receiver Height	5
Ground Factor[2]	0.00

Predicted Noise Level [3]	L_{eq} dBA at 50 feet[3]
Grader	81.0
Flat Bed Truck	80.0
Backhoe	76.0

Combined Predicted Noise Level (L_{eq} dBA at 50 feet)
84.3

Sources:

[1] Obtained from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

[2] Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

[3] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

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

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.

CPUC Site Prep

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L_{eq} dBA)
threshold	9	100.0
PG&E Lockeford Substa	440	65.7
PG&E Thurman Switchi	600	63.0
LEU Guild Substation	600	63.0

Equipment	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1]
Dozer	85	0.4
Dump Truck	84	0.4
Roller	85	0.2

Ground Type	hard
Source Height	8
Receiver Height	5
Ground Factor[2]	0.00

Predicted Noise Level [3]	L_{eq} dBA at 50 feet[3]
Dozer	81.0
Dump Truck	80.0
Roller	78.0

Combined Predicted Noise Level (L_{eq} dBA at 50 feet)
84.6

Sources:

[1] Obtained from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

[2] Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

[3] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

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

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.

CPUC Grading and Paving

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L_{eq} dBA)
threshold	11	100.0
PG&E Lockeford Substa	440	67.6
PG&E Thurman Switchi	600	64.9

Equipment	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1]
Concrete Mixer Truck	85	0.4
Dozer	85	0.4
Roller	85	0.2
Grader	85	0.4

Ground Type	hard
Source Height	8
Receiver Height	5
Ground Factor[2]	0.00

Predicted Noise Level[3]	L_{eq} dBA at 50 feet[3]
Concrete Mixer Truck	81.0
Dozer	81.0
Roller	78.0
Grader	81.0

Combined Predicted Noise Level (L_{eq} dBA at 50 feet)
86.5

Sources:

[1] Obtained from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

[2] Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

[3] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

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

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.

CPUC Foundation and Excavation

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L_{eq} dBA)
threshold	7	100.0
PG&E 230 kV Transmiss	80	79.2
PG&E Lockeford Substa	440	64.4
PG&E Thurman Switchi	600	61.7
LEU Guild Substation	600	61.7

Equipment	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1]
Crane	85	0.16
Dump Truck	84	0.4
Auger Drill Rig	85	0.2

Ground Type	hard
Source Height	8
Receiver Height	5
Ground Factor[2]	0.00

Predicted Noise Level [3]	L_{eq} dBA at 50 feet[3]
Crane	77.0
Dump Truck	80.0
Auger Drill Rig	78.0

Combined Predicted Noise Level (L_{eq} dBA at 50 feet)
83.3

Sources:

[1] Obtained from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

[2] Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

[3] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

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

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.

CPUC Equipment Installation

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L_{eq} dBA)
threshold	7	100.0
PG&E Lockeford Substa	440	63.4
PG&E Thurman Switchi	600	60.7

Equipment	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1]
Compactor (ground)	80	0.2
Dump Truck	84	0.4
Crane	85	0.16

Ground Type	hard
Source Height	8
Receiver Height	5
Ground Factor[2]	0.00

Predicted Noise Level [3]	L_{eq} dBA at 50 feet[3]
Compactor (ground)	73.0
Dump Truck	80.0
Crane	77.0

Combined Predicted Noise Level (L_{eq} dBA at 50 feet)
82.3

Sources:

[1] Obtained from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

[2] Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

[3] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

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

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.

CPUC Clearing and Landscaping

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L_{eq} dBA)
threshold	6	100.0
PG&E Lockeford Substa	140	72.5
PG&E Thurman Switchi	800	57.4

Equipment	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1]
Pickup Truck	55	0.4
Backhoe	80	0.4
Dump Truck	84	0.4

Ground Type	hard
Source Height	8
Receiver Height	5
Ground Factor[2]	0.00

Predicted Noise Level [3]	L_{eq} dBA at 50 feet[3]
Pickup Truck	51.0
Backhoe	76.0
Dump Truck	80.0

Combined Predicted Noise Level (L_{eq} dBA at 50 feet)
81.5

Sources:

[1] Obtained from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

[2] Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

[3] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

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

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.

CPUC Rebuilding Substation

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L_{eq} dBA)
threshold	7	100.0
PG&E Lockeford Substa	440	64.2

Equipment	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1]
Man Lift	85	0.2
Dump Truck	84	0.4
Compressor (air)	80	0.4

Ground Type	hard
Source Height	8
Receiver Height	5
Ground Factor[2]	0.00

Predicted Noise Level [3]	L_{eq} dBA at 50 feet[3]
Man Lift	78.0
Dump Truck	80.0
Compressor (air)	76.0

Combined Predicted Noise Level (L_{eq} dBA at 50 feet)
83.1

Sources:

[1] Obtained from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

[2] Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

[3] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

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

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.

Nighttime Concrete Pouring

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L_{eq} dBA)
threshold	4,236	45.0
PG&E Lockeford Substa	440	64.7
PG&E Thurman Switchi	2230	50.6
LEU industrial and Guild	2230	50.6

Equipment	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1]
Flat Bed Truck	84	0.4
Concrete Mixer Truck	85	0.4

Ground Type	hard
Source Height	8
Receiver Height	5
Ground Factor[2]	0.00

Predicted Noise Level [3]	L_{eq} dBA at 50 feet[3]
Flat Bed Truck	80.0
Concrete Mixer Truck	81.0

Combined Predicted Noise Level (L_{eq} dBA at 50 feet)
83.6

Sources:

[1] Obtained from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

[2] Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

[3] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

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

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.

Nighttime Commissioning

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L_{eq} dBA)
threshold	2,238	45.0
PG&E Lockeford Substa	440	59.1
PG&E Thurman Switchi	2230	45.0
LEU industrial and Guild	2230	45.0

Equipment	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1]
Man Lift	85	0.2
Pickup Truck	55	0.4

Ground Type	hard
Source Height	8
Receiver Height	5
Ground Factor[2]	0.00

Predicted Noise Level [3]	L_{eq} dBA at 50 feet[3]
Man Lift	78.0
Pickup Truck	51.0

Combined Predicted Noise Level (L_{eq} dBA at 50 feet)
78.0

Sources:

[1] Obtained from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

[2] Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

[3] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

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

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.

Equipment Description	Acoustical Usage Factor (%)	Spec 721.560 Lmax @ 50ft (dBA slow)	Actual Measured Lmax @ 50ft (dBA slow)	No. of Actual Data Samples (count)	Spec 721.560 LmaxCalc	Spec 721.560 Leq	Distance	Actual Measured LmaxCalc	Actual Measured Leq
Auger Drill Rig	20	85	84	36	79.0	72.0	100	78.0	71.0
Backhoe	40	80	78	372	74.0	70.0	100	72.0	68.0
Bar Bender	20	80	na	0	74.0	67.0	100		
Blasting	na	94	na	0	88.0		100		
Boring Jack Power Unit	50	80	83	1	74.0	71.0	100	77.0	74.0
Chain Saw	20	85	84	46	79.0	72.0	100	78.0	71.0
Clam Shovel (dropping)	20	93	87	4	87.0	80.0	100	81.0	74.0
Compactor (ground)	20	80	83	57	74.0	67.0	100	77.0	70.0
Compressor (air)	40	80	78	18	74.0	70.0	100	72.0	68.0
Concrete Batch Plant	15	83	na	0	77.0	68.7	100		
Concrete Mixer Truck	40	85	79	40	79.0	75.0	100	73.0	69.0
Concrete Pump Truck	20	82	81	30	76.0	69.0	100	75.0	68.0
Concrete Saw	20	90	90	55	84.0	77.0	100	84.0	77.0
Crane	16	85	81	405	79.0	71.0	100	75.0	67.0
Dozer	40	85	82	55	79.0	75.0	100	76.0	72.0
Drill Rig Truck	20	84	79	22	78.0	71.0	100	73.0	66.0
Drum Mixer	50	80	80	1	74.0	71.0	100	74.0	71.0
Dump Truck	40	84	76	31	78.0	74.0	100	70.0	66.0
Excavator	40	85	81	170	79.0	75.0	100	75.0	71.0
Flat Bed Truck	40	84	74	4	78.0	74.0	100	68.0	64.0
Front End Loader	40	80	79	96	74.0	70.0	100	73.0	69.0
Generator	50	82	81	19	76.0	73.0	100	75.0	72.0
Generator (<25KVA, VMS s	50	70	73	74	64.0	61.0	100	67.0	64.0
Gradall	40	85	83	70	79.0	75.0	100	77.0	73.0
Grader	40	85	na	0	79.0	75.0	100		
Grapple (on Backhoe)	40	85	87	1	79.0	75.0	100	81.0	77.0
Horizontal Boring Hydr. Ja	25	80	82	6	74.0	68.0	100	76.0	70.0
Hydra Break Ram	10	90	na	0	84.0	74.0	100		
Impact Pile Driver	20	95	101	11	89.0	82.0	100	95.0	88.0
Jackhammer	20	85	89	133	79.0	72.0	100	83.0	76.0
Man Lift	20	85	75	23	79.0	72.0	100	69.0	62.0
Mounted Impact Hammer	20	90	90	212	84.0	77.0	100	84.0	77.0
Pavement Scarafier	20	85	90	2	79.0	72.0	100	84.0	77.0
Paver	50	85	77	9	79.0	76.0	100	71.0	68.0
Pickup Truck	40	55	75	1	49.0	45.0	100	69.0	65.0
Pneumatic Tools	50	85	85	90	79.0	76.0	100	79.0	76.0
Pumps	50	77	81	17	71.0	68.0	100	75.0	72.0
Refrigerator Unit	100	82	73	3	76.0	76.0	100	67.0	67.0
Rivit Buster/chipping gun	20	85	79	19	79.0	72.0	100	73.0	66.0
Rock Drill	20	85	81	3	79.0	72.0	100	75.0	68.0
Roller	20	85	80	16	79.0	72.0	100	74.0	67.0
Sand Blasting (Single Nozz	20	85	96	9	79.0	72.0	100	90.0	83.0
Scraper	40	85	84	12	79.0	75.0	100	78.0	74.0
Shears (on backhoe)	40	85	96	5	79.0	75.0	100	90.0	86.0
Slurry Plant	100	78	78	1	72.0	72.0	100	72.0	72.0
Slurry Trenching Machine	50	82	80	75	76.0	73.0	100	74.0	71.0
Soil Mix Drill Rig	50	80	na	0	74.0	71.0	100		
Tractor	40	84	na	0	78.0	74.0	100		
Vacuum Excavator (Vac-tr	40	85	85	149	79.0	75.0	100	79.0	75.0
Vacuum Street Sweeper	10	80	82	19	74.0	64.0	100	76.0	66.0
Ventilation Fan	100	85	79	13	79.0	79.0	100	73.0	73.0
Vibrating Hopper	50	85	87	1	79.0	76.0	100	81.0	78.0
Vibratory Concrete Mixer	20	80	80	1	74.0	67.0	100	74.0	67.0
Vibratory Pile Driver	20	95	101	44	89.0	82.0	100	95.0	88.0
Warning Horn	5	85	83	12	79.0	66.0	100	77.0	64.0
Welder / Torch	40	73	74	5	67.0	63.0	100	68.0	64.0

Source:
FHWA Roadway Construction Noise Model, January 2006. Table 9.1
U.S. Department of Transportation
CA/T Construction Spec. 721.560

Increase in Long-Term Noise Measurement Summary

KEY: Orange cells are for input.
Grey cells are intermediate calculations performed by the model.
Green cells are data to present in a written analysis (output).

Measurement Site: PG&E Lockeford Control Enclosure
Measurement Date: Operational Noise
Project Name: PG&E CPUC

Computation of CNEL

Hour of Day (military time)	Sound Level Leq (dBA)	Sound Power =10*Log(dBA /10)	Period of 24-Hour Day (1=included, 0=not) Day	Evening	Night	Sound Power Breakdown by Period of Day Day	Evening	Night
0:00	35.5	3,548	0	0	1	0	0	3,548
1:00	35.5	3,548	0	0	1	0	0	3,548
2:00	35.5	3,548	0	0	1	0	0	3,548
3:00	35.5	3,548	0	0	1	0	0	3,548
4:00	35.5	3,548	0	0	1	0	0	3,548
5:00	35.5	3,548	0	0	1	0	0	3,548
6:00	35.5	3,548	0	0	1	0	0	3,548
7:00	35.5	3,548	1	0	0	3,548	0	0
8:00	35.5	3,548	1	0	0	3,548	0	0
9:00	35.5	3,548	1	0	0	3,548	0	0
10:00	35.5	3,548	1	0	0	3,548	0	0
11:00	35.5	3,548	1	0	0	3,548	0	0
12:00	35.5	3,548	1	0	0	3,548	0	0
13:00	35.5	3,548	1	0	0	3,548	0	0
14:00	35.5	3,548	1	0	0	3,548	0	0
15:00	35.5	3,548	1	0	0	3,548	0	0
16:00	35.5	3,548	1	0	0	3,548	0	0
17:00	35.5	3,548	1	0	0	3,548	0	0
18:00	35.5	3,548	1	0	0	3,548	0	0
19:00	35.5	3,548	0	1	0	0	3,548	0
20:00	35.5	3,548	0	1	0	0	3,548	0
21:00	35.5	3,548	0	1	0	0	3,548	0
22:00	35.5	3,548	0	0	1	0	0	3,548
23:00	35.5	3,548	0	0	1	0	0	3,548

	Day	Evening	Night
Sum of Sound Power during Period wo/penalty	42,578	10,644	31,933
Log Factor for CNEL Penalty (i.e., 10*log(x))	1	3	10
Sound Power during Period with penalty	42,578	31,933	319,332

Total Daily Sound Power, with penalties	393,843
Hours per Day	24
Average Hourly Sound Power, with penalties	16,410
CNEL	42.2

Ldn computation on next page.

Computation of Ldn

Period of 24-Hour Day (1=included, 0=not)		Sound Power Breakdown by Period of Day	
Day	Night	Day	Night
0	1	0	3,548
0	1	0	3,548
0	1	0	3,548
0	1	0	3,548
0	1	0	3,548
0	1	0	3,548
0	1	0	3,548
1	0	3,548	0
1	0	3,548	0
1	0	3,548	0
1	0	3,548	0
1	0	3,548	0
1	0	3,548	0
1	0	3,548	0
1	0	3,548	0
1	0	3,548	0
1	0	3,548	0
1	0	3,548	0
1	0	3,548	0
1	0	3,548	0
1	0	3,548	0
1	0	3,548	0
0	1	0	3,548
0	1	0	3,548

	Day	Night
Sum of Sound Power during Period wo/penalty	53,222	31,933
Log Factor for Penalty (i.e., 10*log(x))	1	10
Sound Power during Period with penalty	53,222	319,332

Total Daily Sound Power, with penalties	372,554
Hours per Day	24
Average Hourly Sound Power, with penalties	15,523
Ldn	41.9

Notes:

Computation of the CNEL based on 1-hour Leq measurements for each hour of a day are based on equation 2-27 on pg. 2-57 of Caltrans 2009.

Computation of the Ldn based on 1-hour Leq measurements for each hour of a day are based on equation 2-26 on pg. 2-56 of Caltrans 2009.

Log factors for the Ldn and CNEL penalties are provided in Table 2-12 on pg. 2-52 of Caltrans 2009.

Source:

California Deaprtment of Transportation (Caltrans), Divisiong of Environmental Analysis. 2009 (November). *2009 Technical Noise Supplement* . Sacramento, CA. Available: <http://www.dot.ca.gov/hq/env/noise/>. Accessed September 24, 2010.

Increase in Long-Term Noise Measurement Summary

KEY: Orange cells are for input.
Grey cells are intermediate calculations performed by the model.
Green cells are data to present in a written analysis (output).

Measurement Site: PG&E Lockeford Battery Enclosure
Measurement Date: Operational Noise
Project Name: PG&E CPUC

Computation of CNEL

Hour of Day (military time)	Sound Level Leq (dBA)	Sound Power =10*Log(dBA /10)	Period of 24-Hour Day (1=included, 0=not) Day	Evening	Night	Sound Power Breakdown by Period of Day Day	Evening	Night
0:00	25.5	355	0	0	1	0	0	355
1:00	25.5	355	0	0	1	0	0	355
2:00	25.5	355	0	0	1	0	0	355
3:00	25.5	355	0	0	1	0	0	355
4:00	25.5	355	0	0	1	0	0	355
5:00	25.5	355	0	0	1	0	0	355
6:00	25.5	355	0	0	1	0	0	355
7:00	25.5	355	1	0	0	355	0	0
8:00	25.5	355	1	0	0	355	0	0
9:00	25.5	355	1	0	0	355	0	0
10:00	25.5	355	1	0	0	355	0	0
11:00	25.5	355	1	0	0	355	0	0
12:00	25.5	355	1	0	0	355	0	0
13:00	25.5	355	1	0	0	355	0	0
14:00	25.5	355	1	0	0	355	0	0
15:00	25.5	355	1	0	0	355	0	0
16:00	25.5	355	1	0	0	355	0	0
17:00	25.5	355	1	0	0	355	0	0
18:00	25.5	355	1	0	0	355	0	0
19:00	25.5	355	0	1	0	0	355	0
20:00	25.5	355	0	1	0	0	355	0
21:00	25.5	355	0	1	0	0	355	0
22:00	25.5	355	0	0	1	0	0	355
23:00	25.5	355	0	0	1	0	0	355

	Day	Evening	Night
Sum of Sound Power during Period wo/penalty	4,258	1,064	3,193
Log Factor for CNEL Penalty (i.e., 10*log(x))	1	3	10
Sound Power during Period with penalty	4,258	3,193	31,933

Total Daily Sound Power, with penalties	39,384
Hours per Day	24
Average Hourly Sound Power, with penalties	1,641
CNEL	32.2

Ldn computation on next page.

Computation of Ldn

Period of 24-Hour Day (1=included, 0=not) Day	Night	Sound Power Breakdown by Period of Day Day	Night
0	1	0	355
0	1	0	355
0	1	0	355
0	1	0	355
0	1	0	355
0	1	0	355
0	1	0	355
1	0	355	0
1	0	355	0
1	0	355	0
1	0	355	0
1	0	355	0
1	0	355	0
1	0	355	0
1	0	355	0
1	0	355	0
1	0	355	0
1	0	355	0
1	0	355	0
1	0	355	0
1	0	355	0
1	0	355	0
0	1	0	355
0	1	0	355

	Day	Night
Sum of Sound Power during Period wo/penalty	5,322	3,193
Log Factor for Penalty (i.e., 10*log(x))	1	10
Sound Power during Period with penalty	5,322	31,933

Total Daily Sound Power, with penalties	37,255
Hours per Day	24
Average Hourly Sound Power, with penalties	1,552
Ldn	31.9

Notes:

Computation of the CNEL based on 1-hour Leq measurements for each hour of a day are based on equation 2-27 on pg. 2-57 of Caltrans 2009.

Computation of the Ldn based on 1-hour Leq measurements for each hour of a day are based on equation 2-26 on pg. 2-56 of Caltrans 2009.

Log factors for the Ldn and CNEL penalties are provided in Table 2-12 on pg. 2-52 of Caltrans 2009.

Source:

California Deaprtment of Transportation (Caltrans), Divisiong of Environmental Analysis. 2009 (November). *2009 Technical Noise Supplement* . Sacramento, CA. Available: <http://www.dot.ca.gov/hq/env/noise/>. Accessed September 24, 2010.

Increase in Long-Term Noise Measurement Summary

KEY: Orange cells are for input.
Grey cells are intermediate calculations performed by the model.
Green cells are data to present in a written analysis (output).

Measurement Site: PG&E Thurman Control Enclosure
Measurement Date: Operational Noise
Project Name: PG&E CPUC

Computation of CNEL

Hour of Day (military time)	Sound Level Leq (dBA)	Sound Power =10*Log(dBA /10)	Period of 24-Hour Day (1=included, 0=not) Day	Evening	Night	Sound Power Breakdown by Period of Day Day	Evening	Night
0:00	23.5	224	0	0	1	0	0	224
1:00	23.5	224	0	0	1	0	0	224
2:00	23.5	224	0	0	1	0	0	224
3:00	23.5	224	0	0	1	0	0	224
4:00	23.5	224	0	0	1	0	0	224
5:00	23.5	224	0	0	1	0	0	224
6:00	23.5	224	0	0	1	0	0	224
7:00	23.5	224	1	0	0	224	0	0
8:00	23.5	224	1	0	0	224	0	0
9:00	23.5	224	1	0	0	224	0	0
10:00	23.5	224	1	0	0	224	0	0
11:00	23.5	224	1	0	0	224	0	0
12:00	23.5	224	1	0	0	224	0	0
13:00	23.5	224	1	0	0	224	0	0
14:00	23.5	224	1	0	0	224	0	0
15:00	23.5	224	1	0	0	224	0	0
16:00	23.5	224	1	0	0	224	0	0
17:00	23.5	224	1	0	0	224	0	0
18:00	23.5	224	1	0	0	224	0	0
19:00	23.5	224	0	1	0	0	224	0
20:00	23.5	224	0	1	0	0	224	0
21:00	23.5	224	0	1	0	0	224	0
22:00	23.5	224	0	0	1	0	0	224
23:00	23.5	224	0	0	1	0	0	224

	Day	Evening	Night
Sum of Sound Power during Period wo/penalty	2,686	672	2,015
Log Factor for CNEL Penalty (i.e., 10*log(x))	1	3	10
Sound Power during Period with penalty	2,686	2,015	20,148

Total Daily Sound Power, with penalties	24,850
Hours per Day	24
Average Hourly Sound Power, with penalties	1,035
CNEL	30.2

Ldn computation on next page.

Computation of Ldn

Period of 24-Hour Day (1=included, 0=not) Day	Night	Sound Power Breakdown by Period of Day Day	Night
0	1	0	224
0	1	0	224
0	1	0	224
0	1	0	224
0	1	0	224
0	1	0	224
0	1	0	224
1	0	224	0
1	0	224	0
1	0	224	0
1	0	224	0
1	0	224	0
1	0	224	0
1	0	224	0
1	0	224	0
1	0	224	0
1	0	224	0
1	0	224	0
1	0	224	0
1	0	224	0
1	0	224	0
1	0	224	0
0	1	0	224
0	1	0	224

Sum of Sound Power during Period wo/penalty	3,358	2,015
Log Factor for Penalty (i.e., 10*log(x))	1	10
Sound Power during Period with penalty	3,358	20,148

Total Daily Sound Power, with penalties	23,507
Hours per Day	24
Average Hourly Sound Power, with penalties	979
Ldn	29.9

Notes:

Computation of the CNEL based on 1-hour Leq measurements for each hour of a day are based on equation 2-27 on pg. 2-57 of Caltrans 2009.

Computation of the Ldn based on 1-hour Leq measurements for each hour of a day are based on equation 2-26 on pg. 2-56 of Caltrans 2009.

Log factors for the Ldn and CNEL penalties are provided in Table 2-12 on pg. 2-52 of Caltrans 2009.

Source:

California Deaprtment of Transportation (Caltrans), Divisiong of Environmental Analysis. 2009 (November). *2009 Technical Noise Supplement* . Sacramento, CA. Available: <http://www.dot.ca.gov/hq/env/noise/>. Accessed September 24, 2010.

Increase in Long-Term Noise Measurement Summary

KEY: Orange cells are for input.
Grey cells are intermediate calculations performed by the model.
Green cells are data to present in a written analysis (output).

Measurement Site: PG&E Thurman Battery Enclosure
Measurement Date: Operational Noise
Project Name: PG&E CPUC

Computation of CNEL

Hour of Day (military time)	Sound Level Leq (dBA)	Sound Power =10*Log(dBA /10)	Period of 24-Hour Day (1=included, 0=not) Day	Evening	Night	Sound Power Breakdown by Period of Day Day	Evening	Night
0:00	18.5	71	0	0	1	0	0	71
1:00	18.5	71	0	0	1	0	0	71
2:00	18.5	71	0	0	1	0	0	71
3:00	18.5	71	0	0	1	0	0	71
4:00	18.5	71	0	0	1	0	0	71
5:00	18.5	71	0	0	1	0	0	71
6:00	18.5	71	0	0	1	0	0	71
7:00	18.5	71	1	0	0	71	0	0
8:00	18.5	71	1	0	0	71	0	0
9:00	18.5	71	1	0	0	71	0	0
10:00	18.5	71	1	0	0	71	0	0
11:00	18.5	71	1	0	0	71	0	0
12:00	18.5	71	1	0	0	71	0	0
13:00	18.5	71	1	0	0	71	0	0
14:00	18.5	71	1	0	0	71	0	0
15:00	18.5	71	1	0	0	71	0	0
16:00	18.5	71	1	0	0	71	0	0
17:00	18.5	71	1	0	0	71	0	0
18:00	18.5	71	1	0	0	71	0	0
19:00	18.5	71	0	1	0	0	71	0
20:00	18.5	71	0	1	0	0	71	0
21:00	18.5	71	0	1	0	0	71	0
22:00	18.5	71	0	0	1	0	0	71
23:00	18.5	71	0	0	1	0	0	71

	Day	Evening	Night
Sum of Sound Power during Period wo/penalty	850	212	637
Log Factor for CNEL Penalty (i.e., 10*log(x))	1	3	10
Sound Power during Period with penalty	850	637	6,372

Total Daily Sound Power, with penalties	7,858
Hours per Day	24
Average Hourly Sound Power, with penalties	327
CNEL	25.2

Ldn computation on next page.

Computation of Ldn

Period of 24-Hour Day (1=included, 0=not)		Sound Power Breakdown by Period of Day	
Day	Night	Day	Night
0	1	0	71
0	1	0	71
0	1	0	71
0	1	0	71
0	1	0	71
0	1	0	71
0	1	0	71
1	0	71	0
1	0	71	0
1	0	71	0
1	0	71	0
1	0	71	0
1	0	71	0
1	0	71	0
1	0	71	0
1	0	71	0
1	0	71	0
1	0	71	0
1	0	71	0
1	0	71	0
1	0	71	0
1	0	71	0
0	1	0	71
0	1	0	71

Sum of Sound Power during Period wo/penalty	1,062	637
Log Factor for Penalty (i.e., 10*log(x))	1	10
Sound Power during Period with penalty	1,062	6,372

Total Daily Sound Power, with penalties	7,433
Hours per Day	24
Average Hourly Sound Power, with penalties	310
Ldn	24.9

Notes:

Computation of the CNEL based on 1-hour Leq measurements for each hour of a day are based on equation 2-27 on pg. 2-57 of Caltrans 2009.

Computation of the Ldn based on 1-hour Leq measurements for each hour of a day are based on equation 2-26 on pg. 2-56 of Caltrans 2009.

Log factors for the Ldn and CNEL penalties are provided in Table 2-12 on pg. 2-52 of Caltrans 2009.

Source:

California Deaprtment of Transportation (Caltrans), Divisiong of Environmental Analysis. 2009 (November). *2009 Technical Noise Supplement* . Sacramento, CA. Available: <http://www.dot.ca.gov/hq/env/noise/>. Accessed September 24, 2010.

Increase in Long-Term Noise Measurement Summary

KEY: Orange cells are for input.
Grey cells are intermediate calculations performed by the model.
Green cells are data to present in a written analysis (output).

Measurement Site: HVAC + 2 Transformers
Measurement Date: Operational Noise
Project Name: PG&E CPUC

Computation of CNEL

Hour of Day (military time)	Sound Level Leq (dBA)	Sound Power =10*Log(dBA /10)	Period of 24-Hour Day (1=included, 0=not) Day	Evening	Night	Sound Power Breakdown by Period of Day Day	Evening	Night
0:00	30.8	1,202	0	0	1	0	0	1,202
1:00	30.8	1,202	0	0	1	0	0	1,202
2:00	30.8	1,202	0	0	1	0	0	1,202
3:00	30.8	1,202	0	0	1	0	0	1,202
4:00	30.8	1,202	0	0	1	0	0	1,202
5:00	30.8	1,202	0	0	1	0	0	1,202
6:00	30.8	1,202	0	0	1	0	0	1,202
7:00	30.8	1,202	1	0	0	1,202	0	0
8:00	30.8	1,202	1	0	0	1,202	0	0
9:00	30.8	1,202	1	0	0	1,202	0	0
10:00	30.8	1,202	1	0	0	1,202	0	0
11:00	30.8	1,202	1	0	0	1,202	0	0
12:00	30.8	1,202	1	0	0	1,202	0	0
13:00	30.8	1,202	1	0	0	1,202	0	0
14:00	30.8	1,202	1	0	0	1,202	0	0
15:00	30.8	1,202	1	0	0	1,202	0	0
16:00	30.8	1,202	1	0	0	1,202	0	0
17:00	30.8	1,202	1	0	0	1,202	0	0
18:00	30.8	1,202	1	0	0	1,202	0	0
19:00	30.8	1,202	0	1	0	0	1,202	0
20:00	30.8	1,202	0	1	0	0	1,202	0
21:00	30.8	1,202	0	1	0	0	1,202	0
22:00	30.8	1,202	0	0	1	0	0	1,202
23:00	30.8	1,202	0	0	1	0	0	1,202

	Day	Evening	Night
Sum of Sound Power during Period wo/penalty	14,427	3,607	10,820
Log Factor for CNEL Penalty (i.e., 10*log(x))	1	3	10
Sound Power during Period with penalty	14,427	10,820	108,204

Total Daily Sound Power, with penalties	133,451
Hours per Day	24
Average Hourly Sound Power, with penalties	5,560
CNEL	37.5

Ldn computation on next page.

Computation of Ldn

Period of 24-Hour Day (1=included, 0=not)		Sound Power Breakdown by Period of Day	
Day	Night	Day	Night
0	1	0	1,202
0	1	0	1,202
0	1	0	1,202
0	1	0	1,202
0	1	0	1,202
0	1	0	1,202
0	1	0	1,202
1	0	1,202	0
1	0	1,202	0
1	0	1,202	0
1	0	1,202	0
1	0	1,202	0
1	0	1,202	0
1	0	1,202	0
1	0	1,202	0
1	0	1,202	0
1	0	1,202	0
1	0	1,202	0
1	0	1,202	0
1	0	1,202	0
1	0	1,202	0
1	0	1,202	0
0	1	0	1,202
0	1	0	1,202

Sum of Sound Power during Period wo/penalty	18,034	10,820
Log Factor for Penalty (i.e., 10*log(x))	1	10
Sound Power during Period with penalty	18,034	108,204

Total Daily Sound Power, with penalties	126,238
Hours per Day	24
Average Hourly Sound Power, with penalties	5,260
Ldn	37.2

Notes:

Computation of the CNEL based on 1-hour Leq measurements for each hour of a day are based on equation 2-27 on pg. 2-57 of Caltrans 2009.

Computation of the Ldn based on 1-hour Leq measurements for each hour of a day are based on equation 2-26 on pg. 2-56 of Caltrans 2009.

Log factors for the Ldn and CNEL penalties are provided in Table 2-12 on pg. 2-52 of Caltrans 2009.

Source:

California Deaprtment of Transportation (Caltrans), Divisiong of Environmental Analysis. 2009 (November). *2009 Technical Noise Supplement* . Sacramento, CA. Available: <http://www.dot.ca.gov/hq/env/noise/>. Accessed September 24, 2010.

Addition of Noise Levels from Multiple Sources at a Discrete Receptor

OBJECTIVE: This work sheet is designed to estiamte the combined level of noise exposure at a single discrete receptor from multiple point sources.

KEY: Orange cells are for input.

Grey cells are intermediate calculations performed by the model.

Green cells are data to present in a written analysis (output).

Receptor Name: **Lodi Memorial Park**

STEP 1: Identify the noise sources and enter the reference noise levels (dBA and distance).

Hour of Day (24-HR time)

STEP 3: Select the distance to the receptor and the reduction provided by any intervening barrier.

Step 1.				Step 2.				Step 3.			
Noise Source	**Reference Noise Level**			**Attenuation Characteristics**				**Attenuated Noise Level at Receptor**			
	Reference Noise Level (dBA)	@	Reference Distance (ft)	Ground Type (soft/hard)	Source Height (ft)	Receiver Height (ft)	Ground Factor	Noise Level (dBA)	@	Distance to Receptor (ft)	Reduction Provided by Barrier, if any (dBA)
Transformer	70.0	@	3	hard	35	5	0.00	20.5	@	900	0
Transformer	70.0	@	3	hard	35	5	0.00	20.5	@	900	0
HVAC Unit	76.0	@	3	hard	35	5	0.00	27.0	@	850	0
HVAC Unit	76.0	@	3	hard	35	5	0.00	27.0	@	850	0
				hard	35	5	0.00				

Combined level of noise exposure at receptor from all noise sources (dBA): 30.8

Computation of the attenuated noise level is based on the equation presented on pg. 12-3 and 12-4 of FTA 2006.

Computation of the ground factor is based on the equation presentd in Figure 6-23 on pg. 6-23 of FTA 2006, where the distance of the reference noise leve can be adjusted and the usage factor is not applied (i.e., the usage factor is equal to 1).

Summation of noise levels from different stationary noise sources at the same receptor is based on the equation presented on page 2-3 of FTA 2006.

<u>Sources:</u>

Federal Transit Association (FTA). 2006 (May). Transit Noise and Vibration Impact Assessment. FTA-VA-90-1003-06. Washington, D.C. Available: <http://www.fta.dot.gov/documents/FTA_Noise_and_Vibration_Manual.pdf>. Accessed: March 5, 2020.

Addition of Noise Levels from Multiple Sources at a Discrete Receptor

OBJECTIVE: This work sheet is designed to estiamte the combined level of noise exposure at a single discrete receptor from multiple point sources.

KEY: Orange cells are for input.
Grey cells are intermediate calculations performed by the model.
Green cells are data to present in a written analysis (output).

Receptor Name: **Lodi Memorial Park**

STEP 1: Identify the noise sources and enter the reference noise levels (dBA and distance).
Hour of Day (24-HR time)
STEP 3: Select the distance to the receptor and the reduction provided by any intervening barrier.

Step 1.				Step 2.				Step 3.			
Noise Source	**Reference Noise Level**			**Attenuation Characteristics**				**Attenuated Noise Level at Receptor**			
	Reference Noise Level (dBA)	@	Reference Distance (ft)	Ground Type (soft/hard)	Source Height (ft)	Receiver Height (ft)	Ground Factor	Noise Level (dBA)	@	Distance to Receptor (ft)	Reduction Provided by Barrier, if any (dBA)
Transformer	70.0	@	3	hard	35	5	0.00	70.0	@	3	0
Transformer	70.0	@	3	hard	35	5	0.00	70.0	@	3	0
HVAC Unit	76.0	@	3	hard	35	5	0.00	76.0	@	3	0
HVAC Unit	76.0	@	3	hard	35	5	0.00	76.0	@	3	0
				hard	35	5	0.00				

Combined level of noise exposure at receptor from all noise sources (dBA): **80.0**

Computation of the attenuated noise level is based on the equation presented on pg. 12-3 and 12-4 of FTA 2006.

Computation of the ground factor is based on the equation presentd in Figure 6-23 on pg. 6-23 of FTA 2006, where the distance of the reference noise leve can be adjusted and the usage factor is not applied (i.e., the usage factor is equal to 1).

Summation of noise levels from different stationary noise sources at the same receptor is based on the equation presented on page 2-3 of FTA 2006.

Sources:

Federal Transit Association (FTA). 2006 (May). Transit Noise and Vibration Impact Assessment. FTA-VA-90-1003-06. Washington, D.C. Available: <http://www.fta.dot.gov/documents/FTA_Noise_and_Vibration_Manual.pdf>. Accessed: March 5, 2020.

Attenuation Calculations for Stationary Noise Sources

KEY: Orange cells are for input.
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STEP 1: Identify the noise source and enter the reference noise level (dBA and distance).

STEP 2: Select the ground type (hard or soft), and enter the source and receiver heights.

STEP 3: Select the distance to the receiver.

Noise Source/ID	Reference Noise Level			Attenuation Characteristics				Attenuated Noise Level at Receptor		
	noise level (dBA)	@	distance (ft)	Ground Type (soft/hard)	Source Height (ft)	Receiver Height (ft)	Ground Factor	noise level (dBA)	@	distance (ft)
PG&E Lockeford Control Enclosure	79.0	@	5	hard	8	5	0.00	35.5	@	750
PG&E Lockeford Battery Enclosure	69.0	@	5	hard	8	5	0.00	25.5	@	750
PG&E Thurman Control Enclosure	74.0	@	5	hard	8	5	0.00	23.5	@	1680
PG&E Thurman Battery Enclosure	69.0	@	5	hard	8	5	0.00	18.5	@	1680
LEU Guild transformers	76.0	@	3	hard	8	5	0.00	26.5	@	900
HVAC	70.0	@	3	hard	8	5	0.00	21.0	@	850
				hard	8	5	0.00			
				hard	8	5	0.00			
				hard	8	5	0.00			
				hard	8	5	0.00			
				hard	8	5	0.00			
				hard	8	5	0.00			
				hard	8	5	0.00			
				hard	8	5	0.00			

Notes:

Estimates of attenuated noise levels do not account for reductions from intervening barriers, including walls, trees, vegetation, or structures of any type.

Computation of the attenuated noise level is based on the equation presented on pg. 176 and 177 of FTA 2018.

Computation of the ground factor is based on the equation presentd in Table 4-26 on pg. 86 of FTA 2018, where the distance of the reference noise leve can be adjusted and the usage factor is not applied (i.e., the usage factor is equal to 1).

Sources:

Federal Transit Association (FTA). 2018 (September). Transit Noise and Vibration Impact Assessment. Washington, D.C. Available: <http://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf>Accessed: March 5, 2020.

Parking lot reference Lmax level obtained by Ascent Environmental in 2014 during preparation of the Village At Squaw Valley Specific Plan EIR (Placer County 2014)

Distance Propagation Calculations for Stationary Sources of Ground Vibration

ASCENT

KEY: Orange cells are for input.
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Green cells are data to present in a written analysis (output).

STEP 1: Determine units in which to perform calculation.
— If vibration decibels (VdB), then use Table A and proceed to Steps 2A and 3A.
— If peak particle velocity (PPV), then use Table B and proceed to Steps 2B and 3B.

STEP 2A: Identify the vibration source and enter the reference vibration level (VdB) and distance.

STEP 3A: Select the distance to the receiver.

Table A. Propagation of vibration decibels (VdB) with distance

Noise Source/ID	Reference Noise Level			Attenuated Noise Level at Receptor		
	vibration level (VdB)	@	distance (ft)	vibration level (VdB)	@	distance (ft)
Vibratory Roller (to project site)	94	@	25	85.0	@	50
Vibratory Roller (at 80 dBA threshold)	94	@	25	80.0	@	73

The Lv metric (VdB) is used to assess the likelihood for vibration to result in human annoyance.

STEP 2B: Identify the vibration source and enter the reference peak particle velocity (PPV) and distance.

STEP 3B: Select the distance to the receiver.

Table B. Propagation of peak particle velocity (PPV) with distance

Noise Source/ID	Reference Noise Level			Attenuated Noise Level at Receptor		
	vibration level (PPV)	@	distance (ft)	vibration level (PPV)	@	distance (ft)
Vibratory Roller	0.210	@	25	0.016	@	140
Vibratory Roller (at 0.2 PPV threshold)	0.210	@	25	0.198	@	26
Vibratory Roller (at 0.088)	0.210	@	25	0.0870	@	45
Vibratory Roller (at 0.068)	0.210	@	25	0.0680	@	53

The PPV metric (in/sec) is used for assessing the likelihood for the potential of structural damage.

Table C. PPV to Displacement Conversion

Roller PPV	Frequency	pi	Displacement	
0.016	20	3.14	0.000126104	
0.016	36	3.14	7.00576E-05	
0.088	20	3.14	0.0007	Threshold (20 Hz)
0.068	36	3.14	0.0003	Threshold (36 Hz)

Notes:

Computation of propagated vibration levels is based on the equations presented on pg. 185 of FTA 2018. Estimates of attenuated vibration levels do not account for reductions from intervening underground barriers or other underground structures of any type, or changes in soil type.

Federal Transit Association (FTA). 2018 (September). Transit Noise and Vibration Impact Assessment Manual. FTA Report No. 0123. https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf

https://www.linkedin.com/pulse/basic-vibration-theory-acceleration-velocity-franklin-pereny-pmp#:~:text=where%20f%20is%20the%20frequency,(2%20*%20pi%20*%20f)