APPENDIX B
REVISED DRAFT EIR APPENDICES

In response to comments and as a result of staff-initiated changes, several analyses shown in the Noise Model Data (Appendix G of the Draft EIR) and Air Quality Technical Tables (Appendix H of the Draft EIR) were revised. This Appendix provides these updated analyses. Appendix B.1 provides the full updated Noise Appendix (please see Chapter 5, Draft EIR Revisions, for a list of the changes). Appendix B.2 provides the revised Table 38 and new Table 41 of the updated Air Quality Appendix.

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APPENDIX B.1
REVISED NOISE APPENDIX

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Appendix G: Noise Model Data

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G.1 Noise Model Data – FTA Noise Calculations

Calculation of BART Train Noise at reference Distance - Proposed Project

LeqC (h) = SELref + 10 log (Ncars) + 20 log (S/50) + 10 log (V) – 35.6 Where;

Sel ref = reference SEL

N = Number of cars

S = train speed in MPH

V = trains per hour

Daytime

SELref	79	BART to Livermore Extension Table 3.10-7
Ncars	7.5	average number of cars per train
S	80	train speed
Vd	7.6	average hourly daytime volume of train traffic, in trains per hour (7am to 10 pm) (number of trains between 7-10)/15
Leq, dBA	**63**	at 50 ft

Nighttime

SELref	79	
Ncars	8.5	average number of cars per train
S	80	train speed
Vn	7.3	average hourly nighttime volume of train traffic, in trains per hour (10 pm to 7 am) (number of trains between 10-7)/9
Leq, dBA	**63**	at 50 ft

Calculation of reference Ldn

Ldn	**69**	at 50 ft

Calculation of DMU Noise at Reference Distance - DMU Alternative

LeqC (h) = SELref + 10 log (Ncars) + 20 log (S/50) + 10 log (V) – 35.6 Where

Sel ref = reference SEL

N = Number of cars

S = train speed in MPH

V = trains per hour

Daytime

SELref	85	FTA Table 5-1 DMU, Diesel-powered, 1200 hp	
Ncars	7.5	average number of cars per train	
S	75	train speed	
Vd	7.6	average hourly daytime volume of train traffic, in trains per hour (7am to 10 pm)	(number of trains between 7-10)/15

Leq, dBA **67** at 50 ft

Less 3 dBA reduction for ballast instead of concrete

Adjusted Leq = 64 at 50 feet

Nighttime

SELref	85		
Ncars	8.5	average number of cars per train	
S	75	train speed	
Vn	7.3	average hourly nighttime volume of train traffic, in trains per hour (10 pm to 7 am)	(number of trains between 10-7)/9

Leq, dBA **68** at 50 ft

Less 3 dBA reduction for ballast instead of concrete

Adjusted Leq = 65 at 50 feet

Calculation of reference Ldn

Ldn **71** at 50 ft

BRT Express Bus Alternative - Calculation of Bus Noise

(diesel-powered: 82 SEL (dBA); hybrid: case by case))
Per Roth, 2007 Hybrid bus 3 dBA less than diesel
Hybrid SEL = 79 dBA

Leq (h) = SELref + 10 log log (S/50) + 10 log (V) – 35.6 Where:

Sel ref = reference SEL
N = Number of cars
S = Bus speed in MPH
V = Buses per hour

Daytime

SELref	79	hybrid	
S	65	bus speed	
Vd	7.5	average hourly daytime volume of bus traffic per hour (7am to 10 pm)	(number of buses between 7-10)/15
Leq, dBA	**54**	at 50 ft	

Nighttime

SELref	85		
S	65	bus speed	
Vn	1.6	average hourly daytime volume of bus traffic per hour (10 pm to 7 am)	(number of buses between 10-7)/9
Leq, dBA	**53**	at 50 ft	
Ldn	**60**	at 50 ft	

Calculation of Noise Level at Receptors using Reference SEL at 50 feet

BART Alternative			DMU Alternative			BUS Alternative		
Ref Ldn	69			71			60	
Ref Distance	50		Ref Distance	50		Ref Distance	50	
LT-2 Distance	1100		LT-1 Distance	370		LT-1 Distance	320	
	-13.4			-8.7			-8.1	
LT-2 Ldn	56		LT-1 Ldn	62		LT-1 Ldn	52	
	10	barrier reduction		5	barrier		5	barrier
LT-2 Ldn	46	with barrier	LT-1 Ldn	57	with barrier	LT-1 Ldn	47	with barrier

Ref Ldn	69			71			60	
Ref Distance	50		Ref Distance	50		Ref Distance	50	
LT-2 Distance	170		LT-1 Distance	320		LT-1 Distance	370	
	-5.3			-8.1			-8.7	
LT-2 Ldn	64		LT-1 Ldn	63		LT-1 Ldn	51	
	10	barrier reduction		5	barrier		5	barrier
LT-2 Ldn	54	with barrier	LT-1 Ldn	58	with barrier	LT-1 Ldn	46	with barrier

Ref Ldn	69			71			60	
Ref Distance	50		Ref Distance	50		Ref Distance	50	
ST-1 Distance	680		LT-2 Distance	1100		LT-5 Distance	400	
	-11.3			-13.4			-9.0	
ST-1 Ldn	58		LT-2 Ldn	58		LT-5 Ldn	51	
	5	barrier reduction		10	barrier			
ST-1 Ldn	53	with barrier	LT-2 Ldn	48	with barrier			

Ref Ldn	69			71			60	
Ref Distance	50		Ref Distance	50		Ref Distance	50	
LT-3 Distance	1000		LT-2 Distance	170		LT-4 Distance	100	
	-13.0			-5.3			-3.0	
LT-3 Ldn	56		LT-2 Ldn	66		LT-4 Ldn	57	
				10	barrier			
			LT-2 Ldn	56	with barrier			

Ref Ldn	69		Ref Ldn	71	
Ref Distance	50		Ref Distance	50	
LT-5 Distance	370		ST-1 Distance	680	
	-8.7			-11.3	
LT-5 Ldn	60		ST-1 Ldn	60	
	5	barrier reduction		5	barrier reduction
LT-5 Ldn	55	with barrier	ST-1 Ldn	55	with barrier

Ref Ldn	71	
Ref Distance	50	
LT-3 Distance	1000	
	-13.0	
LT-3 Ldn	58	

Ref Ldn	71	
Ref Distance	50	
LT-5 Distance	370	
	-8.7	
LT-5 Ldn	62	
	5	barrier reduction
LT-5 Ldn	57	with barrier

Calculation of Noise Contribution -Switch (Crossover)

Per FTA Guidance Stationary Source Noise calculation is :

Leq = SELref +Cn - 35.6 where

Selref = Source reference level at 50 feet

Cn = volume adjustment (Number of trans per hour)

Daytime Leq Calculation

SELref	100	FTA table 5-5, crossover
Train	8.9	number of train per hour
Cn	**9**	
Leq, dBA	**74**	at 50 ft

Nighttime Leq Calculation

SELref	100	FTA table 5-5, crossover
Train	6.8	number of train per hour
Cn	**8**	
Leq, dBA	**73**	at 50 ft

Calculated noise levels at distance (D)

	D1 (ref)	50	feet
	D2	680	feet
Reduction =		**-23**	
Ldn at D2 =		57	

Calculation of Ldn contribution at reference distance

Ldn	**79**	at 50 ft

Calculation of Horn Noise for Proposed Project and DMU Alternative

Daytime

SELref	83.1	Highest Monitored Value at Colma BART Station (outdoors)
Train	7.6	number of train per hour
Cn	**9**	
Leq, dBA	**56**	at 50 ft

Nighttime

SELref	83.1	Highest Monitored Value at Colma BART Station (outdoors)
Train	7.3	number of train per hour
Cn	**9**	
Leq, dBA	**56**	at 50 ft

Ldn	**63**	at 50 ft

Calculated noise levels at distance (D)		
D1 (ref)	50	feet
D2	1000	feet
Reduction =	-26	
Ldn at D2 =	37	

BART Train operations (from separate sheet) =	56	Ldn
Add horn noise	37	Ldn
Total noise BART and Switch) =	56	Ldn
DMU Train operations (from separate sheet) =	58	Ldn
Add switch noise	37	Ldn
Total noise BART and Switch) =	58	Ldn

Noise Impact Estimates for Proposed BART Storage and Maintenance Facility

Receptor 1: 1442 Hartman Road Residence

Existing Noise Levels	As measured using Larson Davis LxT sound Level Meter		
Existing 24 hour Noise Level =	53	Ldn	Per FTA Table 3-1, at an existing noise level of 53 Ldn, A project contributing 54 Ldn or less would be considered to have no impact
Daytime average hourly Leq =	54	Leq	Per FTA Table 3-1, at an existing noise level of 54 hourly Leq, A project contributing 54 Leq or less would be considered to have no impact
Nighttime Average Hourly Leq =	41	Leq	Per FTA Table 3-1, at an existing noise level of 41 hourly Leq, A project contributing 50 Leq or less would be considered to have no impact
Average of 5 quietest Leq (nighttime)	32	Leq	Per FTA Table 3-1, at an existing noise level of 32 hourly Leq, A project contributing 41 Leq or less would be considered to have no impact

Distances from Noise Sources	Distances are estimated based on a combination of Google Earth Ruler Tool and Figure 2-9 of the FEIR		
Distance to Facility Fencline =	920	feet	
Distance to nearest rail	1100	feet	
Distance to Switch =	1100	feet	
Distance to Maintaince Building =	1108	feet	
Distance to blowdown building =	1385	feet	
Distance to Vehicle cleaning platform =	1538	feet	(shielded by Maintenance building)

Noise Sources Sources identified based on input from BART staff and analyst observations of Concord Maintenance Facility on 01/17/2018
Sources Measured by ESA at Concord Yard Except for car wash which is an FTA estimate from Table 6-7

Source	Reference sound level (Leq)			SEL	Reference Distance		Note
Train Movements (at switch)	59.7	Leq		73	50	feet	Intermittant source (5 minutes or less)
Train movement (at switch with toot horn)	64.5	Leq		80.6	50		Intermittant source (5 minutes or less)
Train Movement (at switch with Yard Horn)	68.8	Leq		84.4	50		Intermittant source (5 minutes or less)
Car Coupling	69.2	Leq		85.7	50		Intermittant source (5 minutes or less)
High Railer Movement (at switch)	74.2	Leq		91.4	50		Includes wheel squeal Intermittant source (5 minutes or less)
Blowpit (Rotoclone)	65.5	Leq		NA	30		Constant source 1 hour or less
Shop Noise (Impact Wrench)	85.8	Leq		NA	40		Interior of building
Car Washing				111			
Wheel Truing	49	Lmax	(46 Ldn)		250		Wilson Ihrig Study 2011 both truing and commpressor with 2 nighttime hours in swing shift

Operational Source Assumptions

Source	
Train Movements (at switch)	5 per hour
Train movement (at switch with toot horn)	1 per hour
Train Movement (at switch with Yard Horn)	1 per hour
Car Coupling	5 per hour
High Railer Movement (at switch)	1 per hour
Blowpit (Rotoclone)	Constant (day and evening hours)
Shop Noise (Impact Wrench)	Constant interior (with 20 dBA reduction for for building enclosure)
Car Washing	Constant interior (with 5 dBA reduction for for shielding by maintenance building)
Wheel truing	(daytime hours plus 2 nighttime hours during swing shift)

Noise Contributions at Receptor (see separate calculation sheets)

	Ldn	Remove LOG	Nighttime Leq	Remove LOG
Train Movements (at switch)	32	1584.893	26	398.1072
Train movement (at switch with toot horn)	33	1995.262	27	501.1872
Train Movement (at switch with Yard Horn)	37	5011.872	30	1000
Car Coupling	17	50.11872	11	12.58925
High Railer Movement (at switch)	35	3162.278	29	794.3282
Blowpit (Rotoclone)	39	7943.282	32	1584.893
Shop Noise (Impact Wrench)	38	6309.573	32	1584.893
Car Washing	35	3162.278	28	630.9573
Wheel truing	33	1995.262	36	3981.072
Total	**44.9**		**40.2**	

Noise Impact Estimates for Proposed BART Storage and Maintenance Facility

Receptor 1: 1442 Hartman Road Residence

Existing Noise Levels	As measured using Larson Davis LxT sound Level Meter		
Existing 24 hour Noise Level =	53	Ldn	Per FTA Table 3-1, at an existing noise level of 53 Ldn, A project contributing 54 Ldn or less would be considered to have no impact
Daytime average hourly Leq =	54	Leq	Per FTA Table 3-1, at an existing noise level of 54 hourly Leq, A project contributing 54 Leq or less would be considered to have no impact
Nighttime Average Hourly Leq =	41	Leq	Per FTA Table 3-1, at an existing noise level of 41 hourly Leq, A project contributing 50 Leq or less would be considered to have no impact
Average of 5 quietest Leq (nighttime)	32	Leq	Per FTA Table 3-1, at an existing noise level of 32 hourly Leq, A project contributing 41 Leq or less would be considered to have no impact

Distances from Noise Sources	Distances are estimated based on a combination of Google Earth Ruler Tool and Figure 2-9 of the FEIR		
Distance to Facility Fencline =	920	feet	
Distance to nearest rail	1100	feet	
Distance to Switch =	1100	feet	
Distance to Maintaince Building =	1108	feet	
Distance to blowdown building =	1385	feet	
Distance to Vehicle cleaning platform =	1538	feet	(shielded by Maintenance building)

Noise Sources Sources identified based on input from BART staff and analyst observations of Concord Maintenance Facility on 01/17/2018
Sources Measured by ESA at Concord Yard Except for car wash which is an FTA estimate from Table 6-7

Source	Reference sound level (Leq)			SEL	Reference Distance	Note
Train Movements (at switch)	59.7	Leq		73	50 feet	Intermittant source (5 minutes or less)
Train movement (at switch with toot horn)	64.5	Leq		80.6	50	Intermittant source (5 minutes or less)
Train Movement (at switch with Yard Horn)	68.8	Leq		84.4	50	Intermittant source (5 minutes or less)
Car Coupling	69.2	Leq		85.7	50	Intermittant source (5 minutes or less)
High Railer Movement (at switch)	74.2	Leq		91.4	50	Includes wheel squeal Intermittant source (5 minutes or less)
Blowpit (Rotoclone)	65.5	Leq		NA	30	Constant source 1 hour or less
Shop Noise (Impact Wrench)	85.8	Leq		NA	40	Interior of building
Car Washing				111		
Wheel Truing	49	Lmax	(46 Ldn)		250	Wilson Ihrig Study 2011 both truing and commpressor with 2 nighttime hours in swing shift

Operational Source Assumptions

Source	
Train Movements (at switch)	5 per hour
Train movement (at switch with toot horn)	1 per hour
Train Movement (at switch with Yard Horn)	1 per hour
Car Coupling	5 per hour
High Railer Movement (at switch)	1 per hour
Blowpit (Rotoclone)	Constant (day and evening hours)
Shop Noise (Impact Wrench)	Constant interior (with 20 dBA reduction for for building enclosure)
Car Washing	Constant interior (with 5 dBA reduction for for shielding by maintenance building)
Wheel truing	(daytime hours plus 2 nighttime hours during swing shift)

Noise Contributions at Receptor (see separate calculation sheets)

	Ldn	Remove LOG	Nighttime Leq	Remove LOG
Train Movements (at switch)	32	1584.893	26	398.1072
Train movement (at switch with toot horn)	33	1995.262	27	501.1872
Train Movement (at switch with Yard Horn)	37	5011.872	30	1000
Car Coupling	17	50.11872	11	12.58925
High Railer Movement (at switch)	35	3162.278	29	794.3282
Blowpit (Rotoclone)	39	7943.282	32	1584.893
Shop Noise (Impact Wrench)	38	6309.573	32	1584.893
Car Washing	35	3162.278	28	630.9573
Wheel truing	33	1995.262	36	3981.072
Total	**44.9**		**40.2**	

Calculation of Leq and Lmax at Receptors from Rail Sources at SMF-LT9

Source: Train movements

Event duration = 22 seconds

Monitored Leq = 59.7 dBA

Distance Adjustment			
D1 = Reference Distance =		50	feet
D2 = receptor distance =		1100	feet
Leq =	60		
D1	50	feet	
D2	1100	feet	
Distance Reduction	-27	dBA	
Resultant Leq =	33		

Monitored Lmax = 64.9

Distance Adjustment			
D1 = Reference Distance =		50	feet
D2 = receptor distance =		1100	feet
Ldn@D1	65		
D1	50	feet	
D2	1100	feet	
Distance Reduction	-27	dBA	
Resultant Lmax=	38		

Source: Train movements with standard horn

Event duration = 41 seconds

Monitored Leq = 64.5 dBA

Distance Adjustment			
D1 = Reference Distance =		50	feet
D2 = receptor distance =		1100	feet
Leq =	65		
D1	50	feet	
D2	1100	feet	

Distance Reduction	-27	dBA
Resultant Leq =	38	

Monitored Lmax = 76.2

Distance Adjustment			
D1 = Reference Distance =		50	feet
D2 = receptor distance =		920	feet
Lmax@50	76		
D1	50	feet	
D2	1100	feet	
Distance Reduction	-27	dBA	
Resultant Lmax=	49		

Source: Train movements with yard horn

Event duration = 36 seconds

Monitored Leq = 68.8 dBA

Distance Adjustment			
D1 = Reference Distance =		50	feet
D2 = receptor distance =		1100	feet
Leq =	69		
D1	50	feet	
D2	1100	feet	
Distance Reduction	-27	dBA	
Resultant Leq =	42		

Monitored Lmax = 78.3

Distance Adjustment			
D1 = Reference Distance =		50	feet
D2 = receptor distance =		1100	feet
Lmax@50	78		
D1	50	feet	

D2	1100	feet
Distance Reduction	-27	dBA
Resultant Lmax=	51	

Source: High railer

Event duration = 52 seconds

Monitored Leq = 74.2 dBA

Distance Adjustment

D1 = Reference Distance = 50 feet

D2 = receptor distance = 1100 feet

Leq =	74	
D1	50	feet
D2	1100	feet
Distance Reduction	-27	dBA
Resultant Leq =	47	

Monitored Lmax = 87.3

Distance Adjustment

D1 = Reference Distance = 50 feet

D2 = receptor distance = 1100 feet

Lmax@50	87	
D1	50	feet
D2	1100	feet
Distance Reduction	-27	dBA
Resultant Lmax=	60	

Noise Impact Estimates for Proposed BART Storage and Maintenance Facility LT-10

Receptor : West of 2294 north Livermore Road

Existing Noise Levels	As measured using Larson Davis LxT sound Level Meter		
Existing 24 hour Noise Level =	56	Ldn	Per FTA Table 3-1, at an existing noise level of 56 Ldn, A project contributing 55 Ldn or less would be considered to have no impact
Daytime average hourly Leq =	52	Leq	Per FTA Table 3-1, at an existing noise level of 52 hourly Leq, A project contributing 54 Leq or less would be considered to have no impact
Nighttime Average Hourly Leq =	49	Leq	Per FTA Table 3-1, at an existing noise level of 41 hourly Leq, A project contributing 53 Leq or less would be considered to have no impact
Average of 5 quietest Leq (nighttime)	47	Leq	Per FTA Table 3-1, at an existing noise level of 47 hourly Leq, A project contributing 52 Leq or less would be considered to have no impact

Distances from Noise Sources	Distances are estimated based on a combination of Google Earth Ruler Tool and Figure 2-9 of the FEIR	
Distance to tail tracks =	1264	feet
Distance to Facility Fencline =	3009	feet
Distance to nearest rail	1264	feet
Distance to Switch =	3009	feet
Distance to Maintaince Building =	5562	feet
Distance to blowdown building =	5778	feet
Distance to Vehicle cleaning platform =	4855	feet

Noise Sources Sources identified based on input from BART staff and analyst observations of Concord Maintenance Facility on 01/17/2018
Sources Measured by ESA at Concord Yard Except for car wash which is an FTA estimate from Table 6-7

Source	Reference sound level (Leq)			SEL	Reference Distance		Note
Train Movements (at switch)	59.7	Leq		73	50	feet	Intermittant source (5 minutes or less)
Train movement (at switch with toot horn)	64.5	Leq		80.6	50		Intermittant source (5 minutes or less)
Train Movement (at switch with Yard Horn)	68.8	Leq		84.4	50		Intermittant source (5 minutes or less)
Car Coupling	69.2	Leq		85.7	50		Intermittant source (5 minutes or less)
High Railer Movement (at switch)	74.2	Leq		91.4	50		Includes wheel squeal Intermittant source (5 minutes or less)
Blowpit (Rotoclone)	65.5	Leq		NA	30		Constant source 1 hour or less
Shop Noise (Impact Wrench)	85.8	Leq		NA	40		Interior of building
Car Washing				111			FTA
Wheel Truing	49	Lmax	(46 Ldn)		250		Wilson Ihrig Study 2011 both truing and commpressor with 2 nighttime hours in swing shift

Operational Source Assumptions

Source	
Train Movements (at switch)	5 per hour
Train movement (at switch with toot horn)	1 per hour
Train Movement (at switch with Yard Horn)	1 per hour
Car Coupling	5 per hour
High Railer Movement (at switch)	1 per hour
Blowpit (Rotoclone)	Constant (day and evening hours)
Shop Noise (Impact Wrench)	Constant interior (with 20 dBA reduction for for building enclosure)
Car Washing	Constant (day and evening hours)

Noise Contributions at Receptor (see separate calculation sheets)

	Ldn	Remove LOG	Nighttime Leq	Remove LOG
Train Movements (at switch)	24	251.1886	17	50.11872
Train movement (at switch with toot horn)	24	251.1886	18	63.09573
Train Movement (at switch with Yard Horn)	28	630.9573	22	158.4893
Car Coupling	9	7.943282	2	1.584893
High Railer Movement (at switch)	27	501.1872	20	100
Blowpit (Rotoclone)	26	398.1072	20	100
Shop Noise (Impact Wrench)	24	251.1886	17	50.11872
Car Washing	25	316.2278	18	63.09573
	19	79.43282	22	158.4893
Total	**34.3**		**28.7**	

Calculation of Leq and Lmax at Receptors from Rail Sources at SMF - LT-10

Source: Train movements

Event duration = 22 seconds

Monitored Leq = 59.7 dBA

Distance Adjustment			
D1 = Reference Distance =			50 feet
D2 = receptor distance =			3009 feet
Leq =	60		
D1	50	feet	
D2	3009	feet	
Distance Reduction	-36	dBA	
Resultant Leq =	24		

Monitored Lmax = 64.9

Distance Adjustment			
D1 = Reference Distance =			50 feet
D2 = receptor distance =			3009 feet
Ldn@D1	65		
D1	50	feet	
D2	3009	feet	
Distance Reduction	-36	dBA	
Resultant Lmax=	29		

Source: Train movements with standard horn

Event duration = 41 seconds

Monitored Leq = 64.5 dBA

Distance Adjustment			
D1 = Reference Distance =			50 feet
D2 = receptor distance =			3009 feet
Leq =	65		
D1	50	feet	
D2	3009	feet	

Distance Reduction	-36	dBA
Resultant Leq =	29	

Monitored Lmax = 76.2

Distance Adjustment		
D1 = Reference Distance =	50	feet
D2 = receptor distance =	3009	feet
Lmax@50	76	
D1	50	feet
D2	3009	feet
Distance Reduction	-36	dBA
Resultant Lmax=	41	

Source: Train movements with yard horn

Event duration = 36 seconds

Monitored Leq = 68.8 dBA

Distance Adjustment		
D1 = Reference Distance =	50	feet
D2 = receptor distance =	3009	feet
Leq =	69	
D1	50	feet
D2	3009	feet
Distance Reduction	-36	dBA
Resultant Leq =	33	

Monitored Lmax = 78.3

Distance Adjustment		
D1 = Reference Distance =	50	feet
D2 = receptor distance =	3009	feet
Lmax@50	78	
D1	50	feet

D2	3009	feet
Distance Reduction	-36	dBA
Resultant Lmax=	43	

Source: High railer

Event duration = 52 seconds

Monitored Leq = 74.2 dBA

Distance Adjustment		
D1 = Reference Distance =		50 feet
D2 = receptor distance =		3009 feet
Leq =	74	
D1	50	feet
D2	3009	feet
Distance Reduction	-36	dBA
Resultant Leq =	39	

Monitored Lmax = 87.3

Distance Adjustment		
D1 = Reference Distance =		50 feet
D2 = receptor distance =		3009 feet
Lmax@50	87	
D1	50	feet
D2	3009	feet
Distance Reduction	-36	dBA
Resultant Lmax=	52	

G.2 Noise Model Data – Traffic Noise Input Assumptions and Modeling Output

Existing Conditions AM Peak Hour

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE %						VEHICLE SPEED						NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL 15 meters from
				Auto		MT		HT		Auto	k/h	MT	k/h	HT	k/h	Auto	MT	HT	
Calveno Peak	from:	to:		%	Auto	%	MT	%	HT										roadway center)
Owens	Willow	Hacienda	904	95	858.8	3	27.12	2	18.1	40	64	40	64	40	64	65.3	59.3	63.8	68.2
Martinelli	Hacienda	BART	440	95	418	3	13.2	2	8.8	40	64	40	64	40	64	62.2	56.1	60.7	65.1
Dublin	Hacienda	Iron Horse	1441	95	1369	3	43.23	2	28.8	45	72	45	72	45	72	68.8	62.1	66.3	71.3
Campus Hill	Portola	Campus Loop	580	97	562.6	2	11.6	1	5.8	40	64	40	64	40	64	63.5	55.6	58.9	65.3
Murietta	J. London	Stanley	1328	97	1288.2	2	26.56	1	13.3	35	56	35	56	35	56	65.4	58.3	62.0	67.6
Vasco	East Ave.	Telsa Rd.	1261	97	1223.2	2	25.22	1	12.6	45	72	45	72	45	72	68.3	59.8	62.8	69.8
	Assumptions:	AM peak hour traffic data from ARUP																	

2025 Baseline Condition AM Peak Hour

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE %						VEHICLE SPEED						NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL 15 meters from
				Auto		MT		HT		Auto	k/h	MT	k/h	HT	k/h	Auto	MT	HT	
Calveno Peak	from:	to:		%	Auto	%	MT	%	HT										roadway center)
Owens	Willow	Hacienda	1041	95	988.95	3	31.23	2	20.8	40	64	40	64	40	64	65.9	59.9	64.5	68.9
Martinelli	Hacienda	BART	498	95	473.1	3	14.94	2	9.96	40	64	40	64	40	64	62.7	56.7	61.3	65.7
Dublin	Hacienda	Iron Horse	1534	95	1457.3	3	46.02	2	30.7	45	72	45	72	45	72	69.1	62.4	66.6	71.6
Campus Hill	Portola	Campus Loop	640	97	620.8	2	12.8	1	6.4	40	64	40	64	40	64	63.9	56.0	59.3	65.7
Murietta	J. London	Stanley	1332	97	1292	2	26.64	1	13.3	35	56	35	56	35	56	65.4	58.3	62.0	67.6
Vasco	East Ave.	Telsa Rd.	1341	97	1300.8	2	26.82	1	13.4	45	72	45	72	45	72	68.6	60.0	63.0	70.1
Airway	Portola	Sutter	423	97	410.31	2	8.46	1	4.23	35	56	35	56	35	56	60.4	53.3	57.0	62.6
	Assumptions:	AM peak hour traffic data from ARUP																	

2025 Baseline +Project AM Peak Hour

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE %						VEHICLE SPEED						NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL
				Auto		MT		HT		Auto	k/h	MT	k/h	HT	k/h	Auto	MT	HT	15 meters from
Calveno Peak																			
	from:	to:		%	Auto	%	MT	%	HT										roadway center)
Owens	Willow	Hacienda	981	95	931.95	3	29.43	2	19.6	40	64	40	64	40	64	65.7	59.6	64.2	68.6
Martinelli	Hacienda	BART	495	95	470.25	3	14.85	2	9.9	40	64	40	64	40	64	62.7	56.7	61.2	65.6
Dublin	Hacienda	Iron Horse	1534	95	1457.3	3	46.02	2	30.7	45	72	45	72	45	72	69.1	62.4	66.6	71.6
Campus Hill	Portola	Campus Loop	705	97	683.85	2	14.1	1	7.05	40	64	40	64	40	64	64.3	56.4	59.8	66.1
Murietta	J. London	Stanley	1342	97	1301.7	2	26.84	1	13.4	35	56	35	56	35	56	65.5	58.3	62.0	67.6
Vasco	East Ave.	Telsa Rd.	1253	97	1215.4	2	25.06	1	12.5	45	72	45	72	45	72	68.3	59.7	62.7	69.8
Airway	Portola	Sutter	1004	97	973.88	2	20.08	1	10	35	56	35	56	35	56	64.2	57.1	60.8	66.4
	Assumptions:	AM peak hour traffic data from ARUP																	

2025 Baseline + DMU Alternative AM Peak Hour

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE %						VEHICLE SPEED						NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL
				Auto		MT		HT		Auto	k/h	MT	k/h	HT	k/h	Auto	MT	HT	15 meters from
Calveno Peak																			
	from:	to:		%	Auto	%	MT	%	HT										roadway center)
Owens	Willow	Hacienda	982	95	932.9	3	29.46	2	19.6	40	64	40	64	40	64	65.7	59.6	64.2	68.6
Martinelli	Hacienda	BART	499	95	474.05	3	14.97	2	9.98	40	64	40	64	40	64	62.7	56.7	61.3	65.7
Dublin	Hacienda	Iron Horse	1537	95	1460.2	3	46.11	2	30.7	45	72	45	72	45	72	69.1	62.4	66.6	71.6
Campus Hill	Portola	Campus Loop	716	97	694.52	2	14.32	1	7.16	40	64	40	64	40	64	64.4	56.5	59.8	66.2
Murietta	J. London	Stanley	1336	97	1295.9	2	26.72	1	13.4	35	56	35	56	35	56	65.4	58.3	62.0	67.6
Vasco	East Ave.	Telsa Rd.	1340	97	1299.8	2	26.8	1	13.4	45	72	45	72	45	72	68.6	60.0	63.0	70.1
Airway	Portola	Sutter	786	97	762.42	2	15.72	1	7.86	35	56	35	56	35	56	63.1	56.0	59.7	65.3
	Assumptions:	AM peak hour traffic data from ARUP																	

2025 Baseline + BRT Alternative AM Peak Hour

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE %						VEHICLE SPEED						NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL 15 meters from
				Auto		MT		HT		Auto	k/h	MT	k/h	HT	k/h	Auto	MT	HT	
Calveno Peak	from:	to:		%	Auto	%	MT	%	HT										roadway center)
Owens	Willow	Hacienda	1037	95	985.15	3	31.11	2	20.7	40	64	40	64	40	64	65.9	59.9	64.4	68.8
Martinelli	Hacienda	BART	496	95	471.2	3	14.88	2	9.92	40	64	40	64	40	64	62.7	56.7	61.2	65.6
Dublin	Hacienda	Iron Horse	1535	95	1458.3	3	46.05	2	30.7	45	72	45	72	45	72	69.1	62.4	66.6	71.6
Campus Hill	Portola	Campus Loop	637	97	617.89	2	12.74	1	6.37	40	64	40	64	40	64	63.9	56.0	59.3	65.7
Murietta	J. London	Stanley	1330	97	1290.1	2	26.6	1	13.3	35	56	35	56	35	56	65.4	58.3	62.0	67.6
Vasco	East Ave.	Telsa Rd.	1344	97	1303.7	2	26.88	1	13.4	45	72	45	72	45	72	68.6	60.0	63.0	70.1
Airway	Portola	Sutter	422	97	409.34	2	8.44	1	4.22	35	56	35	56	35	56	60.4	53.3	57.0	62.6

Assumptions: AM peak hour traffic data from ARUP

2025 Baseline + Enhanced Bus Alternative AM Peak Hour

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE %						VEHICLE SPEED						NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL 15 meters from
				Auto		MT		HT		Auto	k/h	MT	k/h	HT	k/h	Auto	MT	HT	
Calveno Peak	from:	to:		%	Auto	%	MT	%	HT										roadway center)
Owens	Willow	Hacienda	1039	95	987.05	3	31.17	2	20.8	40	64	40	64	40	64	65.9	59.9	64.5	68.8
Martinelli	Hacienda	BART	498	95	473.1	3	14.94	2	9.96	40	64	40	64	40	64	62.7	56.7	61.3	65.7
Dublin	Hacienda	Iron Horse	1533	95	1456.4	3	45.99	2	30.7	45	72	45	72	45	72	69.1	62.4	66.6	71.6
Campus Hill	Portola	Campus Loop	638	97	618.86	2	12.76	1	6.38	40	64	40	64	40	64	63.9	56.0	59.3	65.7
Murietta	J. London	Stanley	1331	97	1291.1	2	26.62	1	13.3	35	56	35	56	35	56	65.4	58.3	62.0	67.6
Vasco	East Ave.	Telsa Rd.	1339	97	1298.8	2	26.78	1	13.4	45	72	45	72	45	72	68.6	60.0	63.0	70.1

Assumptions: AM peak hour traffic data from ARUP

Existing Conditions PM Peak Hour

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE %						VEHICLE SPEED						NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL
				Auto		MT		HT		Auto	k/h	MT	k/h	HT	k/h	Auto	MT	HT	15 meters from
Calveno Peak																			
	from:	to:		%	Auto	%	MT	%	HT										roadway center)
Owens	Willow	Hacienda	1344	95	1276.8	3	40.32	2	26.9	40	64	40	64	40	64	67.0	61.0	65.6	70.0
Martinelli	Hacienda	BART	828	95	786.6	3	24.84	2	16.6	40	64	40	64	40	64	64.9	58.9	63.5	67.9
Dublin	Hacienda	Iron Horse	1962	95	1863.9	3	58.86	2	39.2	45	72	45	72	45	72	70.2	63.4	67.7	72.7
Campus Hill	Portola	Campus Loop	658	97	638.26	2	13.16	1	6.58	40	64	40	64	40	64	64.0	56.1	59.5	65.8
Murietta	J. London	Stanley	1491	97	1446.3	2	29.82	1	14.9	35	56	35	56	35	56	65.9	58.8	62.5	68.1
Vasco	East Ave.	Telsa Rd.	1552	97	1505.4	2	31.04	1	15.5	45	72	45	72	45	72	69.2	60.7	63.7	70.7
	Assumptions:	PM peak hour traffic data from ARUP																	

2025 Baseline Condition PM Peak Hour

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE %						VEHICLE SPEED						NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL
				Auto		MT		HT		Auto	k/h	MT	k/h	HT	k/h	Auto	MT	HT	15 meters from
Calveno Peak																			
	from:	to:		%	Auto	%	MT	%	HT										roadway center)
Owens	Willow	Hacienda	1630	95	1548.5	3	48.9	2	32.6	40	64	40	64	40	64	67.9	61.8	66.4	70.8
Martinelli	Hacienda	BART	1001	95	950.95	3	30.03	2	20	40	64	40	64	40	64	65.8	59.7	64.3	68.7
Dublin	Hacienda	Iron Horse	2070	95	1966.5	3	62.1	2	41.4	45	72	45	72	45	72	70.4	63.7	67.9	72.9
Campus Hill	Portola	Campus Loop	855	97	829.35	2	17.1	1	8.55	40	64	40	64	40	64	65.2	57.3	60.6	67.0
Murietta	J. London	Stanley	1710	97	1658.7	2	34.2	1	17.1	35	56	35	56	35	56	66.5	59.4	63.1	68.7
Vasco	East Ave.	Telsa Rd.	1772	97	1718.8	2	35.44	1	17.7	45	72	45	72	45	72	69.8	61.2	64.2	71.3
Airway	Portola	Sutter	924	97	896.28	2	18.48	1	9.24	35	56	35	56	35	56	63.8	56.7	60.4	66.0
	Assumptions:	PM peak hour traffic data from ARUP																	

2025 Baseline + Project PM Peak Hour

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE % Auto		MT		HT		VEHICLE SPEED Auto	k/h	MT	k/h	HT	k/h	NOISE LEVEL (dBA) Auto	MT	HT	CALCULATED NOISE LEVEL 15 meters from
Calveno Peak																			
	from:	to:		%	Auto	%	MT	%	HT										roadway center)
Owens	Willow	Hacienda	1590	95	1510.5	3	47.7	2	31.8	40	64	40	64	40	64	67.8	61.7	66.3	70.7
Martinelli	Hacienda	BART	840	95	798	3	25.2	2	16.8	40	64	40	64	40	64	65.0	59.0	63.5	67.9
Dublin	Hacienda	Iron Horse	2075	95	1971.3	3	62.25	2	41.5	45	72	45	72	45	72	70.4	63.7	67.9	72.9
Campus Hill	Portola	Campus Loop	924	97	896.28	2	18.48	1	9.24	40	64	40	64	40	64	65.5	57.6	60.9	67.3
Murietta	J. London	Stanley	1842	97	1786.7	2	36.84	1	18.4	35	56	35	56	35	56	66.8	59.7	63.4	69.0
Vasco	East Ave.	Telsa Rd.	1774	97	1720.8	2	35.48	1	17.7	45	72	45	72	45	72	69.8	61.2	64.2	71.3
Airway	Portola	Sutter	1507	97	1461.8	2	30.14	1	15.1	35	56	35	56	35	56	66.0	58.8	62.5	68.1
	Assumptions:	PM peak hour traffic data from ARUP																	

2025 Baseline + DMU Alternative PM Peak Hour

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE % Auto		MT		HT		VEHICLE SPEED Auto	k/h	MT	k/h	HT	k/h	NOISE LEVEL (dBA) Auto	MT	HT	CALCULATED NOISE LEVEL 15 meters from
Calveno Peak																			
	from:	to:		%	Auto	%	MT	%	HT										roadway center)
Owens	Willow	Hacienda	1621	95	1540	3	48.63	2	32.4	40	64	40	64	40	64	67.9	61.8	66.4	70.8
Martinelli	Hacienda	BART	900	95	855	3	27	2	18	40	64	40	64	40	64	65.3	59.3	63.8	68.2
Dublin	Hacienda	Iron Horse	2072	95	1968.4	3	62.16	2	41.4	45	72	45	72	45	72	70.4	63.7	67.9	72.9
Campus Hill	Portola	Campus Loop	930	97	902.1	2	18.6	1	9.3	40	64	40	64	40	64	65.5	57.6	61.0	67.3
Murietta	J. London	Stanley	1813	97	1758.6	2	36.26	1	18.1	35	56	35	56	35	56	66.8	59.6	63.3	68.9
Vasco	East Ave.	Telsa Rd.	1724	97	1672.3	2	34.48	1	17.2	45	72	45	72	45	72	69.7	61.1	64.1	71.2
Airway	Portola	Sutter	1245	97	1207.7	2	24.9	1	12.5	35	56	35	56	35	56	65.1	58.0	61.7	67.3
	Assumptions:	PM peak hour traffic data from ARUP																	

2025 Baseline + BRT Alternative PM Peak Hour

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE %						VEHICLE SPEED						NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL
				Auto		MT		HT		Auto	k/h	MT	k/h	HT	k/h	Auto	MT	HT	15 meters from
Calveno Peak																			
	from:	to:		%	Auto	%	MT	%	HT										roadway center)
Owens	Willow	Hacienda	1631	95	1549.5	3	48.93	2	32.6	40	64	40	64	40	64	67.9	61.8	66.4	70.8
Martinelli	Hacienda	BART	991	95	941.45	3	29.73	2	19.8	40	64	40	64	40	64	65.7	59.7	64.2	68.6
Dublin	Hacienda	Iron Horse	2068	95	1964.6	3	62.04	2	41.4	45	72	45	72	45	72	70.4	63.7	67.9	72.9
Campus Hill	Portola	Campus Loop	852	97	826.44	2	17.04	1	8.52	40	64	40	64	40	64	65.2	57.3	60.6	66.9
Murietta	J. London	Stanley	1710	97	1658.7	2	34.2	1	17.1	35	56	35	56	35	56	66.5	59.4	63.1	68.7
Vasco	East Ave.	Telsa Rd.	1762	97	1709.1	2	35.24	1	17.6	45	72	45	72	45	72	69.8	61.2	64.2	71.3
Airway	Portola	Sutter	925	97	897.25	2	18.5	1	9.25	35	56	35	56	35	56	63.8	56.7	60.4	66.0

Assumptions: PM peak hour traffic data from ARUP

2025 Baseline + Enhanced Bus Alternative PM Peak Hour

ROAD SEGMENT			# VEHICLES	Auto		MT		HT		Auto	k/h	MT	k/h	HT	k/h	Auto	MT	HT	CALCULATED NOISE LEVEL 15 meters from
Calveno Peak																			
	from:	to:		%	Auto	%	MT	%	HT										roadway center)
Owens	Willow	Hacienda	1631	95	1549.5	3	48.93	2	32.6	40	64	40	64	40	64	67.9	61.8	66.4	70.8
Martinelli	Hacienda	BART	991	95	941.45	3	29.73	2	19.8	40	64	40	64	40	64	65.7	59.7	64.2	68.6
Dublin	Hacienda	Iron Horse	2068	95	1964.6	3	62.04	2	41.4	45	72	45	72	45	72	70.4	63.7	67.9	72.9
Campus Hill	Portola	Campus Loop	853	97	827.41	2	17.06	1	8.53	40	64	40	64	40	64	65.2	57.3	60.6	67.0
Murietta	J. London	Stanley	1710	97	1658.7	2	34.2	1	17.1	35	56	35	56	35	56	66.5	59.4	63.1	68.7
Vasco	East Ave.	Telsa Rd.	1762	97	1709.1	2	35.24	1	17.6	45	72	45	72	45	72	69.8	61.2	64.2	71.3

Assumptions: PM peak hour traffic data from ARUP

Existing Conditions AM Peak Hour

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE %						VEHICLE SPEED						NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL 15 meters from
				Auto		MT		HT		Auto	k/h	MT	k/h	HT	k/h	Auto	MT	HT	
Calveno Peak	from:	to:		%	Auto	%	MT	%	HT										roadway center)
Owens	Willow	Hacienda	904	95	858.8	3	27.12	2	18.1	40	64	40	64	40	64	65.3	59.3	63.8	68.2
Martinelli	Hacienda	BART	440	95	418	3	13.2	2	8.8	40	64	40	64	40	64	62.2	56.1	60.7	65.1
Dublin	Hacienda	Iron Horse	1441	95	1369	3	43.23	2	28.8	45	72	45	72	45	72	68.8	62.1	66.3	71.3
Campus Hill	Portola	Campus Loop	580	97	562.6	2	11.6	1	5.8	40	64	40	64	40	64	63.5	55.6	58.9	65.3
Murietta	J. London	Stanley	1328	97	1288.2	2	26.56	1	13.3	35	56	35	56	35	56	65.4	58.3	62.0	67.6
Vasco	East Ave.	Telsa Rd.	1261	97	1223.2	2	25.22	1	12.6	45	72	45	72	45	72	68.3	59.8	62.8	69.8
	Assumptions:	AM peak hour traffic data from ARUP																	

2040 Baseline Condition AM Peak Hour

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE %						VEHICLE SPEED						NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL 15 meters from
				Auto		MT		HT		Auto	k/h	MT	k/h	HT	k/h	Auto	MT	HT	
Calveno Peak	from:	to:		%	Auto	%	MT	%	HT										roadway center)
Owens	Willow	Hacienda	1166	95	1107.7	3	34.98	2	23.3	40	64	40	64	40	64	66.4	60.4	65.0	69.3
Martinelli	Hacienda	BART	577	95	548.15	3	17.31	2	11.5	40	64	40	64	40	64	63.4	57.3	61.9	66.3
Dublin	Hacienda	Iron Horse	1722	95	1635.9	3	51.66	2	34.4	45	72	45	72	45	72	69.6	62.9	67.1	72.1
Campus Hill	Portola	Campus Loop	718	97	696.46	2	14.36	1	7.18	40	64	40	64	40	64	64.4	56.5	59.8	66.2
Murietta	J. London	Stanley	1628	97	1579.2	2	32.56	1	16.3	35	56	35	56	35	56	66.3	59.2	62.9	68.5
Vasco	East Ave.	Telsa Rd.	1431	97	1388.1	2	28.62	1	14.3	45	72	45	72	45	72	68.9	60.3	63.3	70.4
Airway	Portola	Sutter	415	97	402.55	2	8.3	1	4.15	35	56	35	56	35	56	60.4	53.2	56.9	62.5
	Assumptions:	AM peak hour traffic data from ARUP																	

2040 Baseline +Project AM Peak Hour

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE % Auto		MT		HT		VEHICLE SPEED Auto	k/h	MT	k/h	HT	k/h	NOISE LEVEL (dBA) Auto	MT	HT	CALCULATED NOISE LEVEL 15 meters from
Calveno																			
Peak																			
	from:	to:		%	Auto	%	MT	%	HT										roadway center)
Owens	Willow	Hacienda	1093	95	1038.4	3	32.79	2	21.9	40	64	40	64	40	64	66.1	60.1	64.7	69.1
Martinelli	Hacienda	BART	572	95	543.4	3	17.16	2	11.4	40	64	40	64	40	64	63.3	57.3	61.9	66.3
Dublin	Hacienda	Iron Horse	1683	95	1598.9	3	50.49	2	33.7	45	72	45	72	45	72	69.5	62.8	67.0	72.0
Campus Hill	Portola	Campus Loop	793	97	769.21	2	15.86	1	7.93	40	64	40	64	40	64	64.8	56.9	60.3	66.6
Murietta	J. London	Stanley	1873	97	1816.8	2	37.46	1	18.7	35	56	35	56	35	56	66.9	59.8	63.5	69.1
Vasco	East Ave.	Telsa Rd.	1414	97	1371.6	2	28.28	1	14.1	45	72	45	72	45	72	68.8	60.3	63.3	70.3
Airway	Portola	Sutter	1111	97	1077.7	2	22.22	1	11.1	35	56	35	56	35	56	64.6	57.5	61.2	66.8
	Assumptions:	AM peak hour traffic data from ARUP																	

2040 Baseline + DMU Alternative AM Peak Hour

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE % Auto		MT		HT		VEHICLE SPEED Auto	k/h	MT	k/h	HT	k/h	NOISE LEVEL (dBA) Auto	MT	HT	CALCULATED NOISE LEVEL 15 meters from
Calveno																			
Peak																			
	from:	to:		%	Auto	%	MT	%	HT										roadway center)
Owens	Willow	Hacienda	1102	95	1046.9	3	33.06	2	22	40	64	40	64	40	64	66.2	60.1	64.7	69.1
Martinelli	Hacienda	BART	575	95	546.25	3	17.25	2	11.5	40	64	40	64	40	64	63.4	57.3	61.9	66.3
Dublin	Hacienda	Iron Horse	1676	95	1592.2	3	50.28	2	33.5	45	72	45	72	45	72	69.5	62.7	67.0	72.0
Campus Hill	Portola	Campus Loop	788	97	764.36	2	15.76	1	7.88	40	64	40	64	40	64	64.8	56.9	60.2	66.6
Murietta	J. London	Stanley	1820	97	1765.4	2	36.4	1	18.2	35	56	35	56	35	56	66.8	59.6	63.3	68.9
Vasco	East Ave.	Telsa Rd.	1433	97	1390	2	28.66	1	14.3	45	72	45	72	45	72	68.9	60.3	63.3	70.4
Airway	Portola	Sutter	737	97	714.89	2	14.74	1	7.37	35	56	35	56	35	56	62.9	55.7	59.4	65.0
	Assumptions:	AM peak hour traffic data from ARUP																	

2040 Baseline + BRT Alternative AM Peak Hour

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE % Auto		MT		HT		VEHICLE SPEED Auto k/h		MT k/h		HT k/h		NOISE LEVEL (dBA) Auto	MT	HT	CALCULATED NOISE LEVEL 15 meters from
Calveno Peak																			
	from:	to:		%	Auto	%	MT	%	HT										roadway center)
Owens	Willow	Hacienda	1155	95	1097.3	3	34.65	2	23.1	40	64	40	64	40	64	66.4	60.3	64.9	69.3
Martinelli	Hacienda	BART	576	95	547.2	3	17.28	2	11.5	40	64	40	64	40	64	63.4	57.3	61.9	66.3
Dublin	Hacienda	Iron Horse	1683	95	1598.9	3	50.49	2	33.7	45	72	45	72	45	72	69.5	62.8	67.0	72.0
Campus Hill	Portola	Campus Loop	709	97	687.73	2	14.18	1	7.09	40	64	40	64	40	64	64.4	56.5	59.8	66.1
Murietta	J. London	Stanley	1622	97	1573.3	2	32.44	1	16.2	35	56	35	56	35	56	66.3	59.1	62.8	68.4
Vasco	East Ave.	Telsa Rd.	1417	97	1374.5	2	28.34	1	14.2	45	72	45	72	45	72	68.8	60.3	63.3	70.3
Airway	Portola	Sutter	418	97	405.46	2	8.36	1	4.18	35	56	35	56	35	56	60.4	53.3	57.0	62.6
	Assumptions:	AM peak hour traffic data from ARUP																	

2040 Baseline + Enhanced Bus Alternative AM Peak Hour

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE % Auto		MT		HT		VEHICLE SPEED Auto k/h		MT k/h		HT k/h		NOISE LEVEL (dBA) Auto	MT	HT	CALCULATED NOISE LEVEL 15 meters from
Calveno Peak																			
	from:	to:		%	Auto	%	MT	%	HT										roadway center)
Owens	Willow	Hacienda	1158	95	1100.1	3	34.74	2	23.2	40	64	40	64	40	64	66.4	60.3	64.9	69.3
Martinelli	Hacienda	BART	577	95	548.15	3	17.31	2	11.5	40	64	40	64	40	64	63.4	57.3	61.9	66.3
Dublin	Hacienda	Iron Horse	1699	95	1614.1	3	50.97	2	34	45	72	45	72	45	72	69.5	62.8	67.1	72.0
Campus Hill	Portola	Campus Loop	709	97	687.73	2	14.18	1	7.09	40	64	40	64	40	64	64.4	56.5	59.8	66.1
Murietta	J. London	Stanley	1621	97	1572.4	2	32.42	1	16.2	35	56	35	56	35	56	66.3	59.1	62.8	68.4
Vasco	East Ave.	Telsa Rd.	1425	97	1382.3	2	28.5	1	14.3	45	72	45	72	45	72	68.9	60.3	63.3	70.4
	Assumptions:	AM peak hour traffic data from ARUP																	

Existing Conditions PM Peak Hour

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE %						VEHICLE SPEED						NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL 15 meters from
				Auto		MT		HT		Auto	k/h	MT	k/h	HT	k/h	Auto	MT	HT	
Calveno Peak	from:	to:		%	Auto	%	MT	%	HT										roadway center)
Owens	Willow	Hacienda	904	95	858.8	3	27.12	2	18.1	40	64	40	64	40	64	65.3	59.3	63.8	68.2
Martinelli	Hacienda	BART	440	95	418	3	13.2	2	8.8	40	64	40	64	40	64	62.2	56.1	60.7	65.1
Dublin	Hacienda	Iron Horse	1441	95	1369	3	43.23	2	28.8	45	72	45	72	45	72	68.8	62.1	66.3	71.3
Campus Hill	Portola	Campus Loop	580	97	562.6	2	11.6	1	5.8	40	64	40	64	40	64	63.5	55.6	58.9	65.3
Murietta	J. London	Stanley	1328	97	1288.2	2	26.56	1	13.3	35	56	35	56	35	56	65.4	58.3	62.0	67.6
Vasco	East Ave.	Telsa Rd.	1261	97	1223.2	2	25.22	1	12.6	45	72	45	72	45	72	68.3	59.8	62.8	69.8
	Assumptions:	PM peak hour traffic data from ARUP																	

2040 Baseline Condition PM Peak Hour

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE %						VEHICLE SPEED						NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL 15 meters from
				Auto		MT		HT		Auto	k/h	MT	k/h	HT	k/h	Auto	MT	HT	
Calveno Peak	from:	to:		%	Auto	%	MT	%	HT										roadway center)
Owens	Willow	Hacienda	1908	95	1812.6	3	57.24	2	38.2	40	64	40	64	40	64	68.6	62.5	67.1	71.5
Martinelli	Hacienda	BART	1240	95	1178	3	37.2	2	24.8	40	64	40	64	40	64	66.7	60.6	65.2	69.6
Dublin	Hacienda	Iron Horse	2509	95	2383.6	3	75.27	2	50.2	45	72	45	72	45	72	71.2	64.5	68.8	73.7
Campus Hill	Portola	Campus Loop	889	97	862.33	2	17.78	1	8.89	40	64	40	64	40	64	65.3	57.4	60.8	67.1
Murietta	J. London	Stanley	2319	97	2249.4	2	46.38	1	23.2	35	56	35	56	35	56	67.8	60.7	64.4	70.0
Vasco	East Ave.	Telsa Rd.	2297	97	2228.1	2	45.94	1	23	45	72	45	72	45	72	70.9	62.4	65.4	72.4
Airway	Portola	Sutter	986	97	956.42	2	19.72	1	9.86	35	56	35	56	35	56	64.1	57.0	60.7	66.3
	Assumptions:	PM peak hour traffic data from ARUP																	

2040 Baseline +Project PM Peak Hour

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE % Auto		MT		HT		VEHICLE SPEED Auto	k/h	MT	k/h	HT	k/h	NOISE LEVEL (dBA) Auto	MT	HT	CALCULATED NOISE LEVEL 15 meters from
Calveno																			
Peak																			
	from:	to:		%	Auto	%	MT	%	HT										roadway center)
Owens	Willow	Hacienda	2011	95	1910.5	3	60.33	2	40.2	40	64	40	64	40	64	68.8	62.7	67.3	71.7
Martinelli	Hacienda	BART	936	95	889.2	3	28.08	2	18.7	40	64	40	64	40	64	65.5	59.4	64.0	68.4
Dublin	Hacienda	Iron Horse	2506	95	2380.7	3	75.18	2	50.1	45	72	45	72	45	72	71.2	64.5	68.7	73.7
Campus Hill	Portola	Campus Loop	959	97	930.23	2	19.18	1	9.59	40	64	40	64	40	64	65.7	57.8	61.1	67.5
Murietta	J. London	Stanley	2507	97	2431.8	2	50.14	1	25.1	35	56	35	56	35	56	68.2	61.0	64.7	70.3
Vasco	East Ave.	Telsa Rd.	2338	97	2267.9	2	46.76	1	23.4	45	72	45	72	45	72	71.0	62.4	65.4	72.5
Airway	Portola	Sutter	1525	97	1479.3	2	30.5	1	15.3	35	56	35	56	35	56	66.0	58.9	62.6	68.2
	Assumptions:	PM peak hour traffic data from ARUP																	

2040 Baseline + DMU Alternative PM Peak Hour

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE % Auto		MT		HT		VEHICLE SPEED Auto	k/h	MT	k/h	HT	k/h	NOISE LEVEL (dBA) Auto	MT	HT	CALCULATED NOISE LEVEL 15 meters from
Calveno																			
Peak																			
	from:	to:		%	Auto	%	MT	%	HT										roadway center)
Owens	Willow	Hacienda	1974	95	1875.3	3	59.22	2	39.5	40	64	40	64	40	64	68.7	62.7	67.2	71.6
Martinelli	Hacienda	BART	1069	95	1015.6	3	32.07	2	21.4	40	64	40	64	40	64	66.0	60.0	64.6	69.0
Dublin	Hacienda	Iron Horse	2470	95	2346.5	3	74.1	2	49.4	45	72	45	72	45	72	71.2	64.4	68.7	73.7
Campus Hill	Portola	Campus Loop	961	97	932.17	2	19.22	1	9.61	40	64	40	64	40	64	65.7	57.8	61.1	67.5
Murietta	J. London	Stanley	2443	97	2369.7	2	48.86	1	24.4	35	56	35	56	35	56	68.1	60.9	64.6	70.2
Vasco	East Ave.	Telsa Rd.	2269	97	2200.9	2	45.38	1	22.7	45	72	45	72	45	72	70.9	62.3	65.3	72.4
Airway	Portola	Sutter	1270	97	1231.9	2	25.4	1	12.7	35	56	35	56	35	56	65.2	58.1	61.8	67.4
	Assumptions:	PM peak hour traffic data from ARUP																	

2040 Baseline + BRT Alternative PM Peak Hour

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE %						VEHICLE SPEED						NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL
				Auto		MT		HT		Auto	k/h	MT	k/h	HT	k/h	Auto	MT	HT	15 meters from
Calveno Peak																			
	from:	to:		%	Auto	%	MT	%	HT										roadway center)
Owens	Willow	Hacienda	1914	95	1818.3	3	57.42	2	38.3	40	64	40	64	40	64	68.6	62.5	67.1	71.5
Martinelli	Hacienda	BART	1238	95	1176.1	3	37.14	2	24.8	40	64	40	64	40	64	66.7	60.6	65.2	69.6
Dublin	Hacienda	Iron Horse	2468	95	2344.6	3	74.04	2	49.4	45	72	45	72	45	72	71.2	64.4	68.7	73.7
Campus Hill	Portola	Campus Loop	885	97	858.45	2	17.7	1	8.85	40	64	40	64	40	64	65.3	57.4	60.7	67.1
Murietta	J. London	Stanley	2234	97	2167	2	44.68	1	22.3	35	56	35	56	35	56	67.7	60.5	64.2	69.8
Vasco	East Ave.	Telsa Rd.	2281	97	2212.6	2	45.62	1	22.8	45	72	45	72	45	72	70.9	62.3	65.3	72.4
Airway	Portola	Sutter	975	97	945.75	2	19.5	1	9.75	35	56	35	56	35	56	64.1	56.9	60.6	66.2

Assumptions: PM peak hour traffic data from ARUP

2040 Baseline + Enhanced Bus Alternative PM Peak Hour

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE %						VEHICLE SPEED						NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL
				Auto		MT		HT		Auto	k/h	MT	k/h	HT	k/h	Auto	MT	HT	15 meters from
Calveno Peak																			
	from:	to:		%	Auto	%	MT	%	HT										roadway center)
Owens	Willow	Hacienda	1902	95	1806.9	3	57.06	2	38	40	64	40	64	40	64	68.5	62.5	67.1	71.5
Martinelli	Hacienda	BART	1221	95	1160	3	36.63	2	24.4	40	64	40	64	40	64	66.6	60.6	65.2	69.5
Dublin	Hacienda	Iron Horse	2534	95	2407.3	3	76.02	2	50.7	45	72	45	72	45	72	71.3	64.5	68.8	73.8
Campus Hill	Portola	Campus Loop	879	97	852.63	2	17.58	1	8.79	40	64	40	64	40	64	65.3	57.4	60.7	67.1
Murietta	J. London	Stanley	2288	97	2219.4	2	45.76	1	22.9	35	56	35	56	35	56	67.8	60.6	64.3	69.9
Vasco	East Ave.	Telsa Rd.	2280	97	2211.6	2	45.6	1	22.8	45	72	45	72	45	72	70.9	62.3	65.3	72.4

Assumptions: PM peak hour traffic data from ARUP

Existing Conditions AM Peak Hour

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE %						VEHICLE SPEED						NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL
				Auto		MT		HT		Auto	k/h	MT	k/h	HT	k/h	Auto	MT	HT	15 meters from
Calveno Peak																			
	from:	to:		%	Auto	%	MT	%	HT										roadway center)
Owens	Willow	Hacienda	904	95	858.8	3	27.12	2	18.1	40	64	40	64	40	64	65.3	59.3	63.8	68.2
Martinelli	Hacienda	BART	440	95	418	3	13.2	2	8.8	40	64	40	64	40	64	62.2	56.1	60.7	65.1
Dublin	Hacienda	Iron Horse	1441	95	1369	3	43.23	2	28.8	45	72	45	72	45	72	68.8	62.1	66.3	71.3
Campus Hill	Portola	Campus Loop	580	97	562.6	2	11.6	1	5.8	40	64	40	64	40	64	63.5	55.6	58.9	65.3
Murietta	J. London	Stanley	1328	97	1288.2	2	26.56	1	13.3	35	56	35	56	35	56	65.4	58.3	62.0	67.6
Vasco	East Ave.	Telsa Rd.	1261	97	1223.2	2	25.22	1	12.6	45	72	45	72	45	72	68.3	59.8	62.8	69.8
	Assumptions:	AM peak hour traffic data from ARUP																	

2025 Baseline AM Peak Hour

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE %						VEHICLE SPEED						NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL
				Auto		MT		HT		Auto	k/h	MT	k/h	HT	k/h	Auto	MT	HT	15 meters from
Calveno Peak																			
	from:	to:		%	Auto	%	MT	%	HT										roadway center)
Owens	Willow	Hacienda	1041	95	988.95	3	31.23	2	20.8	40	64	40	64	40	64	65.9	59.9	64.5	68.9
Martinelli	Hacienda	BART	498	95	473.1	3	14.94	2	9.96	40	64	40	64	40	64	62.7	56.7	61.3	65.7
Dublin	Hacienda	Iron Horse	1534	95	1457.3	3	46.02	2	30.7	45	72	45	72	45	72	69.1	62.4	66.6	71.6
Campus Hill	Portola	Campus Loop	640	97	620.8	2	12.8	1	6.4	40	64	40	64	40	64	63.9	56.0	59.3	65.7
Murietta	J. London	Stanley	1332	97	1292	2	26.64	1	13.3	35	56	35	56	35	56	65.4	58.3	62.0	67.6
Vasco	East Ave.	Telsa Rd.	1341	97	1300.8	2	26.82	1	13.4	45	72	45	72	45	72	68.6	60.0	63.0	70.1
Airway	Portola	Sutter	423	97	410.31	2	8.46	1	4.23	35	56	35	56	35	56	60.4	53.3	57.0	62.6
	Assumptions:	AM peak hour traffic data from ARUP																	

2025 Baseline + Project + Garage Expansion + Isabel Neighborhood Plan AM Peak Hour

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE %						VEHICLE SPEED						NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL
				Auto		MT		HT		Auto	k/h	MT	k/h	HT	k/h	Auto	MT	HT	15 meters from
Calveno Peak																			
	from:	to:		%	Auto	%	MT	%	HT										roadway center)
Owens	Willow	Hacienda	978	95	929.1	3	29.34	2	19.6	40	64	40	64	40	64	65.7	59.6	64.2	68.6
Martinelli	Hacienda	BART	427	95	405.65	3	12.81	2	8.54	40	64	40	64	40	64	62.1	56.0	60.6	65.0
Dublin	Hacienda	Iron Horse	1517	95	1441.2	3	45.51	2	30.3	45	72	45	72	45	72	69.0	62.3	66.6	71.5
Campus Hill	Portola	Campus Loop	794	97	770.18	2	15.88	1	7.94	40	64	40	64	40	64	64.8	56.9	60.3	66.6
Murietta	J. London	Stanley	1339	97	1298.8	2	26.78	1	13.4	35	56	35	56	35	56	65.4	58.3	62.0	67.6
Vasco	East Ave.	Telsa Rd.	1339	97	1298.8	2	26.78	1	13.4	45	72	45	72	45	72	68.6	60.0	63.0	70.1
Airway	Portola	Sutter	932	97	904.04	2	18.64	1	9.32	35	56	35	56	35	56	63.9	56.7	60.4	66.0

Assumptions: AM peak hour traffic data from ARUP

2025 Baseline + DMU Alternative + Garage Expansion + Isabel Neighborhood Plan AM Peak Hour

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE %						VEHICLE SPEED						NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL
				Auto		MT		HT		Auto	k/h	MT	k/h	HT	k/h	Auto	MT	HT	15 meters from
Calveno Peak																			
	from:	to:		%	Auto	%	MT	%	HT										roadway center)
Owens	Willow	Hacienda	980	95	931	3	29.4	2	19.6	40	64	40	64	40	64	65.7	59.6	64.2	68.6
Martinelli	Hacienda	BART	431	95	409.45	3	12.93	2	8.62	40	64	40	64	40	64	62.1	56.1	60.6	65.0
Dublin	Hacienda	Iron Horse	1518	95	1442.1	3	45.54	2	30.4	45	72	45	72	45	72	69.0	62.3	66.6	71.5
Campus Hill	Portola	Campus Loop	787	97	763.39	2	15.74	1	7.87	40	64	40	64	40	64	64.8	56.9	60.2	66.6
Murietta	J. London	Stanley	1332	97	1292	2	26.64	1	13.3	35	56	35	56	35	56	65.4	58.3	62.0	67.6
Vasco	East Ave.	Telsa Rd.	1297	97	1258.1	2	25.94	1	13	45	72	45	72	45	72	68.4	59.9	62.9	70.0
Airway	Portola	Sutter	519	97	503.43	2	10.38	1	5.19	35	56	35	56	35	56	61.3	54.2	57.9	63.5

Assumptions: AM peak hour traffic data from ARUP

2025 Baseline + BRT Alternative + Garage Expansion + Isabel Neighborhood Plan AM Peak Hour

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE % Auto		MT		HT		VEHICLE SPEED Auto	k/h	MT	k/h	HT	k/h	NOISE LEVEL (dBA) Auto	MT	HT	CALCULATED NOISE LEVEL 15 meters from
Calveno Peak																			
	from:	to:		%	Auto	%	MT	%	HT										roadway center)
Owens	Willow	Hacienda	1066	95	1012.7	3	31.98	2	21.3	40	64	40	64	40	64	66.0	60.0	64.6	69.0
Martinelli	Hacienda	BART	429	95	407.55	3	12.87	2	8.58	40	64	40	64	40	64	62.1	56.0	60.6	65.0
Dublin	Hacienda	Iron Horse	1518	95	1442.1	3	45.54	2	30.4	45	72	45	72	45	72	69.0	62.3	66.6	71.5
Campus Hill	Portola	Campus Loop	639	97	619.83	2	12.78	1	6.39	40	64	40	64	40	64	63.9	56.0	59.3	65.7
Murietta	J. London	Stanley	1332	97	1292	2	26.64	1	13.3	35	56	35	56	35	56	65.4	58.3	62.0	67.6
Vasco	East Ave.	Telsa Rd.	1339	97	1298.8	2	26.78	1	13.4	45	72	45	72	45	72	68.6	60.0	63.0	70.1
Airway	Portola	Sutter	422	97	409.34	2	8.44	1	4.22	35	56	35	56	35	56	60.4	53.3	57.0	62.6
	Assumptions:	AM peak hour traffic data from ARUP																	

2025 Baseline + Enhanced Bus Alternative + Garage Expansion AM Peak Hour

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE % Auto		MT		HT		VEHICLE SPEED Auto	k/h	MT	k/h	HT	k/h	NOISE LEVEL (dBA) Auto	MT	HT	CALCULATED NOISE LEVEL 15 meters from
Calveno Peak																			
	from:	to:		%	Auto	%	MT	%	HT										roadway center)
Owens	Willow	Hacienda	1068	95	1014.6	3	32.04	2	21.4	40	64	40	64	40	64	66.0	60.0	64.6	69.0
Martinelli	Hacienda	BART	431	95	409.45	3	12.93	2	8.62	40	64	40	64	40	64	62.1	56.1	60.6	65.0
Dublin	Hacienda	Iron Horse	1517	95	1441.2	3	45.51	2	30.3	45	72	45	72	45	72	69.0	62.3	66.6	71.5
Campus Hill	Portola	Campus Loop	638	97	618.86	2	12.76	1	6.38	40	64	40	64	40	64	63.9	56.0	59.3	65.7
Murietta	J. London	Stanley	1331	97	1291.1	2	26.62	1	13.3	35	56	35	56	35	56	65.4	58.3	62.0	67.6
Vasco	East Ave.	Telsa Rd.	1347	97	1306.6	2	26.94	1	13.5	45	72	45	72	45	72	68.6	60.0	63.0	70.1
Airway	Portola	Sutter	422	97	409.34	2	8.44	1	4.22	35	56	35	56	35	56	60.4	53.3	57.0	62.6
	Assumptions:	AM peak hour traffic data from ARUP																	

Existing Conditions PM Peak Hour

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE %						VEHICLE SPEED						NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL 15 meters from roadway center)
				Auto		MT		HT		Auto	k/h	MT	k/h	HT	k/h	Auto	MT	HT	
Calveno																			
Peak																			
	from:	to:		%	Auto	%	MT	%	HT										
Owens	Willow	Hacienda	1344	95	1276.8	3	40.32	2	26.9	40	64	40	64	40	64	67.0	61.0	65.6	70.0
Martinelli	Hacienda	BART	828	95	786.6	3	24.84	2	16.6	40	64	40	64	40	64	64.9	58.9	63.5	67.9
Dublin	Hacienda	Iron Horse	1962	95	1863.9	3	58.86	2	39.2	45	72	45	72	45	72	70.2	63.4	67.7	72.7
Campus Hill	Portola	Campus Loop	658	97	638.26	2	13.16	1	6.58	40	64	40	64	40	64	64.0	56.1	59.5	65.8
Murietta	J. London	Stanley	1491	97	1446.3	2	29.82	1	14.9	35	56	35	56	35	56	65.9	58.8	62.5	68.1
Vasco	East Ave.	Telsa Rd.	1552	97	1505.4	2	31.04	1	15.5	45	72	45	72	45	72	69.2	60.7	63.7	70.7
	Assumptions:	PM peak hour traffic data from ARUP																	

2025 Baseline PM Peak Hour

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE %						VEHICLE SPEED						NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL 15 meters from roadway center)
				Auto		MT		HT		Auto	k/h	MT	k/h	HT	k/h	Auto	MT	HT	
Calveno																			
Peak																			
	from:	to:		%	Auto	%	MT	%	HT										
Owens	Willow	Hacienda	1630	95	1548.5	3	48.9	2	32.6	40	64	40	64	40	64	67.9	61.8	66.4	70.8
Martinelli	Hacienda	BART	1001	95	950.95	3	30.03	2	20	40	64	40	64	40	64	65.8	59.7	64.3	68.7
Dublin	Hacienda	Iron Horse	2070	95	1966.5	3	62.1	2	41.4	45	72	45	72	45	72	70.4	63.7	67.9	72.9
Campus Hill	Portola	Campus Loop	855	97	829.35	2	17.1	1	8.55	40	64	40	64	40	64	65.2	57.3	60.6	67.0
Murietta	J. London	Stanley	1710	97	1658.7	2	34.2	1	17.1	35	56	35	56	35	56	66.5	59.4	63.1	68.7
Vasco	East Ave.	Telsa Rd.	1772	97	1718.8	2	35.44	1	17.7	45	72	45	72	45	72	69.8	61.2	64.2	71.3
Airway	Portola	Sutter	924	97	896.28	2	18.48	1	9.24	35	56	35	56	35	56	63.8	56.7	60.4	66.0
	Assumptions:	PM peak hour traffic data from ARUP																	

2025 Baseline + Project + Garage Expansion + Isabel Neighborhood Plan PM Peak Hour

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE %						VEHICLE SPEED						NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL
				Auto		MT		HT		Auto	k/h	MT	k/h	HT	k/h	Auto	MT	HT	15 meters from
Calveno Peak	from:	to:		%	Auto	%	MT	%	HT										roadway center)
Owens	Willow	Hacienda	1609	95	1528.6	3	48.27	2	32.2	40	64	40	64	40	64	67.8	61.8	66.4	70.7
Martinelli	Hacienda	BART	839	95	797.05	3	25.17	2	16.8	40	64	40	64	40	64	65.0	58.9	63.5	67.9
Dublin	Hacienda	Iron Horse	2051	95	1948.5	3	61.53	2	41	45	72	45	72	45	72	70.3	63.6	67.9	72.9
Campus Hill	Portola	Campus Loop	1144	97	1109.7	2	22.88	1	11.4	40	64	40	64	40	64	66.4	58.5	61.9	68.2
Murietta	J. London	Stanley	1830	97	1775.1	2	36.6	1	18.3	35	56	35	56	35	56	66.8	59.7	63.4	69.0
Vasco	East Ave.	Telsa Rd.	1779	97	1725.6	2	35.58	1	17.8	45	72	45	72	45	72	69.8	61.2	64.3	71.3
Airway	Portola	Sutter	1424	97	1381.3	2	28.48	1	14.2	35	56	35	56	35	56	65.7	58.6	62.3	67.9

Assumptions: PM peak hour traffic data from ARUP

2025 Baseline + DMU Alternative + Garage Expansion + Isabel Neighborhood Plan PM Peak Hour

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE %						VEHICLE SPEED						NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL
				Auto		MT		HT		Auto	k/h	MT	k/h	HT	k/h	Auto	MT	HT	15 meters from
Calveno Peak	from:	to:		%	Auto	%	MT	%	HT										roadway center)
Owens	Willow	Hacienda	1589	95	1509.6	3	47.67	2	31.8	40	64	40	64	40	64	67.8	61.7	66.3	70.7
Martinelli	Hacienda	BART	915	95	869.25	3	27.45	2	18.3	40	64	40	64	40	64	65.4	59.3	63.9	68.3
Dublin	Hacienda	Iron Horse	2055	95	1952.3	3	61.65	2	41.1	45	72	45	72	45	72	70.4	63.6	67.9	72.9
Campus Hill	Portola	Campus Loop	1133	97	1099	2	22.66	1	11.3	40	64	40	64	40	64	66.4	58.5	61.8	68.2
Murietta	J. London	Stanley	1810	97	1755.7	2	36.2	1	18.1	35	56	35	56	35	56	66.8	59.6	63.3	68.9
Vasco	East Ave.	Telsa Rd.	1780	97	1726.6	2	35.6	1	17.8	45	72	45	72	45	72	69.8	61.2	64.3	71.3
Airway	Portola	Sutter	1012	97	981.64	2	20.24	1	10.1	35	56	35	56	35	56	64.2	57.1	60.8	66.4

Assumptions: PM peak hour traffic data from ARUP

2025 Baseline + BRT Alternative + Garage Expansion + Isabel Neighborhood Plan PM Peak Hour

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE %						VEHICLE SPEED						NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL 15 meters from
				Auto		MT		HT		Auto	k/h	MT	k/h	HT	k/h	Auto	MT	HT	
Calveno Peak	from:	to:		%	Auto	%	MT	%	HT										roadway center)
Owens	Willow	Hacienda	1582	95	1502.9	3	47.46	2	31.6	40	64	40	64	40	64	67.7	61.7	66.3	70.7
Martinelli	Hacienda	BART	957	95	909.15	3	28.71	2	19.1	40	64	40	64	40	64	65.6	59.5	64.1	68.5
Dublin	Hacienda	Iron Horse	2061	95	1958	3	61.83	2	41.2	45	72	45	72	45	72	70.4	63.6	67.9	72.9
Campus Hill	Portola	Campus Loop	850	97	824.5	2	17	1	8.5	40	64	40	64	40	64	65.1	57.2	60.6	66.9
Murietta	J. London	Stanley	1699	97	1648	2	33.98	1	17	35	56	35	56	35	56	66.5	59.3	63.0	68.6
Vasco	East Ave.	Telsa Rd.	1756	97	1703.3	2	35.12	1	17.6	45	72	45	72	45	72	69.8	61.2	64.2	71.3
Airway	Portola	Sutter	925	97	897.25	2	18.5	1	9.25	35	56	35	56	35	56	63.8	56.7	60.4	66.0
	Assumptions:	PM peak hour traffic data from ARUP																	

2025 Baseline + Enhanced Bus Alternative + Garage Expansion PM Peak Hour

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE %						VEHICLE SPEED						NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL 15 meters from
				Auto		MT		HT		Auto	k/h	MT	k/h	HT	k/h	Auto	MT	HT	
Calveno Peak	from:	to:		%	Auto	%	MT	%	HT										roadway center)
Owens	Willow	Hacienda	1583	95	1503.9	3	47.49	2	31.7	40	64	40	64	40	64	67.8	61.7	66.3	70.7
Martinelli	Hacienda	BART	983	95	933.85	3	29.49	2	19.7	40	64	40	64	40	64	65.7	59.6	64.2	68.6
Dublin	Hacienda	Iron Horse	2055	95	1952.3	3	61.65	2	41.1	45	72	45	72	45	72	70.4	63.6	67.9	72.9
Campus Hill	Portola	Campus Loop	843	97	817.71	2	16.86	1	8.43	40	64	40	64	40	64	65.1	57.2	60.5	66.9
Murietta	J. London	Stanley	1770	97	1716.9	2	35.4	1	17.7	35	56	35	56	35	56	66.7	59.5	63.2	68.8
Vasco	East Ave.	Telsa Rd.	1767	97	1714	2	35.34	1	17.7	45	72	45	72	45	72	69.8	61.2	64.2	71.3
Altamont Pass	Laughlin	Lot	0	97	0	2	0	1	0	45	72	45	72	45	72	#####	#NUM!	#####	####
Airway	Portola	Sutter	925	97	897.25	2	18.5	1	9.25	35	56	35	56	35	56	63.8	56.7	60.4	66.0
	Assumptions:	PM peak hour traffic data from ARUP																	

Existing Conditions AM Peak Hour

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE %						VEHICLE SPEED						NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL 15 meters from roadway center)
				Auto		MT		HT		Auto	k/h	MT	k/h	HT	k/h	Auto	MT	HT	
Calveno Peak	from:	to:		%	Auto	%	MT	%	HT										
Owens	Willow	Hacienda	904	95	858.8	3	27.12	2	18.1	40	64	40	64	40	64	65.3	59.3	63.8	68.2
Martinelli	Hacienda	BART	440	95	418	3	13.2	2	8.8	40	64	40	64	40	64	62.2	56.1	60.7	65.1
Dublin	Hacienda	Iron Horse	1441	95	1369	3	43.23	2	28.8	45	72	45	72	45	72	68.8	62.1	66.3	71.3
Campus Hill	Portola	Campus Loop	580	97	562.6	2	11.6	1	5.8	40	64	40	64	40	64	63.5	55.6	58.9	65.3
Murietta	J. London	Stanley	1328	97	1288.2	2	26.56	1	13.3	35	56	35	56	35	56	65.4	58.3	62.0	67.6
Vasco	East Ave.	Telsa Rd.	1261	97	1223.2	2	25.22	1	12.6	45	72	45	72	45	72	68.3	59.8	62.8	69.8
	Assumptions:	AM peak hour traffic data from ARUP																	

2040 Baseline AM Peak Hour

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE %						VEHICLE SPEED						NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL 15 meters from roadway center)
				Auto		MT		HT		Auto	k/h	MT	k/h	HT	k/h	Auto	MT	HT	
Calveno Peak	from:	to:		%	Auto	%	MT	%	HT										
Owens	Willow	Hacienda	1166	95	1107.7	3	34.98	2	23.3	40	64	40	64	40	64	66.4	60.4	65.0	69.3
Martinelli	Hacienda	BART	577	95	548.15	3	17.31	2	11.5	40	64	40	64	40	64	63.4	57.3	61.9	66.3
Dublin	Hacienda	Iron Horse	1722	95	1635.9	3	51.66	2	34.4	45	72	45	72	45	72	69.6	62.9	67.1	72.1
Campus Hill	Portola	Campus Loop	718	97	696.46	2	14.36	1	7.18	40	64	40	64	40	64	64.4	56.5	59.8	66.2
Murietta	J. London	Stanley	1628	97	1579.2	2	32.56	1	16.3	35	56	35	56	35	56	66.3	59.2	62.9	68.5
Vasco	East Ave.	Telsa Rd.	1431	97	1388.1	2	28.62	1	14.3	45	72	45	72	45	72	68.9	60.3	63.3	70.4
Airway	Portola	Sutter	415	97	402.55	2	8.3	1	4.15	35	56	35	56	35	56	60.4	53.2	56.9	62.5
	Assumptions:	AM peak hour traffic data from ARUP																	

2040 Baseline + Project + Garage Expansion AM Peak Hour

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE % Auto	%	MT	%	HT	VEHICLE SPEED Auto k/h		MT k/h		HT k/h		NOISE LEVEL (dBA) Auto	MT	HT	CALCULATED NOISE LEVEL 15 meters from roadway center)
Calveno Peak	from:	to:		%	Auto	%	MT	%	HT									
Owens	Willow	Hacienda	1157	95	1099.2	3	34.71	2	23.1	40	64	40	64	40	64	66.4	60.3	64.9	69.3
Martinelli	Hacienda	BART	508	95	482.6	3	15.24	2	10.2	40	64	40	64	40	64	62.8	56.8	61.3	65.7
Dublin	Hacienda	Iron Horse	1663	95	1579.9	3	49.89	2	33.3	45	72	45	72	45	72	69.4	62.7	67.0	71.9
Campus Hill	Portola	Campus Loop	803	97	778.91	2	16.06	1	8.03	40	64	40	64	40	64	64.9	57.0	60.3	66.7
Murietta	J. London	Stanley	1933	97	1875	2	38.66	1	19.3	35	56	35	56	35	56	67.0	59.9	63.6	69.2
Vasco	East Ave.	Telsa Rd.	1421	97	1378.4	2	28.42	1	14.2	45	72	45	72	45	72	68.8	60.3	63.3	70.4
Airway	Portola	Sutter	1145	97	1110.7	2	22.9	1	11.5	35	56	35	56	35	56	64.8	57.6	61.3	66.9
	Assumptions:	AM peak hour traffic data from ARUP																	

2040 Baseline + DMU Alternative+ Garage Expansion AM Peak Hour

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE % Auto	%	MT	%	HT	VEHICLE SPEED Auto k/h		MT k/h		HT k/h		NOISE LEVEL (dBA) Auto	MT	HT	CALCULATED NOISE LEVEL 15 meters from roadway center)
Calveno Peak	from:	to:		%	Auto	%	MT	%	HT									
Owens	Willow	Hacienda	1113	95	1057.4	3	33.39	2	22.3	40	64	40	64	40	64	66.2	60.2	64.8	69.1
Martinelli	Hacienda	BART	510	95	484.5	3	15.3	2	10.2	40	64	40	64	40	64	62.8	56.8	61.4	65.8
Dublin	Hacienda	Iron Horse	1652	95	1569.4	3	49.56	2	33	45	72	45	72	45	72	69.4	62.7	66.9	71.9
Campus Hill	Portola	Campus Loop	812	97	787.64	2	16.24	1	8.12	40	64	40	64	40	64	64.9	57.0	60.4	66.7
Murietta	J. London	Stanley	1877	97	1820.7	2	37.54	1	18.8	35	56	35	56	35	56	66.9	59.8	63.5	69.1
Vasco	East Ave.	Telsa Rd.	1422	97	1379.3	2	28.44	1	14.2	45	72	45	72	45	72	68.8	60.3	63.3	70.4
Airway	Portola	Sutter	990	97	960.3	2	19.8	1	9.9	35	56	35	56	35	56	64.1	57.0	60.7	66.3
	Assumptions:	AM peak hour traffic data from ARUP																	

2040 Baseline + BRT Alternative + Garage Expansion AM Peak Hour

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE %						VEHICLE SPEED						NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL 15 meters from roadway center)
				Auto		MT		HT		Auto	k/h	MT	k/h	HT	k/h	Auto	MT	HT	
Calveno																			
Peak																			
	from:	to:		%	Auto	%	MT	%	HT										
Owens	Willow	Hacienda	1179	95	1120.1	3	35.37	2	23.6	40	64	40	64	40	64	66.5	60.4	65.0	69.4
Martinelli	Hacienda	BART	509	95	483.55	3	15.27	2	10.2	40	64	40	64	40	64	62.8	56.8	61.4	65.7
Dublin	Hacienda	Iron Horse	1716	95	1630.2	3	51.48	2	34.3	45	72	45	72	45	72	69.6	62.9	67.1	72.1
Campus Hill	Portola	Campus Loop	709	97	687.73	2	14.18	1	7.09	40	64	40	64	40	64	64.4	56.5	59.8	66.1
Murietta	J. London	Stanley	1614	97	1565.6	2	32.28	1	16.1	35	56	35	56	35	56	66.3	59.1	62.8	68.4
Vasco	East Ave.	Telsa Rd.	1431	97	1388.1	2	28.62	1	14.3	45	72	45	72	45	72	68.9	60.3	63.3	70.4
Airway	Portola	Sutter	412	97	399.64	2	8.24	1	4.12	35	56	35	56	35	56	60.3	53.2	56.9	62.5
	Assumptions:	AM peak hour traffic data from ARUP																	

2040 Baseline + Enhanced Bus Alternative + Garage Expansion AM Peak Hour

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE %						VEHICLE SPEED						NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL 15 meters from roadway center)
				Auto		MT		HT		Auto	k/h	MT	k/h	HT	k/h	Auto	MT	HT	
Calveno																			
Peak																			
	from:	to:		%	Auto	%	MT	%	HT										
Owens	Willow	Hacienda	1191	95	1131.5	3	35.73	2	23.8	40	64	40	64	40	64	66.5	60.5	65.0	69.4
Martinelli	Hacienda	BART	514	95	488.3	3	15.42	2	10.3	40	64	40	64	40	64	62.9	56.8	61.4	65.8
Dublin	Hacienda	Iron Horse	1783	95	1693.9	3	53.49	2	35.7	45	72	45	72	45	72	69.7	63.0	67.3	72.2
Campus Hill	Portola	Campus Loop	708	97	686.76	2	14.16	1	7.08	40	64	40	64	40	64	64.3	56.4	59.8	66.1
Murietta	J. London	Stanley	1657	97	1607.3	2	33.14	1	16.6	35	56	35	56	35	56	66.4	59.2	62.9	68.5
Vasco	East Ave.	Telsa Rd.	1419	97	1376.4	2	28.38	1	14.2	45	72	45	72	45	72	68.8	60.3	63.3	70.4
Airway	Portola	Sutter	412	97	399.64	2	8.24	1	4.12	35	56	35	56	35	56	60.3	53.2	56.9	62.5
	Assumptions:	AM peak hour traffic data from ARUP																	

Existing Conditions

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE % Auto		MT		HT		VEHICLE SPEED Auto	k/h	MT	k/h	HT	k/h	NOISE LEVEL (dBA) Auto	MT	HT	CALCULATED NOISE LEVEL 15 meters from
Calveno																			
Peak																			
	from:	to:		%	Auto	%	MT	%	HT										roadway center)
Owens	Willow	Hacienda	904	95	858.8	3	27.12	2	18.1	40	64	40	64	40	64	65.3	59.3	63.8	68.2
Martinelli	Hacienda	BART	440	95	418	3	13.2	2	8.8	40	64	40	64	40	64	62.2	56.1	60.7	65.1
Dublin	Hacienda	Iron Horse	1441	95	1369	3	43.23	2	28.8	45	72	45	72	45	72	68.8	62.1	66.3	71.3
Campus Hill	Portola	Campus Loop	580	97	562.6	2	11.6	1	5.8	40	64	40	64	40	64	63.5	55.6	58.9	65.3
Murietta	J. London	Stanley	1328	97	1288.2	2	26.56	1	13.3	35	56	35	56	35	56	65.4	58.3	62.0	67.6
Vasco	East Ave.	Telsa Rd.	1261	97	1223.2	2	25.22	1	12.6	45	72	45	72	45	72	68.3	59.8	62.8	69.8
	Assumptions:	PM peak hour traffic data from ARUP																	

2040 Baseline PM Peak Hour

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE % Auto		MT		HT		VEHICLE SPEED Auto	k/h	MT	k/h	HT	k/h	NOISE LEVEL (dBA) Auto	MT	HT	CALCULATED NOISE LEVEL 15 meters from
Calveno																			
Peak																			
	from:	to:		%	Auto	%	MT	%	HT										roadway center)
Owens	Willow	Hacienda	1908	95	1812.6	3	57.24	2	38.2	40	64	40	64	40	64	68.6	62.5	67.1	71.5
Martinelli	Hacienda	BART	1240	95	1178	3	37.2	2	24.8	40	64	40	64	40	64	66.7	60.6	65.2	69.6
Dublin	Hacienda	Iron Horse	2509	95	2383.6	3	75.27	2	50.2	45	72	45	72	45	72	71.2	64.5	68.8	73.7
Campus Hill	Portola	Campus Loop	889	97	862.33	2	17.78	1	8.89	40	64	40	64	40	64	65.3	57.4	60.8	67.1
Murietta	J. London	Stanley	2319	97	2249.4	2	46.38	1	23.2	35	56	35	56	35	56	67.8	60.7	64.4	70.0
Vasco	East Ave.	Telsa Rd.	2297	97	2228.1	2	45.94	1	23	45	72	45	72	45	72	70.9	62.4	65.4	72.4
Airway	Portola	Sutter	986	97	956.42	2	19.72	1	9.86	35	56	35	56	35	56	64.1	57.0	60.7	66.3
	Assumptions:	PM peak hour traffic data from ARUP																	

2040 Baseline + Proposed Project + Garage Expansion PM Peak Hour

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE %						VEHICLE SPEED						NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL 15 meters from
				Auto		MT		HT		Auto	k/h	MT	k/h	HT	k/h	Auto	MT	HT	
Calveno Peak	from:	to:		%	Auto	%	MT	%	HT										roadway center)
Owens	Willow	Hacienda	1714	95	1628.3	3	51.42	2	34.3	40	64	40	64	40	64	68.1	62.0	66.6	71.0
Martinelli	Hacienda	BART	1061	95	1008	3	31.83	2	21.2	40	64	40	64	40	64	66.0	60.0	64.5	68.9
Dublin	Hacienda	Iron Horse	2758	95	2620.1	3	82.74	2	55.2	45	72	45	72	45	72	71.6	64.9	69.2	74.1
Campus Hill	Portola	Campus Loop	920	97	892.4	2	18.4	1	9.2	40	64	40	64	40	64	65.5	57.6	60.9	67.3
Murietta	J. London	Stanley	2597	97	2519.1	2	51.94	1	26	35	56	35	56	35	56	68.3	61.2	64.9	70.5
Vasco	East Ave.	Telsa Rd.	2450	97	2376.5	2	49	1	24.5	45	72	45	72	45	72	71.2	62.6	65.6	72.7
Airway	Portola	Sutter	1818	97	1763.5	2	36.36	1	18.2	35	56	35	56	35	56	66.8	59.6	63.3	68.9

Assumptions: PM peak hour traffic data from ARUP

2040 Baseline + DMU Alternative+ Garage Expansion PM Peak Hour

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE %						VEHICLE SPEED						NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL 15 meters from
				Auto		MT		HT		Auto	k/h	MT	k/h	HT	k/h	Auto	MT	HT	
Calveno Peak	from:	to:		%	Auto	%	MT	%	HT										roadway center)
Owens	Willow	Hacienda	1912	95	1816.4	3	57.36	2	38.2	40	64	40	64	40	64	68.6	62.5	67.1	71.5
Martinelli	Hacienda	BART	1032	95	980.4	3	30.96	2	20.6	40	64	40	64	40	64	65.9	59.8	64.4	68.8
Dublin	Hacienda	Iron Horse	2611	95	2480.5	3	78.33	2	52.2	45	72	45	72	45	72	71.4	64.7	68.9	73.9
Campus Hill	Portola	Campus Loop	929	97	901.13	2	18.58	1	9.29	40	64	40	64	40	64	65.5	57.6	61.0	67.3
Murietta	J. London	Stanley	2610	97	2531.7	2	52.2	1	26.1	35	56	35	56	35	56	68.3	61.2	64.9	70.5
Vasco	East Ave.	Telsa Rd.	2379	97	2307.6	2	47.58	1	23.8	45	72	45	72	45	72	71.1	62.5	65.5	72.6
Airway	Portola	Sutter	1484	97	1439.5	2	29.68	1	14.8	35	56	35	56	35	56	65.9	58.8	62.5	68.1

Assumptions: PM peak hour traffic data from ARUP

2040 Baseline + BRT Alternative + Garage Expansion PM Peak Hour

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE %						VEHICLE SPEED						NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL
				Auto		MT		HT		Auto	k/h	MT	k/h	HT	k/h	Auto	MT	HT	15 meters from
Calveno Peak																			
	from:	to:		%	Auto	%	MT	%	HT										roadway center)
Owens	Willow	Hacienda	1910	95	1814.5	3	57.3	2	38.2	40	64	40	64	40	64	68.6	62.5	67.1	71.5
Martinelli	Hacienda	BART	1206	95	1145.7	3	36.18	2	24.1	40	64	40	64	40	64	66.6	60.5	65.1	69.5
Dublin	Hacienda	Iron Horse	2537	95	2410.2	3	76.11	2	50.7	45	72	45	72	45	72	71.3	64.5	68.8	73.8
Campus Hill	Portola	Campus Loop	879	97	852.63	2	17.58	1	8.79	40	64	40	64	40	64	65.3	57.4	60.7	67.1
Murietta	J. London	Stanley	2279	97	2210.6	2	45.58	1	22.8	35	56	35	56	35	56	67.8	60.6	64.3	69.9
Vasco	East Ave.	Telsa Rd.	2322	97	2252.3	2	46.44	1	23.2	45	72	45	72	45	72	71.0	62.4	65.4	72.5
Airway	Portola	Sutter	985	97	955.45	2	19.7	1	9.85	35	56	35	56	35	56	64.1	57.0	60.7	66.3

Assumptions: PM peak hour traffic data from ARUP

2040 Baseline + Enhanced Bus Alternative + Garage Expansion PM Peak Hour

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE %						VEHICLE SPEED						NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL
				Auto		MT		HT		Auto	k/h	MT	k/h	HT	k/h	Auto	MT	HT	15 meters from
Calveno Peak																			
	from:	to:		%	Auto	%	MT	%	HT										roadway center)
Owens	Willow	Hacienda	1917	95	1821.2	3	57.51	2	38.3	40	64	40	64	40	64	68.6	62.5	67.1	71.5
Martinelli	Hacienda	BART	1225	95	1163.8	3	36.75	2	24.5	40	64	40	64	40	64	66.6	60.6	65.2	69.6
Dublin	Hacienda	Iron Horse	2579	95	2450.1	3	77.37	2	51.6	45	72	45	72	45	72	71.3	64.6	68.9	73.8
Campus Hill	Portola	Campus Loop	881	97	854.57	2	17.62	1	8.81	40	64	40	64	40	64	65.3	57.4	60.7	67.1
Murietta	J. London	Stanley	2320	97	2250.4	2	46.4	1	23.2	35	56	35	56	35	56	67.8	60.7	64.4	70.0
Vasco	East Ave.	Telsa Rd.	2278	97	2209.7	2	45.56	1	22.8	45	72	45	72	45	72	70.9	62.3	65.3	72.4
Airway	Portola	Sutter	985	97	955.45	2	19.7	1	9.85	35	56	35	56	35	56	64.1	57.0	60.7	66.3

Assumptions: PM peak hour traffic data from ARUP

BUS OPERATIONS AT TRANSIT PLAZA

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE % Auto		MT		HT		VEHICLE SPEED Auto k/h		MT k/h		HT k/h		NOISE LEVEL (dBA) Auto	MT	HT	CALCULATED NOISE LEVEL 15 meters from roadway center)	Receptor Dist. from Roadway Center (m.)	Adjusted Noise Level (dBA)
Calveno Peak	from:	to:		%	Auto	%	MT	%	HT												
Plaza Crcl	Turnout	Access Road	18	0.1	0.018	0	0.018	##	18	20	32	20	32	20	32	9.9	22.8	61.1	61.1	187	50.1

Assumptions: AM peak hour traffic data from ARUP

Roadway Noise Analysis
for Laughlin Road Parking Lot
Express Bus Alternative

2040 Baseline

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE %						VEHICLE SPEED						NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL
				Auto		MT		HT		Auto	k/h	MT	k/h	HT	k/h	Auto	MT	HT	15 meters from
Calveno Peak	from:	to:		%	Auto	%	MT	%	HT										roadway center)
Nortfront	Ramp	Laughlin	1256	95	1193.2	3	37.68	2	25.12	35	56	35	56	35	56	65.1	59.8	64.7	68.5
Nortfront	Laughlin	Vasco	1999	95	1899.1	3	59.97	2	39.98	35	56	35	56	35	56	67.1	61.8	66.8	70.6

Assumptions: AM peak hour traffic for Ramp to Laughlin; PM peak hour traffic from Laughlin to Vasco

2040 + BRT

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE %						VEHICLE SPEED						NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL
				Auto		MT		HT		Auto	k/h	MT	k/h	HT	k/h	Auto	MT	HT	15 meters from
Calveno Peak	from:	to:		%	Auto	%	MT	%	HT										roadway center)
Nortfront	Ramp	Laughlin	1255	95	1192.3	3	37.65	2	25.1	35	56	35	56	35	56	65.1	59.8	64.7	68.5
Nortfront	Laughlin	Vasco	1999	95	1899.1	3	59.97	2	39.98	35	56	35	56	35	56	67.1	61.8	66.8	70.6

Assumptions: AM peak hour traffic for Ramp to Laughlin; PM peak hour traffic from Laughlin to Vasco

Existing Conditions

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE % Auto		MT		HT		VEHICLE SPEED Auto k/h		MT k/h		HT k/h		NOISE LEVEL (dBA) Auto	MT	HT	CALCULATED NOISE LEVEL (15 meters from roadway center)	Receptor Dist. from Roadway Center (m.)	Adjusted Noise Level -Distance (dBA)	Adjusted Noise Level - Soundwall (dBA)
Calveno Peak																						
	from:	to:		%	Auto	%	MT	%	HT													
I-580	Hopyard	Hacienda	13287	95	12623	1	132.9	4	531	65	##	65	104	65	##	83.1	69.5	80.5	85.1	113	76.3	60.4
I-580	Sta. Rita	El Charro	14093	95	13388	1	140.9	4	564	65	##	65	104	65	##	83.3	69.7	80.7	85.3	62	79.2	60.5
I-580	Isabel	N. Livermore	14471	95	13747	1	144.7	4	579	65	##	65	104	65	##	83.4	69.8	80.8	85.5	133	76.0	65.0

Assumptions: AM peak hour traffic data for Hopyard to Hacienda. Other 2 segments PM peak hour from ARUP

2025 Baseline Condition

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE % Auto		MT		HT		VEHICLE SPEED Auto k/h		MT k/h		HT k/h		NOISE LEVEL (dBA) Auto	MT	HT	CALCULATED NOISE LEVEL (15 meters from roadway center)	Receptor Dist. from Roadway Center (m.)	Adjusted Noise Level (dBA)	Adjusted Noise Level - Soundwall
Calveno Peak																						
	from:	to:		%	Auto	%	MT	%	HT													
I-580	Hopyard	Hacienda	15190	95	14431	1	151.9	4	608	65	##	65	104	65	##	83.6	70.0	81.1	85.7	113	76.9	61.0
I-580	Sta. Rita	El Charro	14514	95	13788	1	145.1	4	581	65	##	65	104	65	##	83.4	69.8	80.9	85.5	62	79.3	60.6
I-580	Isabel	N. Livermore	15057	95	14304	1	150.6	4	602	65	##	65	104	65	##	83.6	70.0	81.0	85.6	133	76.2	65.2

Assumptions: AM peak hour traffic data for Hopyard to Hacienda. Other 2 segments PM peak hour from ARUP

2025 Baseline + Project

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE % Auto		MT		HT		VEHICLE SPEED Auto k/h		MT k/h		HT k/h		NOISE LEVEL (dBA) Auto	MT	HT	CALCULATED NOISE LEVEL (15 meters from roadway center)	Receptor Dist. from Roadway Center (m.)	Adjusted Noise Level (dBA)	Adjusted Noise Level - Soundwall
Calveno Peak																						
	from:	to:		%	Auto	%	MT	%	HT													
I-580	Hopyard	Hacienda	14401	95	13681	1	144	4	576	65	##	65	104	65	##	83.4	69.8	80.8	85.4	106	76.9	61.0
I-580	Sta. Rita	El Charro	14193	95	13483	1	141.9	4	568	65	##	65	104	65	##	83.3	69.7	80.8	85.4	55	79.7	61.0
I-580	Isabel	N. Livermore	14696	95	13961	1	147	4	588	65	##	65	104	65	##	83.5	69.9	80.9	85.5	126	76.3	65.3

Assumptions: AM peak hour traffic data for Hopyard to Hacienda. Other 2 segments PM peak hour from ARUP

2025 Baseline + DMU Alternative

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE % Auto		MT		HT		VEHICLE SPEED Auto k/h		MT k/h		HT k/h		NOISE LEVEL (dBA) Auto	MT	HT	CALCULATED NOISE LEVEL (15 meters from roadway center)	Receptor Dist. from Roadway Center (m.)	Adjusted Noise Level (dBA)	Adjusted Noise Level - Soundwall
Calveno Peak																						
	from:	to:		%	Auto	%	MT	%	HT													
I-580	Hopyard	Hacienda	14431	95	13709	1	144.3	4	577	65	##	65	104	65	##	83.4	69.8	80.8	85.4	91.7	77.6	61.7
I-580	Sta. Rita	El Charro	14383	95	13664	1	143.8	4	575	65	##	65	104	65	##	83.4	69.8	80.8	85.4	55	79.8	61.1
I-580	Isabel	N. Livermore	14917	95	14171	1	149.2	4	597	65	##	65	104	65	##	83.6	70.0	81.0	85.6	126	76.3	65.3

Assumptions: AM peak hour traffic data for Hopyard to Hacienda. Other 2 segments PM peak hour from ARUP

2025 Baseline + BRT Alternative

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE % Auto		MT		HT		VEHICLE SPEED Auto	k/h	MT	k/h	HT	k/h	NOISE LEVEL (dBA) Auto	MT	HT	CALCULATED NOISE LEVEL (15 meters from	Receptor Dist. from Roadway	Adjusted Noise Level	Adjusted Noise Level - Soundwall
Calveno Peak																						
	from:	to:		%	Auto	%	MT	%	HT										roadway center)	Center (m.)	(dBA)	
I-580	Hopyard	Hacienda	14399	95	13679	1	144	4	576	65	##	65	104	65	##	83.4	69.8	80.8	85.4	90.1	77.7	61.8
I-580	Sta. Rita	El Charro	14476	95	13752	1	144.8	4	579	65	##	65	104	65	##	83.4	69.8	80.8	85.5	62	79.3	60.6
I-580	Isabel	N. Livermore	15023	95	14272	1	150.2	4	601	65	##	65	104	65	##	83.6	70.0	81.0	85.6	133	76.1	65.1

Assumptions: AM peak hour traffic data for Hopyard to Hacienda. Other 2 segments PM peak hour from ARUP

2025 Baseline + Enhanced Bus Alternative

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE % Auto		MT		HT		VEHICLE SPEED Auto	k/h	MT	k/h	HT	k/h	NOISE LEVEL (dBA) Auto	MT	HT	CALCULATED NOISE LEVEL (15 meters from	Receptor Dist. from Roadway	Adjusted Noise Level	Adjusted Noise Level - Soundwall
Calveno Peak																						
	from:	to:		%	Auto	%	MT	%	HT										roadway center)	Center (m.)	(dBA)	
I-580	Hopyard	Hacienda	14446	95	13724	1	144.5	4	578	65	##	65	104	65	##	83.4	69.8	80.8	85.5	113	76.7	60.8
I-580	Sta. Rita	El Charro	14482	95	13758	1	144.8	4	579	65	##	65	104	65	##	83.4	69.8	80.8	85.5	62	79.3	60.6
I-580	Isabel	N. Livermore	15037	95	14285	1	150.4	4	601	65	##	65	104	65	##	83.6	70.0	81.0	85.6	133	76.1	65.1

Assumptions: AM peak hour traffic data for Hopyard to Hacienda. Other 2 segments PM peak hour from ARUP

2040 Baseline

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE % Auto		MT		HT		VEHICLE SPEED Auto	k/h	MT	k/h	HT	k/h	NOISE LEVEL (dBA) Auto	MT	HT	NOISE LEVEL (15 meters from	Dist. from Roadway	Noise Level	Noise Level - Soundwall
Calveno Peak																						
	from:	to:		%	Auto	%	MT	%	HT										roadway center)	Center (m.)	(dBA)	
I-580	Hopyard	Hacienda	15403	95	14633	1	154	4	616	65	##	65	104	65	##	83.7	70.1	81.1	85.7	113	77.0	61.1
I-580	Sta. Rita	El Charro	15798	95	15008	1	158	4	632	65	##	65	104	65	##	83.8	70.2	81.2	85.8	62	79.7	61.0
I-580	Isabel	N. Livermore	16684	95	15850	1	166.8	4	667	65	##	65	104	65	##	84.1	70.4	81.5	86.1	133	76.6	65.6

Assumptions: AM peak hour traffic data for Hopyard to Hacienda. Other 2 segments PM peak hour from ARUP

2040 Baseline + Project

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE % Auto		MT		HT		VEHICLE SPEED Auto	k/h	MT	k/h	HT	k/h	NOISE LEVEL (dBA) Auto	MT	HT	CALCULATED NOISE LEVEL (15 meters from	Receptor Dist. from Roadway	Adjusted Noise Level	Adjusted Noise Level - Soundwall
Calveno Peak																						
	from:	to:		%	Auto	%	MT	%	HT										roadway center)	Center (m.)	(dBA)	
I-580	Hopyard	Hacienda	15361	95	14593	1	153.6	4	614	65	##	65	104	65	##	83.7	70.1	81.1	85.7	106	77.2	61.3
I-580	Sta. Rita	El Charro	15612	95	14831	1	156.1	4	624	65	##	65	104	65	##	83.8	70.2	81.2	85.8	55	80.1	61.4
I-580	Isabel	N. Livermore	16483	95	15659	1	164.8	4	659	65	##	65	104	65	##	84.0	70.4	81.4	86.0	126	76.8	65.8

Assumptions: AM peak hour traffic data for Hopyard to Hacienda. Other 2 segments PM peak hour from ARUP

2040 Baseline + DMU Alternative

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE % Auto		MT		HT		VEHICLE SPEED Autc k/h		MT k/h		HT k/h		NOISE LEVEL (dBA) Auto	MT	HT	CALCULATED NOISE LEVEL 15 meters from	Receptor Dist. from Roadway	Adjusted Noise Level	Adjusted Noise Level - Soundwall
Calveno Peak																						
	from:	to:		%	Auto	%	MT	%	HT										roadway center)	Center (m.)	(dBA)	
I-580	Hopyard	Hacienda	15380	95	14611	1	153.8	4	615	65	##	65	104	65	##	83.7	70.1	81.1	85.7	91.7	77.9	62.0
I-580	Sta. Rita	El Charro	15708	95	14923	1	157.1	4	628	65	##	65	104	65	##	83.8	70.2	81.2	85.8	55	80.2	61.5
I-580	Isabel	N. Livermore	16541	95	15714	1	165.4	4	662	65	##	65	104	65	##	84.0	70.4	81.4	86.0	126	76.8	65.8

Assumptions: AM peak hour traffic data for Hopyard to Hacienda. Other 2 segments PM peak hour from ARUP

2040 Baseline + BRT Alternative

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE % Auto		MT		HT		VEHICLE SPEED Autc k/h		MT k/h		HT k/h		NOISE LEVEL (dBA) Auto	MT	HT	CALCULATED NOISE LEVEL 15 meters from	Receptor Dist. from Roadway	Adjusted Noise Level	Adjusted Noise Level - Soundwall
Calveno Peak																						
	from:	to:		%	Auto	%	MT	%	HT										roadway center)	Center (m.)	(dBA)	
I-580	Hopyard	Hacienda	15371	95	14602	1	153.7	4	615	65	##	65	104	65	##	83.7	70.1	81.1	85.7	90.1	77.9	62.0
I-580	Sta. Rita	El Charro	15785	95	14996	1	157.9	4	631	65	##	65	104	65	##	83.8	70.2	81.2	85.8	62	79.7	61.0
I-580	Isabel	N. Livermore	16681	95	15847	1	166.8	4	667	65	##	65	104	65	##	84.1	70.4	81.5	86.1	133	76.6	65.6

Assumptions: AM peak hour traffic data for Hopyard to Hacienda. Other 2 segments PM peak hour from ARUP

2040 Baseline + Enhanced Bus Alternative

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE % Auto		MT		HT		VEHICLE SPEED Autc k/h		MT k/h		HT k/h		NOISE LEVEL (dBA) Auto	MT	HT	CALCULATED NOISE LEVEL 15 meters from	Receptor Dist. from Roadway	Adjusted Noise Level	Adjusted Noise Level - Soundwall
Calveno Peak																						
	from:	to:		%	Auto	%	MT	%	HT										roadway center)	Center (m.)	(dBA)	
I-580	Hopyard	Hacienda	15426	95	14655	1	154.3	4	617	65	##	65	104	65	##	83.7	70.1	81.1	85.7	113	77.0	61.1
I-580	Sta. Rita	El Charro	15834	95	15042	1	158.3	4	633	65	##	65	104	65	##	83.8	70.2	81.2	85.9	62	79.7	61.0
I-580	Isabel	N. Livermore	16711	95	15875	1	167.1	4	668	65	##	65	104	65	##	84.1	70.5	81.5	86.1	133	76.6	65.6

Assumptions: AM peak hour traffic data for Hopyard to Hacienda. Other 2 segments PM peak hour from ARUP

2025 Baseline Conditions

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE % Auto		MT		HT		VEHICLE SPEED Autc k/h	MT	k/h	HT	k/h	NOISE LEVEL (dBA) Auto	MT	HT	CALCULATED NOISE LEVEL 15 meters from	Receptor Dist. from Roadway	Adjusted Noise Level	Adjusted Noise Level - Soundwall
Calveno Peak																					
	from:	to:		%	Auto	%	MT	%	HT									roadway center)	Center (m.)	(dBA)	
I-580	Hopyard	Hacienda	15190	95	14431	1	151.9	4	608	65	##	65	104	65	##	83.6	70.0	81.1	85.7	113	76.9	61.0
I-580	Sta. Rita	El Charro	14514	95	13788	1	145.1	4	581	65	##	65	104	65	##	83.4	69.8	80.9	85.5	62	79.3	60.6
I-580	Isabel	N. Livermore	15057	95	14304	1	150.6	4	602	65	##	65	104	65	##	83.6	70.0	81.0	85.6	133	76.2	65.2

Assumptions: AM peak hour traffic data for Hopyard to Hacienda. Other 2 segments PM peak hour from ARUP

2025 Baseline + Project + Cumulative

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE % Auto		MT		HT		VEHICLE SPEED Autc k/h	MT	k/h	HT	k/h	NOISE LEVEL (dBA) Auto	MT	HT	CALCULATED NOISE LEVEL 15 meters from	Receptor Dist. from Roadway	Adjusted Noise Level	Adjusted Noise Level - Soundwall
Calveno Peak																					
	from:	to:		%	Auto	%	MT	%	HT									roadway center)	Center (m.)	(dBA)	
I-580	Hopyard	Hacienda	14424	95	13703	1	144.2	4	577	65	##	65	104	65	##	83.4	69.8	80.8	85.4	106	77.0	61.1
I-580	Sta. Rita	El Charro	14249	95	13537	1	142.5	4	570	65	##	65	104	65	##	83.4	69.8	80.8	85.4	55	79.7	61.0
I-580	Isabel	N. Livermore	14836	95	14094	1	148.4	4	593	65	##	65	104	65	##	83.5	69.9	81.0	85.6	126	76.3	65.3

Assumptions: AM peak hour traffic data for Hopyard to Hacienda. Other 2 segments PM peak hour from ARUP

2025 Baseline + DMU Alternative + Cumulative

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE % Auto		MT		HT		VEHICLE SPEED Autc k/h	MT	k/h	HT	k/h	NOISE LEVEL (dBA) Auto	MT	HT	CALCULATED NOISE LEVEL 15 meters from	Receptor Dist. from Roadway	Adjusted Noise Level	Adjusted Noise Level - Soundwall
Calveno Peak																					
	from:	to:		%	Auto	%	MT	%	HT									roadway center)	Center (m.)	(dBA)	
I-580	Hopyard	Hacienda	14412	95	13691	1	144.1	4	576	65	##	65	104	65	##	83.4	69.8	80.8	85.4	91.7	77.6	61.7
I-580	Sta. Rita	El Charro	14490	95	13766	1	144.9	4	580	65	##	65	104	65	##	83.4	69.8	80.8	85.5	55	79.8	61.1
I-580	Isabel	N. Livermore	15006	95	14256	1	150.1	4	600	65	##	65	104	65	##	83.6	70.0	81.0	85.6	126	76.4	65.4

Assumptions: AM peak hour traffic data for Hopyard to Hacienda. Other 2 segments PM peak hour from ARUP

2025 Baseline + BRT Alternative + Cumulative

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE % Auto		MT		HT		VEHICLE SPEED Autc k/h	MT	k/h	HT	k/h	NOISE LEVEL (dBA) Auto	MT	HT	CALCULATED NOISE LEVEL 15 meters from	Receptor Dist. from Roadway	Adjusted Noise Level	Adjusted Noise Level - Soundwall
Calveno Peak																					
	from:	to:		%	Auto	%	MT	%	HT									roadway center)	Center (m.)	(dBA)	
I-580	Hopyard	Hacienda	14392	95	13672	1	143.9	4	576	65	##	65	104	65	##	83.4	69.8	80.8	85.4	90.1	77.6	61.7
I-580	Sta. Rita	El Charro	14456	95	13733	1	144.6	4	578	65	##	65	104	65	##	83.4	69.8	80.8	85.5	39.1	81.3	62.6
I-580	Isabel	N. Livermore	15087	95	14333	1	150.9	4	603	65	##	65	104	65	##	83.6	70.0	81.0	85.6	110.1	77.0	66.0

Assumptions: AM peak hour traffic data for Hopyard to Hacienda. Other 2 segments PM peak hour from ARUP

2025 Baseline + Enhanced Bus Alternative + Cumulative

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE % Auto		MT		HT		VEHICLE SPEED Autc	k/h	MT	k/h	HT	k/h	NOISE LEVEL (dBA) Auto	MT	HT	CALCULATED NOISE LEVEL 15 meters from	Receptor Dist. from Roadway	Adjusted Noise Level	Adjusted Noise Level - Soundwall
Calveno Peak																						
	from:	to:		%	Auto	%	MT	%	HT										roadway center)	Center (m.)	(dBA)	
I-580	Hopyard	Hacienda	14428	95	13707	1	144.3	4	577	65	##	65	104	65	##	83.4	69.8	80.8	85.4	113	76.7	60.8
I-580	Sta. Rita	El Charro	14571	95	13842	1	145.7	4	583	65	##	65	104	65	##	83.5	69.9	80.9	85.5	62	79.3	60.6
I-580	Isabel	N. Livermore	15037	95	14285	1	150.4	4	601	65	##	65	104	65	##	83.6	70.0	81.0	85.6	133	76.1	65.1

Assumptions: AM peak hour traffic data for Hopyard to Hacienda. Other 2 segments PM peak hour from ARUP

2040 Baseline Condition

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE % Auto		MT		HT		VEHICLE SPEED Autc	k/h	MT	k/h	HT	k/h	NOISE LEVEL (dBA) Auto	MT	HT	CALCULATED NOISE LEVEL 15 meters from	Receptor Dist. from Roadway	Adjusted Noise Level	Adjusted Noise Level - Soundwall
Calveno Peak																						
	from:	to:		%	Auto	%	MT	%	HT										roadway center)	Center (m.)	(dBA)	
I-580	Hopyard	Hacienda	15403	95	14633	1	154	4	616	65	##	65	104	65	##	83.7	70.1	81.1	85.7	113	77.0	61.1
I-580	Sta. Rita	El Charro	15798	95	15008	1	158	4	632	65	##	65	104	65	##	83.8	70.2	81.2	85.8	62	79.7	61.0
I-580	Isabel	N. Livermore	16684	95	15850	1	166.8	4	667	65	##	65	104	65	##	84.1	70.4	81.5	86.1	133	76.6	65.6

Assumptions: AM peak hour traffic data for Hopyard to Hacienda. Other 2 segments PM peak hour from ARUP

2040 Baseline + Project + Cumulative

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE % Auto		MT		HT		VEHICLE SPEED Autc	k/h	MT	k/h	HT	k/h	NOISE LEVEL (dBA) Auto	MT	HT	CALCULATED NOISE LEVEL 15 meters from	Receptor Dist. from Roadway	Adjusted Noise Level	Adjusted Noise Level - Soundwall
Calveno Peak																						
	from:	to:		%	Auto	%	MT	%	HT										roadway center)	Center (m.)	(dBA)	
I-580	Hopyard	Hacienda	15601	95	14821	1	156	4	624	65	##	65	104	65	##	83.8	70.2	81.2	85.8	106	77.3	61.4
I-580	Sta. Rita	El Charro	15949	95	15152	1	159.5	4	638	65	##	65	104	65	##	83.9	70.3	81.3	85.9	55	80.2	61.5
I-580	Isabel	N. Livermore	16857	95	16014	1	168.6	4	674	65	##	65	104	65	##	84.1	70.5	81.5	86.1	126	76.9	65.9

Assumptions: AM peak hour traffic data for Hopyard to Hacienda. Other 2 segments PM peak hour from ARUP

2040 Baseline + DMU Alternative+ Cumulative

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE % Auto		MT		HT		VEHICLE SPEED Autc	k/h	MT	k/h	HT	k/h	NOISE LEVEL (dBA) Auto	MT	HT	CALCULATED NOISE LEVEL 15 meters from	Receptor Dist. from Roadway	Adjusted Noise Level	Adjusted Noise Level - Soundwall
Calveno Peak																						
	from:	to:		%	Auto	%	MT	%	HT										roadway center)	Center (m.)	(dBA)	
I-580	Hopyard	Hacienda	15672	95	14888	1	156.7	4	627	65	##	65	104	65	##	83.8	70.2	81.2	85.8	91.7	77.9	62.0
I-580	Sta. Rita	El Charro	15983	95	15184	1	159.8	4	639	65	##	65	104	65	##	83.9	70.3	81.3	85.9	55	80.2	61.5
I-580	Isabel	N. Livermore	16852	95	16009	1	168.5	4	674	65	##	65	104	65	##	84.1	70.5	81.5	86.1	126	76.9	65.9

Assumptions: AM peak hour traffic data for Hopyard to Hacienda. Other 2 segments PM peak hour from ARUP

2040 Baseline + BRT Alternative + Cumulative

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE %						VEHICLE SPEED						NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL (15 meters from roadway center)	Receptor Dist. from Roadway Center (m.)	Adjusted Noise Level (dBA)	Adjusted Noise Level - Soundwall
Calveno Peak				Auto		MT		HT		Auto	k/h	MT	k/h	HT	k/h	Auto	MT	HT				
	from:	to:		%	Auto	%	MT	%	HT													
I-580	Hopyard	Hacienda	15390	95	14621	1	153.9	4	616	65	##	65	104	65	##	83.7	70.1	81.1	85.7	90.1	77.9	62.0
I-580	Sta. Rita	El Charro	15805	95	15015	1	158.1	4	632	65	##	65	104	65	##	83.8	70.2	81.2	85.8	39.1	81.7	63.0
I-580	Isabel	N. Livermore	16686	95	15852	1	166.9	4	667	65	##	65	104	65	##	84.1	70.5	81.5	86.1	110.1	77.4	66.4

Assumptions: AM peak hour traffic data for Hopyard to Hacienda. Other 2 segments PM peak hour from ARUP

2040 Baseline + Enhanced Bus Alternative + Cumulative

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE %						VEHICLE SPEED						NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL (15 meters from roadway center)	Receptor Dist. from Roadway Center (m.)	Adjusted Noise Level (dBA)	Adjusted Noise Level - Soundwall
Calveno Peak				Auto		MT		HT		Auto	k/h	MT	k/h	HT	k/h	Auto	MT	HT				
	from:	to:		%	Auto	%	MT	%	HT													
I-580	Hopyard	Hacienda	15387	95	14618	1	153.9	4	615	65	##	65	104	65	##	83.7	70.1	81.1	85.7	113	77.0	61.1
I-580	Sta. Rita	El Charro	15838	95	15046	1	158.4	4	634	65	##	65	104	65	##	83.8	70.2	81.2	85.9	62	79.7	61.0
I-580	Isabel	N. Livermore	16698	95	15863	1	167	4	668	65	##	65	104	65	##	84.1	70.5	81.5	86.1	133	76.6	65.6

Assumptions: AM peak hour traffic data for Hopyard to Hacienda. Other 2 segments PM peak hour from ARUP

G.3 Noise Model Data – Construction Noise Calculations

FTA General Noise Assessment Calculations for Construction Equipment

Underlying Equation from FTA Guidance Page 12-3

Leq(equip) = E.L. + 10 log(U.F.) – 20 log(D/50) – 10G log(D/50)

where: Leq (equip) = the Leq at a receiver resulting from the operation of a single piece of equipment over a specified time period
E.L. = the noise emission level of the particular piece of equipment at the reference distance of 50 feet, taken from Table 12-1
G = a constant that accounts for topography and ground effects, taken from Figure 6-5 (Chapter 6)
D = the distance from the receiver to the piece of equipment, and
U.F. = a usage factor that accounts for the fraction of time that the equipment is in use over the specified time period.

For general assessment, FTA identifies the following assumptions:

1. Full power operation for a time period of one hour is assumed because most construction equipment operates continuously for periods of one hour or more at some point in the construction period.
Therefore, U.F. = 1, and 10 log(U.F.) = 0
Hence, the Equation simplifies to: *Leq(equip) = E.L. – 20 log(D/50) – 10G log(D/50)*

2. Free-field conditions are assumed and ground effects are ignored. Consequently, G = 0.

Hence, the Equation further simplifies to: *Leq(equip) = E.L. – 20 log(D/50)*

Solving for distance (D) yields: D= *50*10^(Leq-E.L.)/-20)*

Equipment	E.L. (from Table 12-1)	Leq at Distance 370 feet
Forklift	84 dBA. Leq	66.6
Crane	83 dBA. Leq	65.6
Excavator	85 dBA. Leq	67.6
Dozer	85 dBA. Leq	67.6
Compactor	82 dBA. Leq	64.6
Loader	85 dBA. Leq	67.6
Dump Truck	88 dBA. Leq	70.6
Scrapers	89 dBA. Leq	71.6
Grader	85 dBA. Leq	67.6
Paver	89 dBA. Leq	71.6
Vibrator Compactor	82 dBA. Leq	64.6
Two Noisiest (Scraper & Paver)	**92.0 dBA. Leq**	**74.6**

Proposed Project with Storage Facility

#	segments	nearest receptor to construction	
5	**Dublin/Pleasanton Station to Hacienda Drive**	Multi Family Housing at 5200 Iron Horse Parkway	370 feet north of Alt 1 construction
6	Hacienda to Tassajara		
7	Tassajara Interchange		
8	Tassajara to Fallon		
9	Fallon Interchange		
10	Fallon to Airway		
11	Airway Interchange		
12	Airway to Isabel Station		
13	Isabel Interchange		
14	Isabel Station BART		
16	Parking Garage / Surface South		
17	Isabel Station to yard		
19	Tail Track Yard		

FTA General Noise Assessment Calculations for Construction Equipment

Underlying Equation from FTA Guidance Page 12-3

Leq(equip) = E.L. + 10 log(U.F.) – 20 log(D/50) – 10G log(D/50)

where: Leq (equip) = the Leq at a receiver resulting from the operation of a single piece of equipment over a specified time period
E.L. = the noise emission level of the particular piece of equipment at the reference distance of 50 feet, taken from Table 12-1
G = a constant that accounts for topography and ground effects, taken from Figure 6-5 (Chapter 6)
D = the distance from the receiver to the piece of equipment, and
U.F. = a usage factor that accounts for the fraction of time that the equipment is in use over the specified time period.

For general assessment, FTA identifies the following assumptions:

1. Full power operation for a time period of one hour is assumed because most construction equipment operates continuously for periods of one hour or more at some point in the construction period.
Therefore, U.F. = 1, and 10 log(U.F.) = 0
Hence, the Equation simplifies to: *Leq(equip) = E.L. – 20 log(D/50) – 10G log(D/50)*

2. Free-field conditions are assumed and ground effects are ignored. Consequently, G = 0.

Hence, the Equation further simplifies to: *Leq(equip) = E.L. – 20 log(D/50)*

Solving for distance (D) yields: D= *50*10^(Leq-E.L.)/-20)*

Equipment	E.L. (from Table 12-1)	Leq at Distance 442 feet
Forklift	84 dBA. Leq	65.1
Crane	83 dBA. Leq	64.1
Excavator	85 dBA. Leq	66.1
Dozer	85 dBA. Leq	66.1
Compactor	82 dBA. Leq	63.1
Loader	85 dBA. Leq	66.1
Dump Truck	88 dBA. Leq	69.1
Scrapers	89 dBA. Leq	70.1
Grader	85 dBA. Leq	66.1
Paver	89 dBA. Leq	70.1
Vibrator Compactor	82 dBA. Leq	63.1
Two Noisiest (Scraper & Paver)	**92.0 dBA. Leq**	**73.1**

Proposed Project with Storage Facility

#	segments	nearest receptor to construction	
5	Dublin/Pleasanton Station to Hacienda Drive		
6	**Hacienda to Tassajara**	**Single-Family Housing at 5200 Iron Horse Parkway**	**442 feet south of Alt 1 construction**
7	Tassajara Interchange		
8	Tassajara to Fallon		
9	Fallon Interchange		
10	Fallon to Airway		
11	Airway Interchange		
12	Airway to Isabel Station		
13	Isabel Interchange		
14	Isabel Station BART		
16	Parking Garage / Surface South		
17	Isabel Station to yard		
19	Tail Track Yard		

FTA General Noise Assessment Calculations for Construction Equipment

Underlying Equation from FTA Guidance Page 12-3

Leq(equip) = E.L. + 10 log(U.F.) – 20 log(D/50) – 10G log(D/50)

where: Leq (equip) = the Leq at a receiver resulting from the operation of a single piece of equipment over a specified time period
E.L. = the noise emission level of the particular piece of equipment at the reference distance of 50 feet, taken from Table 12-1
G = a constant that accounts for topography and ground effects, taken from Figure 6-5 (Chapter 6)
D = the distance from the receiver to the piece of equipment, and
U.F. = a usage factor that accounts for the fraction of time that the equipment is in use over the specified time period.

For general assessment, FTA identifies the following assumptions:

1. Full power operation for a time period of one hour is assumed because most construction equipment operates continuously for periods of one hour or more at some point in the construction period.
Therefore, U.F. = 1, and 10 log(U.F.) = 0
Hence, the Equation simplifies to: *Leq(equip) = E.L. – 20 log(D/50) – 10G log(D/50)*

2. Free-field conditions are assumed and ground effects are ignored. Consequently, G = 0.

Hence, the Equation further simplifies to: *Leq(equip) = E.L. – 20 log(D/50)*

Solving for distance (D) yields: D= *50*10^(Leq-E.L.)/-20)*

Equipment	E.L. (from Table 12-1)	Leq at Distance 1100 feet
Forklift	84 dBA. Leq	57.2
Crane	83 dBA. Leq	56.2
Excavator	85 dBA. Leq	58.2
Dozer	85 dBA. Leq	58.2
Compactor	82 dBA. Leq	55.2
Loader	85 dBA. Leq	58.2
Dump Truck	88 dBA. Leq	61.2
Scrapers	89 dBA. Leq	62.2
Grader	85 dBA. Leq	58.2
Paver	89 dBA. Leq	62.2
Vibrator Compactor	82 dBA. Leq	55.2
Two Noisiest (Scraper & Paver)	**92.0 dBA. Leq**	**65.2**

Proposed Project with Storage Facility

#	segments	nearest receptor to construction	
5	Dublin/Pleasanton Station to Hacienda Drive		
6	Hacienda Drive to Tassajara Road		
7	**Tassajara Road/I-580 Interchange**	**Single-Family Housing**	**855 feet southeast of Alt 1 construction**
8	Tassajara Road to Fallon		
9	Fallon Interchange		
10	Fallon to Airway		
11	Airway Interchange		
12	Airway to Isabel Station		
13	Isabel Interchange		
14	Isabel Station BART		
16	Parking Garage / Surface South		
18	Maintenance Facility /Yard		
19	Tail Track Yard		

FTA General Noise Assessment Calculations for Construction Equipment

Underlying Equation from FTA Guidance Page 12-3

Leq(equip) = E.L. + 10 log(U.F.) – 20 log(D/50) – 10G log(D/50)

where: Leq (equip) = the Leq at a receiver resulting from the operation of a single piece of equipment over a specified time period
E.L. = the noise emission level of the particular piece of equipment at the reference distance of 50 feet, taken from Table 12-1
G = a constant that accounts for topography and ground effects, taken from Figure 6-5 (Chapter 6)
D = the distance from the receiver to the piece of equipment, and
U.F. = a usage factor that accounts for the fraction of time that the equipment is in use over the specified time period.

For general assessment, FTA identifies the following assumptions:

1. Full power operation for a time period of one hour is assumed because most construction equipment operates continuously for periods of one hour or more at some point in the construction period.
Therefore, U.F. = 1, and 10 log(U.F.) = 0
Hence, the Equation simplifies to: *Leq(equip) = E.L. – 20 log(D/50) – 10G log(D/50)*

2. Free-field conditions are assumed and ground effects are ignored. Consequently, G = 0.

Hence, the Equation further simplifies to: *Leq(equip) = E.L. – 20 log(D/50)*

Solving for distance (D) yields: D= *50*10^(Leq-E.L.)/-20)*

Equipment	E.L. (from Table 12-1)	Leq at Distance 170 feet
Forklift	84 dBA. Leq	73.4
Crane	83 dBA. Leq	72.4
Excavator	85 dBA. Leq	74.4
Dozer	85 dBA. Leq	74.4
Compactor	82 dBA. Leq	71.4
Loader	85 dBA. Leq	74.4
Dump Truck	88 dBA. Leq	77.4
Scrapers	89 dBA. Leq	78.4
Grader	85 dBA. Leq	74.4
Paver	89 dBA. Leq	78.4
Vibrator Compactor	82 dBA. Leq	71.4
Two Noisiest (Scraper & Paver)	**92.0 dBA. Leq**	**81.4**

Proposed Project with Storage Facility

#	segments	nearest receptor to construction	
5	Dublin/Pleasanton Station to Hacienda Drive		
6	Hacienda Drive to Tassajara Road		
7	Tassajara Road/I-580 Interchange		
8	**Tassajara Road to Fallon**	**Single-Family Housing**	**100 feet south of Alt 1 construction**
9	Fallon Interchange		
10	Fallon to Airway		
11	Airway Interchange		
12	Airway to Isabel Station		
13	Isabel Interchange		
14	Isabel Station BART		
16	Parking Garage / Surface South		
17	Isabel Station to yard		
19	Tail Track Yard		

FTA General Noise Assessment Calculations for Construction Equipment

Underlying Equation from FTA Guidance Page 12-3

Leq(equip) = E.L. + 10 log(U.F.) – 20 log(D/50) – 10G log(D/50)

where: Leq (equip) = the Leq at a receiver resulting from the operation of a single piece of equipment over a specified time period
E.L. = the noise emission level of the particular piece of equipment at the reference distance of 50 feet, taken from Table 12-1
G = a constant that accounts for topography and ground effects, taken from Figure 6-5 (Chapter 6)
D = the distance from the receiver to the piece of equipment, and
U.F. = a usage factor that accounts for the fraction of time that the equipment is in use over the specified time period.

For general assessment, FTA identifies the following assumptions:

1. Full power operation for a time period of one hour is assumed because most construction equipment operates continuously for periods of one hour or more at some point in the construction period.
Therefore, U.F. = 1, and 10 log(U.F.) = 0
Hence, the Equation simplifies to: *Leq(equip) = E.L. – 20 log(D/50) – 10G log(D/50)*

2. Free-field conditions are assumed and ground effects are ignored. Consequently, G = 0.

Hence, the Equation further simplifies to: *Leq(equip) = E.L. – 20 log(D/50)*

Solving for distance (D) yields: D= *50*10^(Leq-E.L.)/-20)*

Equipment	E.L. (from Table 12-1)	Leq at Distance 1400 feet
Forklift	84 dBA. Leq	55.1
Crane	83 dBA. Leq	54.1
Excavator	85 dBA. Leq	56.1
Dozer	85 dBA. Leq	56.1
Compactor	82 dBA. Leq	53.1
Loader	85 dBA. Leq	56.1
Dump Truck	88 dBA. Leq	59.1
Scrapers	89 dBA. Leq	60.1
Grader	85 dBA. Leq	56.1
Paver	89 dBA. Leq	60.1
Vibrator Compactor	82 dBA. Leq	53.1
Two Noisiest (Scraper & Paver)	**92.0 dBA. Leq**	**63.1**

Proposed Project with Storage Facility

#	segments	nearest receptor to construction	
5	Dublin/Pleasanton Station to Hacienda Drive		
6	Hacienda Drive to Tassajara Road		
7	Tassajara Road/I-580 Interchange		
8	Tassajara Road to Fallon		
9	**Fallon Road/I-580 Interchange**	**Single-Family Housing**	**1400 feet southwest of Alt 1 construction**
10	Fallon Road to Airway Boulevard		
11	Airway Boulevard/I-580 Interchange		
12	Airway Boulevard to Isabel BART Station		
13	Isabel Interchange		
14	Isabel Station BART		
16	Parking Garage / Surface South		
17	Isabel Station to yard		
19	Tail Track Yard		

FTA General Noise Assessment Calculations for Construction Equipment

Underlying Equation from FTA Guidance Page 12-3

Leq(equip) = E.L. + 10 log(U.F.) – 20 log(D/50) – 10G log(D/50)

where:
- Leq (equip) = the Leq at a receiver resulting from the operation of a single piece of equipment over a specified time period
- E.L. = the noise emission level of the particular piece of equipment at the reference distance of 50 feet, taken from Table 12-1
- G = a constant that accounts for topography and ground effects, taken from Figure 6-5 (Chapter 6)
- D = the distance from the receiver to the piece of equipment, and
- U.F. = a usage factor that accounts for the fraction of time that the equipment is in use over the specified time period.

For general assessment, FTA identifies the following assumptions:

1. Full power operation for a time period of one hour is assumed because most construction equipment operates continuously for periods of one hour or more at some point in the construction period.
   Therefore, U.F. = 1, and 10 log(U.F.) = 0
   Hence, the Equation simplifies to: *Leq(equip) = E.L. – 20 log(D/50) – 10G log(D/50)*

2. Free-field conditions are assumed and ground effects are ignored. Consequently, G = 0.

   Hence, the Equation further simplifies to: *Leq(equip) = E.L. – 20 log(D/50)*

   Solving for distance (D) yields: D= *50*10^(Leq-E.L.)/-20)*

Equipment	E.L. (from Table 12-1)	Leq at Distance 1000 feet
Impact Pile Drivers	101 dBA. Leq	75.0
Forklift	84 dBA. Leq	58.0
Crane	83 dBA. Leq	57.0
Excavator	85 dBA. Leq	59.0
Dozer	85 dBA. Leq	59.0
Compactor	82 dBA. Leq	56.0
Loader	85 dBA. Leq	59.0
Dump Truck	88 dBA. Leq	62.0
Scrapers	89 dBA. Leq	63.0
Grader	85 dBA. Leq	59.0
Paver	89 dBA. Leq	63.0
Vibrator Compactor	82 dBA. Leq	56.0
Two Noisiest (Scraper & Pile driver)	**101.3 dBA. Leq**	**75.3**

Proposed Project with Storage Facility

#	segments	nearest receptor to construction
5	Dublin/Pleasanton Station to Hacienda Drive	
6	Hacienda Drive to Tassajara Road	
7	Tassajara Road/I-580 Interchange	
8	Tassajara Road to Fallon	
9	Fallon Road/I-580 Interchange	
10	Fallon Road to Airway Boulevard	
11	Airway Boulevard/I-580 Interchange	
12	**Airway Boulevard to Isabel BART Station**	**1000 feet**
13	Isabel Interchange	
14	Isabel Station BART	
16	Parking Garage / Surface South	
17	Isabel Station to yard	
19	Tail Track Yard	

FTA General Noise Assessment Calculations for Construction Equipment

Underlying Equation from FTA Guidance Page 12-3

Leq(equip) = E.L. + 10 log(U.F.) – 20 log(D/50) – 10G log(D/50)

where:
- Leq (equip) = the Leq at a receiver resulting from the operation of a single piece of equipment over a specified time period
- E.L. = the noise emission level of the particular piece of equipment at the reference distance of 50 feet, taken from Table 12-1
- G = a constant that accounts for topography and ground effects, taken from Figure 6-5 (Chapter 6)
- D = the distance from the receiver to the piece of equipment, and
- U.F. = a usage factor that accounts for the fraction of time that the equipment is in use over the specified time period.

For general assessment, FTA identifies the following assumptions:

1. Full power operation for a time period of one hour is assumed because most construction equipment operates continuously for periods of one hour or more at some point in the construction period.
   Therefore, U.F. = 1, and 10 log(U.F.) = 0
   Hence, the Equation simplifies to: *Leq(equip) = E.L. – 20 log(D/50) – 10G log(D/50)*

2. Free-field conditions are assumed and ground effects are ignored. Consequently, G = 0.

   Hence, the Equation further simplifies to: *Leq(equip) = E.L. – 20 log(D/50)*

   Solving for distance (D) yields: D= *50*10^(Leq-E.L.)/-20)*

Equipment	E.L. (from Table 12-1)	Leq at Distance 1100 feet
Forklift	84 dBA. Leq	57.2
Crane	83 dBA. Leq	56.2
Excavator	85 dBA. Leq	58.2
Dozer	85 dBA. Leq	58.2
Compactor	82 dBA. Leq	55.2
Loader	85 dBA. Leq	58.2
Dump Truck	88 dBA. Leq	61.2
Scrapers	89 dBA. Leq	62.2
Grader	85 dBA. Leq	58.2
Paver	89 dBA. Leq	62.2
Vibrator Compactor	82 dBA. Leq	55.2
Two Noisiest (Scraper & Paver)	**92.0 dBA. Leq**	**65.2**

Proposed Project with Storage Facility

#	segments	nearest receptor to construction
5	Dublin/Pleasanton Station to Hacienda Drive	
6	Hacienda Drive to Tassajara Road	
7	Tassajara Road/I-580 Interchange	
8	Tassajara Road to Fallon	
9	Fallon Road/I-580 Interchange	
10	Fallon Road to Airway Boulevard	
11	Airway Boulevard/I-580 Interchange	
12	Airway Boulevard to Isabel BART Station	
13	**Isabel Interchange**	**1100 feet**
14	Isabel Station BART	
16	Parking Garage / Surface South	
17	Isabel Station to yard	
19	Tail Track Yard	

FTA General Noise Assessment Calculations for Construction Equipment

Underlying Equation from FTA Guidance Page 12-3

Leq(equip) = E.L. + 10 log(U.F.) – 20 log(D/50) – 10G log(D/50)

where: Leq (equip) = the Leq at a receiver resulting from the operation of a single piece of equipment over a specified time period
E.L. = the noise emission level of the particular piece of equipment at the reference distance of 50 feet, taken from Table 12-1
G = a constant that accounts for topography and ground effects, taken from Figure 6-5 (Chapter 6)
D = the distance from the receiver to the piece of equipment, and
U.F. = a usage factor that accounts for the fraction of time that the equipment is in use over the specified time period.

For general assessment, FTA identifies the following assumptions:

1. Full power operation for a time period of one hour is assumed because most construction equipment operates continuously for periods of one hour or more at some point in the construction period.
Therefore, U.F. = 1, and 10 log(U.F.) = 0
Hence, the Equation simplifies to: *Leq(equip) = E.L. – 20 log(D/50) – 10G log(D/50)*

2. Free-field conditions are assumed and ground effects are ignored. Consequently, G = 0.

Hence, the Equation further simplifies to: *Leq(equip) = E.L. – 20 log(D/50)*

Solving for distance (D) yields: D= *50*10^(Leq-E.L.)/-20)*

Equipment	E.L. (from Table 12-1)	Leq at Distance 1200 feet
Impact Pile Drivers	101 dBA. Leq	73.4
Forklift	84 dBA. Leq	56.4
Crane	83 dBA. Leq	55.4
Excavator	85 dBA. Leq	57.4
Dozer	85 dBA. Leq	57.4
Compactor	82 dBA. Leq	54.4
Loader	85 dBA. Leq	57.4
Dump Truck	88 dBA. Leq	60.4
Scrapers	89 dBA. Leq	61.4
Grader	85 dBA. Leq	57.4
Paver	89 dBA. Leq	61.4
Vibrator Compactor	82 dBA. Leq	54.4
Two Noisiest (Scraper & Pile Driver)	**101.3 dBA. Leq**	**73.7**

Proposed Project with Storage Facility

#	segments	nearest receptor to construction
5	Dublin/Pleasanton Station to Hacienda Drive	
6	Hacienda Drive to Tassajara Road	
7	Tassajara Road/I-580 Interchange	
8	Tassajara Road to Fallon	
9	Fallon Road/I-580 Interchange	
10	Fallon Road to Airway Boulevard	
11	Airway Boulevard/I-580 Interchange	
12	Airway Boulevard to Isabel BART Station	
13	Isabel Interchange	
14	**Isabel Station BART**	**1200 feet**
16	Parking Garage / Surface South	
17	Isabel Station to yard	
19	Tail Track Yard	

FTA General Noise Assessment Calculations for Construction Equipment

Underlying Equation from FTA Guidance Page 12-3

Leq(equip) = E.L. + 10 log(U.F.) – 20 log(D/50) – 10G log(D/50)

where: Leq (equip) = the Leq at a receiver resulting from the operation of a single piece of equipment over a specified time period
E.L. = the noise emission level of the particular piece of equipment at the reference distance of 50 feet, taken from Table 12-1
G = a constant that accounts for topography and ground effects, taken from Figure 6-5 (Chapter 6)
D = the distance from the receiver to the piece of equipment, and
U.F. = a usage factor that accounts for the fraction of time that the equipment is in use over the specified time period.

For general assessment, FTA identifies the following assumptions:

1. Full power operation for a time period of one hour is assumed because most construction equipment operates continuously for periods of one hour or more at some point in the construction period.
Therefore, U.F. = 1, and 10 log(U.F.) = 0
Hence, the Equation simplifies to: *Leq(equip) = E.L. – 20 log(D/50) – 10G log(D/50)*

2. Free-field conditions are assumed and ground effects are ignored. Consequently, G = 0.

Hence, the Equation further simplifies to: *Leq(equip) = E.L. – 20 log(D/50)*

Solving for distance (D) yields: D= *50*10^(Leq-E.L.)/-20)*

Equipment	E.L. (from Table 12-1)	Leq at Distance 1400 feet
Impact Pile Drivers	101 dBA. Leq	72.1
Forklift	84 dBA. Leq	55.1
Crane	83 dBA. Leq	54.1
Excavator	85 dBA. Leq	56.1
Dozer	85 dBA. Leq	56.1
Compactor	82 dBA. Leq	53.1
Loader	85 dBA. Leq	56.1
Dump Truck	88 dBA. Leq	59.1
Scrapers	89 dBA. Leq	60.1
Grader	85 dBA. Leq	56.1
Paver	89 dBA. Leq	60.1
Vibrator Compactor	82 dBA. Leq	53.1
Two Noisiest (Scraper & Pile Driver)	**101.3 dBA. Leq**	**72.4**

Proposed Project with Storage Facility

#	segments	nearest receptor to construction
5	Dublin/Pleasanton Station to Hacienda Drive	
6	Hacienda Drive to Tassajara Road	
7	Tassajara Road/I-580 Interchange	
8	Tassajara Road to Fallon	
9	Fallon Road/I-580 Interchange	
10	Fallon Road to Airway Boulevard	
11	Airway Boulevard/I-580 Interchange	
12	Airway Boulevard to Isabel BART Station	
13	Isabel Interchange	
14	Isabel Station BART	
16	**Parking Garage / Surface South**	**1400** feet
17	Isabel Station to yard	
19	Tail Track Yard	

FTA General Noise Assessment Calculations for Construction Equipment

Underlying Equation from FTA Guidance Page 12-3

Leq(equip) = E.L. + 10 log(U.F.) – 20 log(D/50) – 10G log(D/50)

where:
- Leq (equip) = the Leq at a receiver resulting from the operation of a single piece of equipment over a specified time period
- E.L. = the noise emission level of the particular piece of equipment at the reference distance of 50 feet, taken from Table 12-1
- G = a constant that accounts for topography and ground effects, taken from Figure 6-5 (Chapter 6)
- D = the distance from the receiver to the piece of equipment, and
- U.F. = a usage factor that accounts for the fraction of time that the equipment is in use over the specified time period.

For general assessment, FTA identifies the following assumptions:

1. Full power operation for a time period of one hour is assumed because most construction equipment operates continuously for periods of one hour or more at some point in the construction period.
   Therefore, U.F. = 1, and 10 log(U.F.) = 0
   Hence, the Equation simplifies to: *Leq(equip) = E.L. – 20 log(D/50) – 10G log(D/50)*

2. Free-field conditions are assumed and ground effects are ignored. Consequently, G = 0.

   Hence, the Equation further simplifies to: *Leq(equip) = E.L. – 20 log(D/50)*

   Solving for distance (D) yields: D= *50*10^(Leq-E.L.)/-20)*

Equipment	E.L. (from Table 12-1)	Leq at Distance 370 feet
Impact Pile Drivers	101 dBA. Leq	83.6
Forklift	84 dBA. Leq	66.6
Crane	83 dBA. Leq	65.6
Excavator	85 dBA. Leq	67.6
Dozer	85 dBA. Leq	67.6
Compactor	82 dBA. Leq	64.6
Loader	85 dBA. Leq	67.6
Dump Truck	88 dBA. Leq	70.6
Scrapers	89 dBA. Leq	71.6
Grader	85 dBA. Leq	67.6
Paver	89 dBA. Leq	71.6
Vibrator Compactor	82 dBA. Leq	64.6
Two Noisiest (Scraper & Pile Driver)	**101.3 dBA. Leq**	**83.9**

DMU / EMU Alternative with Maintenance Facility

#	segments	nearest receptor to construction
3	**Dublin/Pleasanton Station Cross Transfer Platform**	**370 feet**
4	Hopyard to Hacienda Drive	
5	Hacienda Interchange	
6	Hacienda to Tassajara	
7	Tassajara Interchange	
8	Tassajara to Fallon	
9	Fallon Interchange	
10	Fallon to Airway	
11	Airway Interchange	
12	Airway to Isabel Station	
13	Isabel Interchange	
15	Isabel Station DMU EMU	
16	Parking Garage / Suface South	
17	Isabel Station to yard	
18	Maintenance Facility /yard	

FTA General Noise Assessment Calculations for Construction Equipment

Underlying Equation from FTA Guidance Page 12-3

Leq(equip) = E.L. + 10 log(U.F.) – 20 log(D/50) – 10G log(D/50)

where: Leq (equip) = the Leq at a receiver resulting from the operation of a single piece of equipment over a specified time period
E.L. = the noise emission level of the particular piece of equipment at the reference distance of 50 feet, taken from Table 12-1
G = a constant that accounts for topography and ground effects, taken from Figure 6-5 (Chapter 6)
D = the distance from the receiver to the piece of equipment, and
U.F. = a usage factor that accounts for the fraction of time that the equipment is in use over the specified time period.

For general assessment, FTA identifies the following assumptions:

1. Full power operation for a time period of one hour is assumed because most construction equipment operates continuously for periods of one hour or more at some point in the construction period.
Therefore, U.F. = 1, and 10 log(U.F.) = 0
Hence, the Equation simplifies to: *Leq(equip) = E.L. – 20 log(D/50) – 10G log(D/50)*

2. Free-field conditions are assumed and ground effects are ignored. Consequently, G = 0.

Hence, the Equation further simplifies to: *Leq(equip) = E.L. – 20 log(D/50)*

Solving for distance (D) yields: D= *50*10^(Leq-E.L.)/-20)*

Equipment	E.L. (from Table 12-1)	Leq at Distance 370 feet
Forklift	84 dBA. Leq	66.6
Crane	83 dBA. Leq	65.6
Excavator	85 dBA. Leq	67.6
Dozer	85 dBA. Leq	67.6
Compactor	82 dBA. Leq	64.6
Loader	85 dBA. Leq	67.6
Dump Truck	88 dBA. Leq	70.6
Scrapers	89 dBA. Leq	71.6
Grader	85 dBA. Leq	67.6
Paver	89 dBA. Leq	71.6
Vibrator Compactor	82 dBA. Leq	64.6
Two Noisiest (Scraper & Paver)	**92.0 dBA. Leq**	**74.6**

DMU / EMU Alternative with Maintenance Facility

#	segments	nearest receptor to construction	
3	Dublin/Pleasanton Station Cross Transfer Platform		
4	**Hopyard to Hacienda Drive**	**Multi Family Housing at 5200 Iron Horse Parkway**	**370 feet north of Alt 2 construction**
5	Hacienda Interchange		
6	Hacienda to Tassajara		
7	Tassajara Interchange		
8	Tassajara to Fallon		
9	Fallon Interchange		
10	Fallon to Airway		
11	Airway Interchange		
12	Airway to Isabel Station		
13	Isabel Interchange		
15	Isabel Station DMU EMU		
16	Parking Garage / Suface South		
17	Isabel Station to yard		
18	Maintenance Facility /yard		

FTA General Noise Assessment Calculations for Construction Equipment

Underlying Equasion from FTA Guidance Page 12-3

Leq(equip) = E.L. + 10 log(U.F.) – 20 log(D/50) – 10G log(D/50)

where: Leq (equip) = the Leq at a receiver resulting from the operation of a single piece of equipment over a specified time period
E.L. = the noise emission level of the particular piece of equipment at the reference distance of 50 feet, taken from Table 12-1
G = a constant that accounts for topography and ground effects, taken from Figure 6-5 (Chapter 6)
D = the distance from the receiver to the piece of equipment, and
U.F. = a usage factor that accounts for the fraction of time that the equipment is in use over the specified time period.

For general assessment, FTA identifies the following assumptions:

1. Full power operation for a time period of one hour is assumed because most construction equipment operates continuously for periods of one hour or more at some point in the construction period.
Therefore, U.F. = 1, and 10 log(U.F.) = 0
Hence, the Equasion simplifies to: *Leq(equip) = E.L. – 20 log(D/50) – 10G log(D/50)*

2. Free-field conditions are assumed and ground effects are ignored. Consequently, G = 0.

Hence, the Equasion further simplifies to: *Leq(equip) = E.L. – 20 log(D/50)*

Solving for distance (D) yields: D= *50*10^(Leq-E.L.)/-20)*

Equipment	E.L. (from Table 12-1)	Leq at Distance 442 feet
Forklift	84 dBA. Leq	65.1
Crane	83 dBA. Leq	64.1
Excavator	85 dBA. Leq	66.1
Dozer	85 dBA. Leq	66.1
Compactor	82 dBA. Leq	63.1
Loader	85 dBA. Leq	66.1
Dump Truck	88 dBA. Leq	69.1
Scrapers	89 dBA. Leq	70.1
Grader	85 dBA. Leq	66.1
Paver	89 dBA. Leq	70.1
Vibrator Compactor	82 dBA. Leq	63.1
Two Noisiest (Scraper & Paver)	**92.0 dBA. Leq**	**73.1**

DMU / EMU Alternative with Maintenance Facility

#	segments	nearest receptor to construction	
3	Dublin/Pleasanton Station Cross Transfer Platform		
4	Hopyard to Hacienda Drive		
5	Hacienda Interchange		
6	**Hacienda to Tassajara**	**Single-Family Housing at 5200 Iron Horse Parkway**	**442 feet south of Alt 2 construction**
7	Tassajara Interchange		
8	Tassajara to Fallon		
9	Fallon Interchange		
10	Fallon to Airway		
11	Airway Interchange		
12	Airway to Isabel Station		
13	Isabel Interchange		
15	Isabel Station DMU EMUT		
16	Parking Garage / Suface South		
17	Isabel Station to yard		
18	Maintenance Facility /Yard		

FTA General Noise Assessment Calculations for Construction Equipment

Underlying Equasion from FTA Guidance Page 12-3

Leq(equip) = E.L. + 10 log(U.F.) – 20 log(D/50) – 10G log(D/50)

where:
- Leq (equip) = the Leq at a receiver resulting from the operation of a single piece of equipment over a specified time period
- E.L. = the noise emission level of the particular piece of equipment at the reference distance of 50 feet, taken from Table 12-1
- G = a constant that accounts for topography and ground effects, taken from Figure 6-5 (Chapter 6)
- D = the distance from the receiver to the piece of equipment, and
- U.F. = a usage factor that accounts for the fraction of time that the equipment is in use over the specified time period.

For general assessment, FTA identifies the following assumptions:

1. Full power operation for a time period of one hour is assumed because most construction equipment operates continuously for periods of one hour or more at some point in the construction period.
   Therefore, U.F. = 1, and 10 log(U.F.) = 0
   Hence, the Equasion simplifies to: *Leq(equip) = E.L. – 20 log(D/50) – 10G log(D/50)*

2. Free-field conditions are assumed and ground effects are ignored. Consequently, G = 0.

   Hence, the Equasion further simplifies to: *Leq(equip) = E.L. – 20 log(D/50)*

   Solving for distance (D) yields: D= *50*10^(Leq-E.L.)/-20)*

Equipment	E.L. (from Table 12-1)	Leq at Distance 855 feet
Forklift	84 dBA. Leq	59.3
Crane	83 dBA. Leq	58.3
Excavator	85 dBA. Leq	60.3
Dozer	85 dBA. Leq	60.3
Compactor	82 dBA. Leq	57.3
Loader	85 dBA. Leq	60.3
Dump Truck	88 dBA. Leq	63.3
Scrapers	89 dBA. Leq	64.3
Grader	85 dBA. Leq	60.3
Paver	89 dBA. Leq	64.3
Vibrator Compactor	82 dBA. Leq	57.3
Two Noisiest (Scraper & Paver)	**92.0 dBA. Leq**	**67.3**

DMU / EMU Alternative with Maintenance Facility

#	segments	nearest receptor to construction	
3	Dublin/Pleasanton Station Cross Transfer Platform		
4	Hopyard to Hacienda Drive		
5	Hacienda Interchange		
6	Hacienda Drive to Tassajara Road		
7	**Tassajara Raod/I-580 Interchange**	**Single-Family Housing**	**855 feet southeast of Alt 2 construction**
8	Tassajara Road to Fallon		
9	Fallon Interchange		
10	Fallon to Airway		
11	Airway Interchange		
12	Airway to Isabel Station		
13	Isabel Interchange		
15	Isabel Station DMU EMU		
16	Parking Garage / Suface South		
17	Isabel Station to yard		
18	Maintenance Facility /Yard		

FTA General Noise Assessment Calculations for Construction Equipment

Underlying Equasion from FTA Guidance Page 12-3

Leq(equip) = E.L. + 10 log(U.F.) – 20 log(D/50) – 10G log(D/50)

where: Leq (equip) = the Leq at a receiver resulting from the operation of a single piece of equipment over a specified time period
E.L. = the noise emission level of the particular piece of equipment at the reference distance of 50 feet, taken from Table 12-1
G = a constant that accounts for topography and ground effects, taken from Figure 6-5 (Chapter 6)
D = the distance from the receiver to the piece of equipment, and
U.F. = a usage factor that accounts for the fraction of time that the equipment is in use over the specified time period.

For general assessment, FTA identifies the following assumptions:

1. Full power operation for a time period of one hour is assumed because most construction equipment operates continuously for periods of one hour or more at some point in the construction period.
Therefore, U.F. = 1, and 10 log(U.F.) = 0
Hence, the Equasion simplifies to: *Leq(equip) = E.L. – 20 log(D/50) – 10G log(D/50)*

2. Free-field conditions are assumed and ground effects are ignored. Consequently, G = 0.

Hence, the Equasion further simplifies to: *Leq(equip) = E.L. – 20 log(D/50)*

Solving for distance (D) yields: D= *50*10^(Leq-E.L.)/-20)*

Equipment	E.L. (from Table 12-1)	Leq at Distance 170 feet
Forklift	84 dBA. Leq	73.4
Crane	83 dBA. Leq	72.4
Excavator	85 dBA. Leq	74.4
Dozer	85 dBA. Leq	74.4
Compactor	82 dBA. Leq	71.4
Loader	85 dBA. Leq	74.4
Dump Truck	88 dBA. Leq	77.4
Scrapers	89 dBA. Leq	78.4
Grader	85 dBA. Leq	74.4
Paver	89 dBA. Leq	78.4
Vibrator Compactor	82 dBA. Leq	71.4
Two Noisiest (Scraper & Paver)	**92.0 dBA. Leq**	**81.4**

DMU / EMU Alternative with Maintenance Facility

#	segments	nearest receptor to construction	
3	Dublin/Pleasanton Station Cross Transfer Platform		
4	Hopyard to Hacienda Drive		
5	Hacienda Interchange		
6	Hacienda Drive to Tassajara Road		
7	Tassajara Raod/I-580 Interchange		
8	**Tassajara Road to Fallon**	**Single-Family Housing**	**170 feet south of Alt 2 construction**
9	Fallon Interchange		
10	Fallon to Airway		
11	Airway Interchange		
12	Airway to Isabel Station		
13	Isabel Interchange		
15	Isabel Station DMU EMU		
16	Parking Garage / Suface South		
17	Isabel Station to yard		
18	Maintenance Facility/yard		

FTA General Noise Assessment Calculations for Construction Equipment

Underlying Equasion from FTA Guidance Page 12-3

Leq(equip) = E.L. + 10 log(U.F.) – 20 log(D/50) – 10G log(D/50)

where: Leq (equip) = the Leq at a receiver resulting from the operation of a single piece of equipment over a specified time period
E.L. = the noise emission level of the particular piece of equipment at the reference distance of 50 feet, taken from Table 12-1
G = a constant that accounts for topography and ground effects, taken from Figure 6-5 (Chapter 6)
D = the distance from the receiver to the piece of equipment, and
U.F. = a usage factor that accounts for the fraction of time that the equipment is in use over the specified time period.

For general assessment, FTA identifies the following assumptions:

1. Full power operation for a time period of one hour is assumed because most construction equipment operates continuously for periods of one hour or more at some point in the construction period.
Therefore, U.F. = 1, and 10 log(U.F.) = 0
Hence, the Equasion simplifies to: *Leq(equip) = E.L. – 20 log(D/50) – 10G log(D/50)*

2. Free-field conditions are assumed and ground effects are ignored. Consequently, G = 0.

Hence, the Equasion further simplifies to: *Leq(equip) = E.L. – 20 log(D/50)*

Solving for distance (D) yields: D= *50*10^(Leq-E.L.)/-20)*

Equipment	E.L. (from Table 12-1)	Leq at Distance 1000 feet
Impact Pile Drivers	101 dBA. Leq	75.0
Forklift	84 dBA. Leq	58.0
Crane	83 dBA. Leq	57.0
Excavator	85 dBA. Leq	59.0
Dozer	85 dBA. Leq	59.0
Compactor	82 dBA. Leq	56.0
Loader	85 dBA. Leq	59.0
Dump Truck	88 dBA. Leq	62.0
Scrapers	89 dBA. Leq	63.0
Grader	85 dBA. Leq	59.0
Paver	89 dBA. Leq	63.0
Vibrator Compactor	82 dBA. Leq	56.0
Two Noisiest (Scraper & Pile driver)	**101.3 dBA. Leq**	**75.3**

DMU / EMU Alternative with Maintenance Facility

#	segments	nearest receptor to construction
3	Dublin/Pleasanton Station Cross Transfer Platform	
4	Hopyard to Hacienda Drive	
5	Hacienda Interchange	
6	Hacienda Drive to Tassajara Road	
7	Tassajara Road/I-580 Interchange	
8	Tassajara Road to Fallon	
9	Fallon Road/I-580 Interchange	
10	Fallon Road to Airway Boulevard	
11	Airway Boulevard/I-580 Interchange	
12	**Airway Boulevard to Isabel Station**	**1000 feet**
13	Isabel Interchange	
15	Isabel Station DMU EMU	
16	Parking Garage / Suface South	
17	Isabel Station to yard	
18	Maintennace Facility /'Yard	

FTA General Noise Assessment Calculations for Construction Equipment

Underlying Equasion from FTA Guidance Page 12-3

Leq(equip) = E.L. + 10 log(U.F.) – 20 log(D/50) – 10G log(D/50)

where: Leq (equip) = the Leq at a receiver resulting from the operation of a single piece of equipment over a specified time period
E.L. = the noise emission level of the particular piece of equipment at the reference distance of 50 feet, taken from Table 12-1
G = a constant that accounts for topography and ground effects, taken from Figure 6-5 (Chapter 6)
D = the distance from the receiver to the piece of equipment, and
U.F. = a usage factor that accounts for the fraction of time that the equipment is in use over the specified time period.

For general assessment, FTA identifies the following assumptions:

1. Full power operation for a time period of one hour is assumed because most construction equipment operates continuously for periods of one hour or more at some point in the construction period.
Therefore, U.F. = 1, and 10 log(U.F.) = 0
Hence, the Equasion simplifies to: *Leq(equip) = E.L. – 20 log(D/50) – 10G log(D/50)*

2. Free-field conditions are assumed and ground effects are ignored. Consequently, G = 0.

Hence, the Equasion further simplifies to: *Leq(equip) = E.L. – 20 log(D/50)*

Solving for distance (D) yields: D= *50*10^(Leq-E.L.)/-20)*

Equipment	E.L. (from Table 12-1)	Leq at Distance 1100 feet
Forklift	84 dBA. Leq	57.2
Crane	83 dBA. Leq	56.2
Excavator	85 dBA. Leq	58.2
Dozer	85 dBA. Leq	58.2
Compactor	82 dBA. Leq	55.2
Loader	85 dBA. Leq	58.2
Dump Truck	88 dBA. Leq	61.2
Scrapers	89 dBA. Leq	62.2
Grader	85 dBA. Leq	58.2
Paver	89 dBA. Leq	62.2
Vibrator Compactor	82 dBA. Leq	55.2
Two Noisiest (Scraper & Paver)	**92.0 dBA. Leq**	**65.2**

DMU / EMU Alternative with Maintenance Facility

#	segments	nearest receptor to construction
3	Dublin/Pleasanton Station Cross Transfer Platform	
4	Hopyard to Hacienda Drive	
5	Dublin/Pleasanton Station to Hacienda Drive	
6	Hacienda Drive to Tassajara Road	
7	Tassajara Road/I-580 Interchange	
8	Tassajara Road to Fallon	
9	Fallon Road/I-580 Interchange	
10	Fallon Road to Airway Boulevard	
11	Airway Boulevard/I-580 Interchange	
12	Airway Boulevard to Isabel Station	
13	**Isabel Interchange**	**1100 feet**
15	Isabel Station DMU EMU	
16	Parking Garage / Suface South	
17	Isabel Station to yard	
18	Maintenance Facility /Yard	

FTA General Noise Assessment Calculations for Construction Equipment

Underlying Equasion from FTA Guidance Page 12-3

Leq(equip) = E.L. + 10 log(U.F.) – 20 log(D/50) – 10G log(D/50)

where: Leq (equip) = the Leq at a receiver resulting from the operation of a single piece of equipment over a specified time period
E.L. = the noise emission level of the particular piece of equipment at the reference distance of 50 feet, taken from Table 12-1
G = a constant that accounts for topography and ground effects, taken from Figure 6-5 (Chapter 6)
D = the distance from the receiver to the piece of equipment, and
U.F. = a usage factor that accounts for the fraction of time that the equipment is in use over the specified time period.

For general assessment, FTA identifies the following assumptions:

1. Full power operation for a time period of one hour is assumed because most construction equipment operates continuously for periods of one hour or more at some point in the construction period.
Therefore, U.F. = 1, and 10 log(U.F.) = 0
Hence, the Equasion simplifies to: *Leq(equip) = E.L. – 20 log(D/50) – 10G log(D/50)*

2. Free-field conditions are assumed and ground effects are ignored. Consequently, G = 0.

Hence, the Equasion further simplifies to: *Leq(equip) = E.L. – 20 log(D/50)*

Solving for distance (D) yields: D= *50*10^(Leq-E.L.)/-20)*

Equipment	E.L. (from Table 12-1)	Leq at Distance 1100 feet
Impact Pile Drivers	101 dBA. Leq	74.2
Forklift	84 dBA. Leq	57.2
Crane	83 dBA. Leq	56.2
Excavator	85 dBA. Leq	58.2
Dozer	85 dBA. Leq	58.2
Compactor	82 dBA. Leq	55.2
Loader	85 dBA. Leq	58.2
Dump Truck	88 dBA. Leq	61.2
Scrapers	89 dBA. Leq	62.2
Grader	85 dBA. Leq	58.2
Paver	89 dBA. Leq	62.2
Vibrator Compactor	82 dBA. Leq	55.2
Two Noisiest (Scraper & Pile Driv	**101.3 dBA. Leq**	**74.5**

DMU / EMU Alternative with Maintenance Facility

#	segments	nearest receptor to construction
3	Dublin/Pleasanton Station Cross Transfer Platform	
4	Hopyard to Hacienda Drive	
5	Hacienda Interchange	
6	Hacienda Drive to Tassajara Road	
7	Tassajara Road/I-580 Interchange	
8	Tassajara Road to Fallon	
9	Fallon Road/I-580 Interchange	
10	Fallon Road to Airway Boulevard	
11	Airway Boulevard/I-580 Interchange	
12	Airway Boulevard to Isabel Station	
13	Isabel Interchange	
15	**Isabel Station DMU EMU**	**1200**
16	Parking Garage / Suface South	
17	Isabel Station to yard	
18	Maintenance Facility /Yard	

FTA General Noise Assessment Calculations for Construction Equipment

Underlying Equasion from FTA Guidance Page 12-3

Leq(equip) = E.L. + 10 log(U.F.) – 20 log(D/50) – 10G log(D/50)

where: Leq (equip) = the Leq at a receiver resulting from the operation of a single piece of equipment over a specified time period
E.L. = the noise emission level of the particular piece of equipment at the reference distance of 50 feet, taken from Table 12-1
G = a constant that accounts for topography and ground effects, taken from Figure 6-5 (Chapter 6)
D = the distance from the receiver to the piece of equipment, and
U.F. = a usage factor that accounts for the fraction of time that the equipment is in use over the specified time period.

For general assessment, FTA identifies the following assumptions:

1. Full power operation for a time period of one hour is assumed because most construction equipment operates continuously for periods of one hour or more at some point in the construction period.
Therefore, U.F. = 1, and 10 log(U.F.) = 0
Hence, the Equasion simplifies to: *Leq(equip) = E.L. – 20 log(D/50) – 10G log(D/50)*

2. Free-field conditions are assumed and ground effects are ignored. Consequently, G = 0.

Hence, the Equasion further simplifies to: *Leq(equip) = E.L. – 20 log(D/50)*

Solving for distance (D) yields: D= *50*10^(Leq-E.L.)/-20)*

Equipment	E.L. (from Table 12-1)	Leq at Distance 1400 feet
Impact Pile Drivers	101 dBA. Leq	72.1
Forklift	84 dBA. Leq	55.1
Crane	83 dBA. Leq	54.1
Excavator	85 dBA. Leq	56.1
Dozer	85 dBA. Leq	56.1
Compactor	82 dBA. Leq	53.1
Loader	85 dBA. Leq	56.1
Dump Truck	88 dBA. Leq	59.1
Scrapers	89 dBA. Leq	60.1
Grader	85 dBA. Leq	56.1
Paver	89 dBA. Leq	60.1
Vibrator Compactor	82 dBA. Leq	53.1
Two Noisiest (Scraper & Pile Driver)	**101.3 dBA. Leq**	**72.4**

DMU / EMU Alternative with Maintenance Facility

#	segments	nearest receptor to construction
3	Dublin/Pleasanton Station Cross Transfer Platform	
4	Hopyard to Hacienda Drive	
5	Hacienda Interchange	
6	Hacienda Drive to Tassajara Road	
7	Tassajara Road/I-580 Interchange	
8	Tassajara Road to Fallon	
9	Fallon Road/I-580 Interchange	
10	Fallon Road to Airway Boulevard	
11	Airway Boulevard/I-580 Interchange	
12	Airway Boulevard to Isabel BART Station	
13	Isabel Interchange	
15	Isabel Station DMU EMU	
16	**Parking Garage / Surface South**	**1400**
17	Isabel Station to yard	
18	Maintenance Facility /Yard	
19	Tail Track Yard	

FTA General Noise Assessment Calculations for Construction Equipment

Underlying Equasion from FTA Guidance Page 12-3

Leq(equip) = E.L. + 10 log(U.F.) – 20 log(D/50) – 10G log(D/50)

where: Leq (equip) = the Leq at a receiver resulting from the operation of a single piece of equipment over a specified time period
E.L. = the noise emission level of the particular piece of equipment at the reference distance of 50 feet, taken from Table 12-1
G = a constant that accounts for topography and ground effects, taken from Figure 6-5 (Chapter 6)
D = the distance from the receiver to the piece of equipment, and
U.F. = a usage factor that accounts for the fraction of time that the equipment is in use over the specified time period.

For general assessment, FTA identifies the following assumptions:

1. Full power operation for a time period of one hour is assumed because most construction equipment operates continuously for periods of one hour or more at some point in the construction period.
Therefore, U.F. = 1, and 10 log(U.F.) = 0
Hence, the Equasion simplifies to: *Leq(equip) = E.L. – 20 log(D/50) – 10G log(D/50)*

2. Free-field conditions are assumed and ground effects are ignored. Consequently, G = 0.

Hence, the Equasion further simplifies to: *Leq(equip) = E.L. – 20 log(D/50)*

Solving for distance (D) yields: D= *50*10^(Leq-E.L.)/-20)*

Equipment	E.L. (from Table 12-1)	Leq at Distance 430 feet
Forklift	84 dBA. Leq	65.3
Crane	83 dBA. Leq	64.3
Excavator	85 dBA. Leq	66.3
Dozer	85 dBA. Leq	66.3
Compactor	82 dBA. Leq	63.3
Loader	85 dBA. Leq	66.3
Dump Truck	88 dBA. Leq	69.3
Scrapers	89 dBA. Leq	70.3
Grader	85 dBA. Leq	66.3
Paver	89 dBA. Leq	70.3
Vibrator Compactor	82 dBA. Leq	63.3
Two Noisiest (Scraper & Paver)	**92.0 dBA. Leq**	**73.3**

DMU / EMU Alternative with Maintenance Facility

#	segments	nearest receptor to construction
3	Dublin/Pleasanton Station Cross Transfer Platform	
4	Hopyard to Hacienda Drive	
5	Hacienda Interchange	
6	Hacienda Drive to Tassajara Road	
7	Tassajara Road/I-580 Interchange	
8	Tassajara Road to Fallon	
9	Fallon Road/I-580 Interchange	
10	Fallon Road to Airway Boulevard	
11	Airway Boulevard/I-580 Interchange	
12	Airway Boulevard to Isabel Station	
13	Isabel Interchange	
15	Isabel Station DMU EMU	
16	Parking Garage / Surface South	
17	**Isabel Station to yard**	**430 feet**
18	Maintenance Facility/Yard	

FTA General Noise Assessment Calculations for Construction Equipment

Underlying Equasion from FTA Guidance Page 12-3

Leq(equip) = E.L. + 10 log(U.F.) – 20 log(D/50) – 10G log(D/50)

where: Leq (equip) = the Leq at a receiver resulting from the operation of a single piece of equipment over a specified time period
E.L. = the noise emission level of the particular piece of equipment at the reference distance of 50 feet, taken from Table 12-1
G = a constant that accounts for topography and ground effects, taken from Figure 6-5 (Chapter 6)
D = the distance from the receiver to the piece of equipment, and
U.F. = a usage factor that accounts for the fraction of time that the equipment is in use over the specified time period.

For general assessment, FTA identifies the following assumptions:

1. Full power operation for a time period of one hour is assumed because most construction equipment operates continuously for periods of one hour or more at some point in the construction period.
Therefore, U.F. = 1, and 10 log(U.F.) = 0
Hence, the Equasion simplifies to: *Leq(equip) = E.L. – 20 log(D/50) – 10G log(D/50)*

2. Free-field conditions are assumed and ground effects are ignored. Consequently, G = 0.

Hence, the Equasion further simplifies to: *Leq(equip) = E.L. – 20 log(D/50)*

Solving for distance (D) yields: D= *50*10^(Leq-E.L.)/-20)*

Equipment	E.L. (from Table 12-1)	Leq at Distance 1900 feet
Forklift	84 dBA. Leq	52.4
Crane	83 dBA. Leq	51.4
Excavator	85 dBA. Leq	53.4
Dozer	85 dBA. Leq	53.4
Compactor	82 dBA. Leq	50.4
Loader	85 dBA. Leq	53.4
Dump Truck	88 dBA. Leq	56.4
Scrapers	89 dBA. Leq	57.4
Grader	85 dBA. Leq	53.4
Paver	89 dBA. Leq	57.4
Vibrator Compactor	82 dBA. Leq	50.4
Two Noisiest (Scraper & Paver)	**92.0 dBA. Leq**	**60.4**

DMU / EMU Alternative with Maintenance Facility

#	segments	nearest receptor to construction
3	Dublin/Pleasanton Station Cross Transfer Platform	
4	Hopyard to Hacienda Drive	
5	Hacienda Interchange	
6	Hacienda Drive to Tassajara Road	
7	Tassajara Road/I-580 Interchange	
8	Tassajara Road to Fallon	
9	Fallon Road/I-580 Interchange	
10	Fallon Road to Airway Boulevard	
11	Airway Boulevard/I-580 Interchange	
12	Airway Boulevard to Isabel Station	
13	Isabel Interchange	
15	Isabel Station DMU EMU	s
16	Parking Garage / Suface South	
17	Isabel Station to yard	
18	**Maintenance Facility/Yard**	1900 feet

FTA General Noise Assessment Calculations for Construction Equipment

Underlying Equation from FTA Guidance Page 12-3

Leq(equip) = E.L. + 10 log(U.F.) – 20 log(D/50) – 10G log(D/50)

where: Leq (equip) = the Leq at a receiver resulting from the operation of a single piece of equipment over a specified time period
E.L. = the noise emission level of the particular piece of equipment at the reference distance of 50 feet, taken from Table 12-1
G = a constant that accounts for topography and ground effects, taken from Figure 6-5 (Chapter 6)
D = the distance from the receiver to the piece of equipment, and
U.F. = a usage factor that accounts for the fraction of time that the equipment is in use over the specified time period.

For general assessment, FTA identifies the following assumptions:

1. Full power operation for a time period of one hour is assumed because most construction equipment operates continuously for periods of one hour or more at some point in the construction period.
   Therefore, U.F. = 1, and 10 log(U.F.) = 0
   Hence, the Equation simplifies to: *Leq(equip) = E.L. – 20 log(D/50) – 10G log(D/50)*

2. Free-field conditions are assumed and ground effects are ignored. Consequently, G = 0.

   Hence, the Equation further simplifies to: *Leq(equip) = E.L. – 20 log(D/50)*

   Solving for distance (D) yields: D= *50*10^(Leq-E.L.)/-20)*

Equipment	E.L. (from Table 12-1)	Leq at Distance 1,100 feet
Forklift	84 dBA. Leq	57.2
Crane	83 dBA. Leq	56.2
Excavator	85 dBA. Leq	58.2
Dozer	85 dBA. Leq	58.2
Compactor	82 dBA. Leq	55.2
Loader	85 dBA. Leq	58.2
Dump Truck	88 dBA. Leq	61.2
Scrapers	89 dBA. Leq	62.2
Grader	85 dBA. Leq	58.2
Paver	89 dBA. Leq	62.2
Vibrator Compactor	82 dBA. Leq	55.2
Two Noisiest (Scraper & Paver)	**92.0 dBA. Leq**	**65.2**

Alternative 3 - Express Bus

#	segments	nearest receptor to construction
2	**Hopyard Interchange**	**1,100 feet**
3	Dublin/Pleasanton Station Cross Transfer Platform	
4	Hopyard to Hacienda Drive	
5	Hacienda Interchange	

FTA General Noise Assessment Calculations for Construction Equipment

Underlying Equation from FTA Guidance Page 12-3

Leq(equip) = E.L. + 10 log(U.F.) – 20 log(D/50) – 10G log(D/50)

where:
- Leq (equip) = the Leq at a receiver resulting from the operation of a single piece of equipment over a specified time period
- E.L. = the noise emission level of the particular piece of equipment at the reference distance of 50 feet, taken from Table 12-1
- G = a constant that accounts for topography and ground effects, taken from Figure 6-5 (Chapter 6)
- D = the distance from the receiver to the piece of equipment, and
- U.F. = a usage factor that accounts for the fraction of time that the equipment is in use over the specified time period.

For general assessment, FTA identifies the following assumptions:

1. Full power operation for a time period of one hour is assumed because most construction equipment operates continuously for periods of one hour or more at some point in the construction period.

   Therefore, U.F. = 1, and 10 log(U.F.) = 0

   Hence, the Equation simplifies to: *Leq(equip) = E.L. – 20 log(D/50) – 10G log(D/50)*

2. Free-field conditions are assumed and ground effects are ignored. Consequently, G = 0.

   Hence, the Equation further simplifies to: *Leq(equip) = E.L. – 20 log(D/50)*

   Solving for distance (D) yields: D= *50*10^(Leq-E.L.)/-20)*

Equipment	E.L. (from Table 12-1)	Leq at Distance 370 feet
Impact Pile Drivers	101 dBA. Leq	83.6
Forklift	84 dBA. Leq	66.6
Crane	83 dBA. Leq	65.6
Excavator	85 dBA. Leq	67.6
Dozer	85 dBA. Leq	67.6
Compactor	82 dBA. Leq	64.6
Loader	85 dBA. Leq	67.6
Dump Truck	88 dBA. Leq	70.6
Scrapers	89 dBA. Leq	71.6
Grader	85 dBA. Leq	67.6
Paver	89 dBA. Leq	71.6
Vibrator Compactor	82 dBA. Leq	64.6
Two Noisiest (Scraper & Pile Driver)	**101.3 dBA. Leq**	**83.9**

Alternative 3 - Express Bus

#	segments	nearest receptor to construction
2	Hopyard Interchange	
3	**Dublin/Pleasanton Station Cross Transfer Platform**	**370 feet**
4	Hopyard to Hacienda Drive	
5	Hacienda Interchange	

FTA General Noise Assessment Calculations for Construction Equipment

Underlying Equation from FTA Guidance Page 12-3

Leq(equip) = E.L. + 10 log(U.F.) – 20 log(D/50) – 10G log(D/50)

where: Leq (equip) = the Leq at a receiver resulting from the operation of a single piece of equipment over a specified time period
E.L. = the noise emission level of the particular piece of equipment at the reference distance of 50 feet, taken from Table 12-1
G = a constant that accounts for topography and ground effects, taken from Figure 6-5 (Chapter 6)
D = the distance from the receiver to the piece of equipment, and
U.F. = a usage factor that accounts for the fraction of time that the equipment is in use over the specified time period.

For general assessment, FTA identifies the following assumptions:

1. Full power operation for a time period of one hour is assumed because most construction equipment operates continuously for periods of one hour or more at some point in the construction period.
   Therefore, U.F. = 1, and 10 log(U.F.) = 0
   Hence, the Equation simplifies to: *Leq(equip) = E.L. – 20 log(D/50) – 10G log(D/50)*

2. Free-field conditions are assumed and ground effects are ignored. Consequently, G = 0.

   Hence, the Equation further simplifies to: *Leq(equip) = E.L. – 20 log(D/50)*

   Solving for distance (D) yields: D= *50*10^(Leq-E.L.)/-20)*

Equipment	E.L. (from Table 12-1)	Leq at Distance 370 feet
Forklift	84 dBA. Leq	66.6
Crane	83 dBA. Leq	65.6
Excavator	85 dBA. Leq	67.6
Dozer	85 dBA. Leq	67.6
Compactor	82 dBA. Leq	64.6
Loader	85 dBA. Leq	67.6
Dump Truck	88 dBA. Leq	70.6
Scrapers	89 dBA. Leq	71.6
Grader	85 dBA. Leq	67.6
Paver	89 dBA. Leq	71.6
Vibrator Compactor	82 dBA. Leq	64.6
Two Noisiest (Scraper & Paver)	**92.0 dBA. Leq**	**74.6**

Alternative 3 - Express Bus

#	segments	nearest receptor to construction	
2	Hopyard Interchange		
3	Dublin/Pleasanton Station Cross Transfer Platform		
4	**Hopyard to Hacienda Drive**	**Multi Family Housing at 5200 Iron Horse Parkway**	**370 feet north of Alt 2 construction**
5	Hacienda Interchange		
6	Hacienda to Tassajara		
7	Tassajara Interchange		
8	Tassajara to Fallon		
9	Fallon Interchange		
10	Fallon to Airway		
11	Airway Interchange		
12	Airway to Isabel Station		
13	Isabel Interchange		
15	Isabel Station DMU EMU		
16	Parking Garage / Suface South		
17	Isabel Station to yard		
18	Maintenance Facility /yard		

FTA General Noise Assessment Calculations for Construction Equipment

Underlying Equation from FTA Guidance Page 12-3

Leq(equip) = E.L. + 10 log(U.F.) – 20 log(D/50) – 10G log(D/50)

where:
- Leq (equip) = the Leq at a receiver resulting from the operation of a single piece of equipment over a specified time period
- E.L. = the noise emission level of the particular piece of equipment at the reference distance of 50 feet, taken from Table 12-1
- G = a constant that accounts for topography and ground effects, taken from Figure 6-5 (Chapter 6)
- D = the distance from the receiver to the piece of equipment, and
- U.F. = a usage factor that accounts for the fraction of time that the equipment is in use over the specified time period.

For general assessment, FTA identifies the following assumptions:

1. Full power operation for a time period of one hour is assumed because most construction equipment operates continuously for periods of one hour or more at some point in the construction period.
   Therefore, U.F. = 1, and 10 log(U.F.) = 0
   Hence, the Equation simplifies to: *Leq(equip) = E.L. – 20 log(D/50) – 10G log(D/50)*

2. Free-field conditions are assumed and ground effects are ignored. Consequently, G = 0.

   Hence, the Equation further simplifies to: *Leq(equip) = E.L. – 20 log(D/50)*

   Solving for distance (D) yields: D= *50*10^(Leq-E.L.)/-20)*

Equipment	E.L. (from Table 12-1)	Leq at Distance 1150 feet
Forklift	84 dBA. Leq	56.8
Crane	83 dBA. Leq	55.8
Excavator	85 dBA. Leq	57.8
Dozer	85 dBA. Leq	57.8
Compactor	82 dBA. Leq	54.8
Loader	85 dBA. Leq	57.8
Dump Truck	88 dBA. Leq	60.8
Scrapers	89 dBA. Leq	61.8
Grader	85 dBA. Leq	57.8
Paver	89 dBA. Leq	61.8
Vibrator Compactor	82 dBA. Leq	54.8
Two Noisiest (Scraper & Paver)	**92.0 dBA. Leq**	**64.8**

Alternative 3 - Express Bus

#	segments	nearest receptor to construction
2	Hopyard Interchange	
3	Dublin/Pleasanton Station Cross Transfer Platform	
4	Hopyard to Hacienda Drive	
5	**Hacienda Interchange**	1,150 feet

FTA General Noise Assessment Calculations for Construction Equipment

Underlying Equation from FTA Guidance Page 12-3

Leq(equip) = E.L. + 10 log(U.F.) – 20 log(D/50) – 10G log(D/50)

where:
- Leq (equip) = the Leq at a receiver resulting from the operation of a single piece of equipment over a specified time period
- E.L. = the noise emission level of the particular piece of equipment at the reference distance of 50 feet, taken from Table 12-1
- G = a constant that accounts for topography and ground effects, taken from Figure 6-5 (Chapter 6)
- D = the distance from the receiver to the piece of equipment, and
- U.F. = a usage factor that accounts for the fraction of time that the equipment is in use over the specified time period.

For general assessment, FTA identifies the following assumptions:

1. Full power operation for a time period of one hour is assumed because most construction equipment operates continuously for periods of one hour or more at some point in the construction period.

   Therefore, U.F. = 1, and 10 log(U.F.) = 0

   Hence, the Equation simplifies to: *Leq(equip) = E.L. – 20 log(D/50) – 10G log(D/50)*

2. Free-field conditions are assumed and ground effects are ignored. Consequently, G = 0.

   Hence, the Equation further simplifies to: *Leq(equip) = E.L. – 20 log(D/50)*

   Solving for distance (D) yields: D= *50*10^(Leq-E.L.)/-20)*

Equipment	E.L. (from Table 12-1)	Leq at Distance 370 feet
Forklift	84 dBA. Leq	66.6
Crane	83 dBA. Leq	65.6
Excavator	85 dBA. Leq	67.6
Dozer	85 dBA. Leq	67.6
Compactor	82 dBA. Leq	64.6
Loader	85 dBA. Leq	67.6
Dump Truck	88 dBA. Leq	70.6
Scrapers	89 dBA. Leq	71.6
Grader	85 dBA. Leq	67.6
Paver	89 dBA. Leq	71.6
Vibrator Compactor	82 dBA. Leq	64.6
Two Noisiest (Scraper & Paver)	**92.0 dBA. Leq**	74.6

BART and DMU Alts

#	segments	nearest receptor to construction
0.5	**Dougherty to Hacienda**	370 feet

FTA General Noise Assessment Calculations for Construction Equipment

Underlying Equation from FTA Guidance Page 12-3

Leq(equip) = E.L. + 10 log(U.F.) – 20 log(D/50) – 10G log(D/50)

where:
- Leq (equip) = the Leq at a receiver resulting from the operation of a single piece of equipment over a specified time period
- E.L. = the noise emission level of the particular piece of equipment at the reference distance of 50 feet, taken from Table 12-1
- G = a constant that accounts for topography and ground effects, taken from Figure 6-5 (Chapter 6)
- D = the distance from the receiver to the piece of equipment, and
- U.F. = a usage factor that accounts for the fraction of time that the equipment is in use over the specified time period.

For general assessment, FTA identifies the following assumptions:

1. Full power operation for a time period of one hour is assumed because most construction equipment operates continuously for periods of one hour more at some point in the construction period.

   Therefore, U.F. = 1, and 10 log(U.F.) = 0
   Hence, the Equation simplifies to: *Leq(equip) = E.L. – 20 log(D/50) – 10G log(D/50)*

2. Free-field conditions are assumed and ground effects are ignored. Consequently, G = 0.

   Hence, the Equation further simplifies to: *Leq(equip) = E.L. – 20 log(D/50)*

   Solving for distance (D) yields: D= *50*10^(Leq-E.L.)/-20)*

Equipment	E.L. (from Table 12-1)	Leq at Distance 460 feet
Forklift	84 dBA. Leq	64.7
Crane	83 dBA. Leq	63.7
Excavator	85 dBA. Leq	65.7
Dozer	85 dBA. Leq	65.7
Compactor	82 dBA. Leq	62.7
Loader	85 dBA. Leq	65.7
Dump Truck	88 dBA. Leq	68.7
Scrapers	89 dBA. Leq	69.7
Grader	85 dBA. Leq	65.7
Paver	89 dBA. Leq	69.7
Vibrator Compactor	82 dBA. Leq	62.7
Two Noisiest (Scraper & Paver)	**92.0 dBA. Leq**	72.7

BRT Alternative

#	segments	nearest receptor to construction
21	Laughlin Parking Lot	460 feet

G.4 Noise Model Data – Construction Vibration Calculations

Vibration propogation from Construction Equipment

Proposed Project - BART Extension with Storage Facility

Tail Track to Main Line

Formula from FTA, 2006 = PPVequip = PPVref x (25/D)^1.5
where

Segment 0.5

Tail Track conversion

PPV refs @ 25 ft =		PPV@25ft
	pile driver (impact)	0.644
	Vibratory Roller	0.21
	Bulldozer (large)	0.089
	Truck(loaded)	0.076
	Jackhammer	0.035

Enter distance = 370 Adjacent Buildings

Resultant PPV =		
	pile driver (impact)	0.011311
	Vibratory Roller	0.003688
	Bulldozer (large)	0.001563
	Truck(loaded)	0.001335
	Jackhammer	0.000615

	Lv@25 ft
pile driver (impact)	104
Vibratory Roller	94
Bulldozer (large)	87
Truck(loaded)	86
Jackhammer	79

Formula from FTA 2006 = Lv(D) = Lv(25 ft) – 30log(D/25)

Resultant Lv =		
	pile driver (impact)	68.89215
	Vibratory Roller	58.89215
	Bulldozer (large)	51.89215
	Truck(loaded)	50.89215
	Jackhammer	43.89215

Vibration propogation from Construction Equipment

Proposed Project - BART Extension with Storage Facility

Formula from FTA, 2006 = PPVequip = PPVref x (25/D)^1.5
where

Segment 5-Dublin/Pleasanton Station to Hacienda Drive

		PPV@25ft
PPV refs @ 25 ft =	pile driver (impact)	0.644
	Vibratory Roller	0.21
	Bulldozer (large)	0.089
	Truck(loaded)	0.076
	Jackhammer	0.035

Enter distance = 370 Adjacent Buildings

Resultant PPV =	pile driver (impact)	0.011311
	Vibratory Roller	0.003688
	Bulldozer (large)	0.001563
	Truck(loaded)	0.001335
	Jackhammer	0.000615

	Lv@25 ft
pile driver (impact)	104
Vibratory Roller	94
Bulldozer (large)	87
Truck(loaded)	86
Jackhammer	79

Formula from FTA 2006 = Lv(D) = Lv(25 ft) – 30log(D/25)

Resultant Lv =	pile driver (impact)	68.89215
	Vibratory Roller	58.89215
	Bulldozer (large)	51.89215
	Truck(loaded)	50.89215
	Jackhammer	43.89215

Vibration propogation from Construction Equipment

Proposed Project - BART Extension with Storage Facility

Formula from FTA, 2006 = PPVequip = PPVref x (25/D)^1.5
where

Segment 6- Hacienda Drive to Tassajara Road

		PPV@25ft
PPV refs @ 25 ft =	pile driver (impact)	0.644
	Vibratory Roller	0.21
	Bulldozer (large)	0.089
	Truck(loaded)	0.076
	Jackhammer	0.035

Enter distance = 442 Adjacent Buildings

Resultant PPV =	pile driver (impact)	0.008663
	Vibratory Roller	0.002825
	Bulldozer (large)	0.001197
	Truck(loaded)	0.001022
	Jackhammer	0.000471

	Lv@25 ft
pile driver (impact)	104
Vibratory Roller	94
Bulldozer (large)	87
Truck(loaded)	86
Jackhammer	79

Formula from FTA 2006 = Lv(D) = Lv(25 ft) – 30log(D/25)

Resultant Lv =	pile driver (impact)	66.57553
	Vibratory Roller	56.57553
	Bulldozer (large)	49.57553
	Truck(loaded)	48.57553
	Jackhammer	41.57553

Vibration propogation from Construction Equipment

Proposed Project - BART Extension with Storage Facility

Formula from FTA, 2006 = PPVequip = PPVref x (25/D)^1.5
where

Segment7 -Tassajara Road/I-580 Interchange

PPV refs @ 25 ft =		PPV@25ft
	pile driver (impact)	0.644
	Vibratory Roller	0.21
	Bulldozer (large)	0.089
	Truck(loaded)	0.076
	Jackhammer	0.035

Enter distance = 1100 Adjacent Buildings

Resultant PPV =		
	pile driver (impact)	0.002207
	Vibratory Roller	0.00072
	Bulldozer (large)	0.000305
	Truck(loaded)	0.00026
	Jackhammer	0.00012

	Lv@25 ft
pile driver (impact)	104
Vibratory Roller	94
Bulldozer (large)	87
Truck(loaded)	86
Jackhammer	79

Formula from FTA 2006 = Lv(D) = Lv(25 ft) – 30log(D/25)

Resultant Lv =		
	pile driver (impact)	54.69642
	Vibratory Roller	44.69642
	Bulldozer (large)	37.69642
	Truck(loaded)	36.69642
	Jackhammer	29.69642

Vibration propogation from Construction Equipment

Proposed Project - BART Extension with Storage Facility

Formula from FTA, 2006 = PPVequip = PPVref x (25/D)^1.5
where

Segment 8-Tassajara Road to Fallon Road

		PPV@25ft
PPV refs @ 25 ft =	pile driver (impact)	0.644
	Vibratory Roller	0.21
	Bulldozer (large)	0.089
	Truck(loaded)	0.076
	Jackhammer	0.035

Enter distance = 170 Adjacent Buildings

Resultant PPV =	pile driver (impact)	0.036318
	Vibratory Roller	0.011843
	Bulldozer (large)	0.005019
	Truck(loaded)	0.004286
	Jackhammer	0.001974

	Lv@25 ft
pile driver (impact)	104
Vibratory Roller	94
Bulldozer (large)	87
Truck(loaded)	86
Jackhammer	79

Formula from FTA 2006 = Lv(D) = Lv(25 ft) – 30log(D/25)

Resultant Lv =	pile driver (impact)	79.02473
	Vibratory Roller	69.02473
	Bulldozer (large)	62.02473
	Truck(loaded)	61.02473
	Jackhammer	54.02473

0

Vibration propogation from Construction Equipment

Proposed Project - BART Extension with Storage Facility

Formula from FTA, 2006 = PPVequip = PPVref x (25/D)^1.5
where

Segment 12 - Airway Boulevard to Isabel BART Station

PPV refs @ 25 ft =		PPV@25ft
	pile driver (impact)	0.644
	Vibratory Roller	0.21
	Bulldozer (large)	0.089
	Truck(loaded)	0.076
	Jackhammer	0.035

Enter distance = 1000 Adjacent Buildings

Resultant PPV =		
	pile driver (impact)	0.002546
	Vibratory Roller	0.00083
	Bulldozer (large)	0.000352
	Truck(loaded)	0.0003
	Jackhammer	0.000138

	Lv@25 ft
pile driver (impact)	104
Vibratory Roller	94
Bulldozer (large)	87
Truck(loaded)	86
Jackhammer	79

Formula from FTA 2006 = Lv(D) = Lv(25 ft) – 30log(D/25)

Resultant Lv =		
	pile driver (impact)	55.9382
	Vibratory Roller	45.9382
	Bulldozer (large)	38.9382
	Truck(loaded)	37.9382
	Jackhammer	30.9382

Vibration propogation from Construction Equipment

Proposed Project - BART Extension with Storage Facility

Formula from FTA, 2006 = PPVequip = PPVref x (25/D)^1.5
where

Segment 13 - Isabel Interchange

		PPV@25ft
PPV refs @ 25 ft =	pile driver (impact)	0.644
	Vibratory Roller	0.21
	Bulldozer (large)	0.089
	Truck(loaded)	0.076
	Jackhammer	0.035

Enter distance = 1100 Adjacent Buildings

Resultant PPV =	pile driver (impact)	0.002207
	Vibratory Roller	0.00072
	Bulldozer (large)	0.000305
	Truck(loaded)	0.00026
	Jackhammer	0.00012

	Lv@25 ft
pile driver (impact)	104
Vibratory Roller	94
Bulldozer (large)	87
Truck(loaded)	86
Jackhammer	79

Formula from FTA 2006 = Lv(D) = Lv(25 ft) – 30log(D/25)

Resultant Lv =	pile driver (impact)	54.69642
	Vibratory Roller	44.69642
	Bulldozer (large)	37.69642
	Truck(loaded)	36.69642
	Jackhammer	29.69642

Vibration propogation from Construction Equipment

Proposed Project - BART Extension with Storage Facility

Formula from FTA, 2006 = PPVequip = PPVref x (25/D)^1.5
where

Segment 14 - Isabel Station BART

		PPV@25ft
PPV refs @ 25 ft =	pile driver (impact)	0.644
	Vibratory Roller	0.21
	Bulldozer (large)	0.089
	Truck(loaded)	0.076
	Jackhammer	0.035

Enter distance = 1200 Adjacent Buildings

Resultant PPV =	pile driver (impact)	0.001937
	Vibratory Roller	0.000631
	Bulldozer (large)	0.000268
	Truck(loaded)	0.000229
	Jackhammer	0.000105

	Lv@25 ft
pile driver (impact)	104
Vibratory Roller	94
Bulldozer (large)	87
Truck(loaded)	86
Jackhammer	79

Formula from FTA 2006 = Lv(D) = Lv(25 ft) – 30log(D/25)

Resultant Lv =	pile driver (impact)	53.56276
	Vibratory Roller	43.56276
	Bulldozer (large)	36.56276
	Truck(loaded)	35.56276
	Jackhammer	28.56276

Vibration propogation from Construction Equipment

Proposed Project - BART Extension with Storage Facility

Formula from FTA, 2006 = PPVequip = PPVref x (25/D)^1.5
where

Segment 16 - Parking Garage / Surface South

		PPV@25ft
PPV refs @ 25 ft =	pile driver (impact)	0.644
	Vibratory Roller	0.21
	Bulldozer (large)	0.089
	Truck(loaded)	0.076
	Jackhammer	0.035

Enter distance = 1400 Adjacent Buildings

Resultant PPV =	pile driver (impact)	0.001537
	Vibratory Roller	0.000501
	Bulldozer (large)	0.000212
	Truck(loaded)	0.000181
	Jackhammer	8.35E-05

	Lv@25 ft
pile driver (impact)	104
Vibratory Roller	94
Bulldozer (large)	87
Truck(loaded)	86
Jackhammer	79

Formula from FTA 2006 = Lv(D) = Lv(25 ft) – 30log(D/25)

Resultant Lv =	pile driver (impact)	51.55436
	Vibratory Roller	41.55436
	Bulldozer (large)	34.55436
	Truck(loaded)	33.55436
	Jackhammer	26.55436

Vibration propogation from Construction Equipment

Proposed Project - BART Extension with Storage Facility

Formula from FTA, 2006 = PPVequip = PPVref x (25/D)^1.5
where

Segment 17 - Isabel Station to yard

		PPV@25ft
PPV refs @ 25 ft =	pile driver (impact)	0.644
	Vibratory Roller	0.21
	Bulldozer (large)	0.089
	Truck(loaded)	0.076
	Jackhammer	0.035

Enter distance = 430 Adjacent Buildings

Resultant PPV =	pile driver (impact)	0.009028
	Vibratory Roller	0.002944
	Bulldozer (large)	0.001248
	Truck(loaded)	0.001065
	Jackhammer	0.000491

	Lv@25 ft
pile driver (impact)	104
Vibratory Roller	94
Bulldozer (large)	87
Truck(loaded)	86
Jackhammer	79

Formula from FTA 2006 = Lv(D) = Lv(25 ft) – 30log(D/25)

Resultant Lv =	pile driver (impact)	66.93415
	Vibratory Roller	56.93415
	Bulldozer (large)	49.93415
	Truck(loaded)	48.93415
	Jackhammer	41.93415

Vibration propogation from Construction Equipment

Proposed Project - BART Extension with Storage Facility

Formula from FTA, 2006 = PPVequip = PPVref x (25/D)^1.5
where

Segment 18 - Tail Track Yard

		PPV@25ft
PPV refs @ 25 ft =	pile driver (impact)	0.644
	Vibratory Roller	0.21
	Bulldozer (large)	0.089
	Truck(loaded)	0.076
	Jackhammer	0.035

Enter distance = 1900 Adjacent Buildings

Resultant PPV =	pile driver (impact)	0.000972
	Vibratory Roller	0.000317
	Bulldozer (large)	0.000134
	Truck(loaded)	0.000115
	Jackhammer	5.28E-05

	Lv@25 ft
pile driver (impact)	104
Vibratory Roller	94
Bulldozer (large)	87
Truck(loaded)	86
Jackhammer	79

Formula from FTA 2006 = Lv(D) = Lv(25 ft) – 30log(D/25)

Resultant Lv =	pile driver (impact)	47.57559
	Vibratory Roller	37.57559
	Bulldozer (large)	30.57559
	Truck(loaded)	29.57559
	Jackhammer	22.57559

Vibration propagation from Construction Equipment

DMU Alternative with Storage Facility

Formula from FTA, 2006 = PPVequip = PPVref x (25/D)^1.5
where

Segment 3

		PPV@25ft
PPV refs @ 25 ft =	pile driver (impact)	0.644
	Vibratory Roller	0.21
	Bulldozer (large)	0.089
	Truck(loaded)	0.076
	Jackhammer	0.035

Enter distance = 370 Adjacent Buildings

Resultant PPV =	pile driver (impact)	0.011311
	Vibratory Roller	0.003688
	Bulldozer (large)	0.001563
	Truck(loaded)	0.001335
	Jackhammer	0.000615

	Lv@25 ft
pile driver (impact)	104
Vibratory Roller	94
Bulldozer (large)	87
Truck(loaded)	86
Jackhammer	79

Formula from FTA 2006 = Lv(D) = Lv(25 ft) – 30log(D/25)

Resultant Lv =	pile driver (impact)	68.89215
	Vibratory Roller	58.89215
	Bulldozer (large)	51.89215
	Truck(loaded)	50.89215
	Jackhammer	43.89215

Vibration propagation from Construction Equipment

DMU Alternative with Storage Facility

Formula from FTA, 2006 = PPVequip = PPVref x (25/D)^1.5
where

Segment 4

		PPV@25ft
PPV refs @ 25 ft =	pile driver (impact)	0.644
	Vibratory Roller	0.21
	Bulldozer (large)	0.089
	Truck(loaded)	0.076
	Jackhammer	0.035

Enter distance = 370 Adjacent Buildings

Resultant PPV =	pile driver (impact)	0.011311
	Vibratory Roller	0.003688
	Bulldozer (large)	0.001563
	Truck(loaded)	0.001335
	Jackhammer	0.000615

	Lv@25 ft
pile driver (impact)	104
Vibratory Roller	94
Bulldozer (large)	87
Truck(loaded)	86
Jackhammer	79

Formula from FTA 2006 = Lv(D) = Lv(25 ft) – 30log(D/25)

Resultant Lv =	pile driver (impact)	68.89215
	Vibratory Roller	58.89215
	Bulldozer (large)	51.89215
	Truck(loaded)	50.89215
	Jackhammer	43.89215

Vibration propagation from Construction Equipment

DMU Alternative with Storage Facility

Formula from FTA, 2006 = PPVequip = PPVref x (25/D)^1.5
where

Segment 6

		PPV@25ft
PPV refs @ 25 ft =	pile driver (impact)	0.644
	Vibratory Roller	0.21
	Bulldozer (large)	0.089
	Truck(loaded)	0.076
	Jackhammer	0.035

Enter distance = 442 Adjacent Buildings

Resultant PPV =	pile driver (impact)	0.008663
	Vibratory Roller	0.002825
	Bulldozer (large)	0.001197
	Truck(loaded)	0.001022
	Jackhammer	0.000471

	Lv@25 ft
pile driver (impact)	104
Vibratory Roller	94
Bulldozer (large)	87
Truck(loaded)	86
Jackhammer	79

Formula from FTA 2006 = Lv(D) = Lv(25 ft) – 30log(D/25)

Resultant Lv =	pile driver (impact)	66.57553
	Vibratory Roller	56.57553
	Bulldozer (large)	49.57553
	Truck(loaded)	48.57553
	Jackhammer	41.57553

Vibration propagation from Construction Equipment

DMU Alternative with Storage Facility

Formula from FTA, 2006 = PPVequip = PPVref x (25/D)^1.5
where

Segment7

		PPV@25ft
PPV refs @ 25 ft =	pile driver (impact)	0.644
	Vibratory Roller	0.21
	Bulldozer (large)	0.089
	Truck(loaded)	0.076
	Jackhammer	0.035

Enter distance = 855 Adjacent Buildings

Resultant PPV =	pile driver (impact)	0.00322
	Vibratory Roller	0.00105
	Bulldozer (large)	0.000445
	Truck(loaded)	0.00038
	Jackhammer	0.000175

	Lv@25 ft
pile driver (impact)	104
Vibratory Roller	94
Bulldozer (large)	87
Truck(loaded)	86
Jackhammer	79

Formula from FTA 2006 = Lv(D) = Lv(25 ft) – 30log(D/25)

Resultant Lv =	pile driver (impact)	57.97922
	Vibratory Roller	47.97922
	Bulldozer (large)	40.97922
	Truck(loaded)	39.97922
	Jackhammer	32.97922

Vibration propagation from Construction Equipment

DMU Alternative with Storage Facility

Formula from FTA, 2006 = PPVequip = PPVref x (25/D)^1.5
where

Segment 8

		PPV@25ft
PPV refs @ 25 ft =	pile driver (impact)	0.644
	Vibratory Roller	0.21
	Bulldozer (large)	0.089
	Truck(loaded)	0.076
	Jackhammer	0.035

Enter distance = 100 Adjacent Buildings

Resultant PPV =	pile driver (impact)	0.0805
	Vibratory Roller	0.02625
	Bulldozer (large)	0.011125
	Truck(loaded)	0.0095
	Jackhammer	0.004375

	Lv@25 ft
pile driver (impact)	104
Vibratory Roller	94
Bulldozer (large)	87
Truck(loaded)	86
Jackhammer	79

Formula from FTA 2006 = Lv(D) = Lv(25 ft) – 30log(D/25)

Resultant Lv =	pile driver (impact)	85.9382
	Vibratory Roller	75.9382
	Bulldozer (large)	68.9382
	Truck(loaded)	67.9382
	Jackhammer	60.9382

Vibration propagation from Construction Equipment

DMU Alternative with Storage Facility

Formula from FTA, 2006 = PPVequip = PPVref x (25/D)^1.5
where

Segment 9

		PPV@25ft
PPV refs @ 25 ft =	pile driver (impact)	0.644
	Vibratory Roller	0.21
	Bulldozer (large)	0.089
	Truck(loaded)	0.076
	Jackhammer	0.035

Enter distance = 1400 Adjacent Buildings

Resultant PPV =	pile driver (impact)	0.001537
	Vibratory Roller	0.000501
	Bulldozer (large)	0.000212
	Truck(loaded)	0.000181
	Jackhammer	8.35E-05

	Lv@25 ft
pile driver (impact)	104
Vibratory Roller	94
Bulldozer (large)	87
Truck(loaded)	86
Jackhammer	79

Formula from FTA 2006 = Lv(D) = Lv(25 ft) – 30log(D/25)

Resultant Lv =	pile driver (impact)	51.55436
	Vibratory Roller	41.55436
	Bulldozer (large)	34.55436
	Truck(loaded)	33.55436
	Jackhammer	26.55436

Vibration propagation from Construction Equipment

DMU Alternative with Storage Facility

Formula from FTA, 2006 = PPVequip = PPVref x (25/D)^1.5
where

Segment 10

		PPV@25ft
PPV refs @ 25 ft =	pile driver (impact)	0.644
	Vibratory Roller	0.21
	Bulldozer (large)	0.089
	Truck(loaded)	0.076
	Jackhammer	0.035

Enter distance = 845 Adjacent Buildings

Resultant PPV =	pile driver (impact)	0.003277
	Vibratory Roller	0.001069
	Bulldozer (large)	0.000453
	Truck(loaded)	0.000387
	Jackhammer	0.000178

	Lv@25 ft
pile driver (impact)	104
Vibratory Roller	94
Bulldozer (large)	87
Truck(loaded)	86
Jackhammer	79

Formula from FTA 2006 = Lv(D) = Lv(25 ft) – 30log(D/25)

Resultant Lv =	pile driver (impact)	58.1325
	Vibratory Roller	48.1325
	Bulldozer (large)	41.1325
	Truck(loaded)	40.1325
	Jackhammer	33.1325

Vibration propagation from Construction Equipment

DMU Alternative with Storage Facility

Formula from FTA, 2006 = PPVequip = PPVref x (25/D)^1.5
where

Segment 12

		PPV@25ft
PPV refs @ 25 ft =	pile driver (impact)	0.644
	Vibratory Roller	0.21
	Bulldozer (large)	0.089
	Truck(loaded)	0.076
	Jackhammer	0.035

Enter distance = 1000 Adjacent Buildings

Resultant PPV =	pile driver (impact)	0.002546
	Vibratory Roller	0.00083
	Bulldozer (large)	0.000352
	Truck(loaded)	0.0003
	Jackhammer	0.000138

	Lv@25 ft
pile driver (impact)	104
Vibratory Roller	94
Bulldozer (large)	87
Truck(loaded)	86
Jackhammer	79

Formula from FTA 2006 = Lv(D) = Lv(25 ft) – 30log(D/25)

Resultant Lv =	pile driver (impact)	55.9382
	Vibratory Roller	45.9382
	Bulldozer (large)	38.9382
	Truck(loaded)	37.9382
	Jackhammer	30.9382

Vibration propagation from Construction Equipment

DMU Alternative with Storage Facility

Formula from FTA, 2006 = PPVequip = PPVref x (25/D)^1.5
where

Segment 13

		PPV@25ft
PPV refs @ 25 ft =	pile driver (impact)	0.644
	Vibratory Roller	0.21
	Bulldozer (large)	0.089
	Truck(loaded)	0.076
	Jackhammer	0.035

Enter distance = 1100 Adjacent Buildings

Resultant PPV =	pile driver (impact)	0.002207
	Vibratory Roller	0.00072
	Bulldozer (large)	0.000305
	Truck(loaded)	0.00026
	Jackhammer	0.00012

	Lv@25 ft
pile driver (impact)	104
Vibratory Roller	94
Bulldozer (large)	87
Truck(loaded)	86
Jackhammer	79

Formula from FTA 2006 = Lv(D) = Lv(25 ft) – 30log(D/25)

Resultant Lv =	pile driver (impact)	54.69642
	Vibratory Roller	44.69642
	Bulldozer (large)	37.69642
	Truck(loaded)	36.69642
	Jackhammer	29.69642

Vibration propagation from Construction Equipment

DMU Alternative with Storage Facility

Formula from FTA, 2006 = PPVequip = PPVref x (25/D)^1.5
where

Segment 15

		PPV@25ft
PPV refs @ 25 ft =	pile driver (impact)	0.644
	Vibratory Roller	0.21
	Bulldozer (large)	0.089
	Truck(loaded)	0.076
	Jackhammer	0.035

Enter distance = 1200 Adjacent Buildings

Resultant PPV =	pile driver (impact)	0.001937
	Vibratory Roller	0.000631
	Bulldozer (large)	0.000268
	Truck(loaded)	0.000229
	Jackhammer	0.000105

	Lv@25 ft
pile driver (impact)	104
Vibratory Roller	94
Bulldozer (large)	87
Truck(loaded)	86
Jackhammer	79

Formula from FTA 2006 = Lv(D) = Lv(25 ft) – 30log(D/25)

Resultant Lv =	pile driver (impact)	53.56276
	Vibratory Roller	43.56276
	Bulldozer (large)	36.56276
	Truck(loaded)	35.56276
	Jackhammer	28.56276

Vibration propagation from Construction Equipment

DMU Alternative with Storage Facility

Formula from FTA, 2006 = PPVequip = PPVref x (25/D)^1.5
where

Segment 16

		PPV@25ft
PPV refs @ 25 ft =	pile driver (impact)	0.644
	Vibratory Roller	0.21
	Bulldozer (large)	0.089
	Truck(loaded)	0.076
	Jackhammer	0.035

Enter distance = 1400 Adjacent Buildings

Resultant PPV =	pile driver (impact)	0.001537
	Vibratory Roller	0.000501
	Bulldozer (large)	0.000212
	Truck(loaded)	0.000181
	Jackhammer	8.35E-05

	Lv@25 ft
pile driver (impact)	104
Vibratory Roller	94
Bulldozer (large)	87
Truck(loaded)	86
Jackhammer	79

Formula from FTA 2006 = Lv(D) = Lv(25 ft) – 30log(D/25)

Resultant Lv =	pile driver (impact)	51.55436
	Vibratory Roller	41.55436
	Bulldozer (large)	34.55436
	Truck(loaded)	33.55436
	Jackhammer	26.55436

Vibration propagation from Construction Equipment

DMU Alternative with Storage Facility

Formula from FTA, 2006 = PPVequip = PPVref x (25/D)^1.5
where

Segment 17

		PPV@25ft
PPV refs @ 25 ft =	pile driver (impact)	0.644
	Vibratory Roller	0.21
	Bulldozer (large)	0.089
	Truck(loaded)	0.076
	Jackhammer	0.035

Enter distance = 430 Adjacent Buildings

Resultant PPV =	pile driver (impact)	0.009028
	Vibratory Roller	0.002944
	Bulldozer (large)	0.001248
	Truck(loaded)	0.001065
	Jackhammer	0.000491

	Lv@25 ft
pile driver (impact)	104
Vibratory Roller	94
Bulldozer (large)	87
Truck(loaded)	86
Jackhammer	79

Formula from FTA 2006 = Lv(D) = Lv(25 ft) – 30log(D/25)

Resultant Lv =	pile driver (impact)	66.93415
	Vibratory Roller	56.93415
	Bulldozer (large)	49.93415
	Truck(loaded)	48.93415
	Jackhammer	41.93415

Vibration propagation from Construction Equipment

DMU Alternative with Storage Facility

Formula from FTA, 2006 = PPVequip = PPVref x (25/D)^1.5
where

Segment 18

		PPV@25ft
PPV refs @ 25 ft =	pile driver (impact)	0.644
	Vibratory Roller	0.21
	Bulldozer (large)	0.089
	Truck(loaded)	0.076
	Jackhammer	0.035

Enter distance = 1900 Adjacent Buildings

Resultant PPV =	pile driver (impact)	0.000972
	Vibratory Roller	0.000317
	Bulldozer (large)	0.000134
	Truck(loaded)	0.000115
	Jackhammer	5.28E-05

	Lv@25 ft
pile driver (impact)	104
Vibratory Roller	94
Bulldozer (large)	87
Truck(loaded)	86
Jackhammer	79

Formula from FTA 2006 = Lv(D) = Lv(25 ft) – 30log(D/25)

Resultant Lv =	pile driver (impact)	47.57559
	Vibratory Roller	37.57559
	Bulldozer (large)	30.57559
	Truck(loaded)	29.57559
	Jackhammer	22.57559

Vibration propogation from Construction Equipment

Express Bus/BRT Alternative

Formula from FTA, 2006 = PPVequip = PPVref x (25/D)^1.5
where

Segment 2 - Hopyard Interchange

		PPV@25ft
PPV refs @ 25 ft =	pile driver (impact)	0.644
	Vibratory Roller	0.21
	Bulldozer (large)	0.089
	Truck(loaded)	0.076
	Jackhammer	0.035

Enter distance = 1100 Adjacent Buildings

Resultant PPV =	pile driver (impact)	0.002207
	Vibratory Roller	0.00072
	Bulldozer (large)	0.000305
	Truck(loaded)	0.00026
	Jackhammer	0.00012

	Lv@25 ft
pile driver (impact)	104
Vibratory Roller	94
Bulldozer (large)	87
Truck(loaded)	86
Jackhammer	79

Formula from FTA 2006 = Lv(D) = Lv(25 ft) – 30log(D/25)

Resultant Lv =	pile driver (impact)	54.69642
	Vibratory Roller	44.69642
	Bulldozer (large)	37.69642
	Truck(loaded)	36.69642
	Jackhammer	29.69642

Vibration propogation from Construction Equipment

Express Bus/BRT Alternative

Formula from FTA, 2006 = PPVequip = PPVref x (25/D)^1.5
where

Segment 3 - Dublin/Pleasanton Station Cross Transfer Platform

		PPV@25ft
PPV refs @ 25 ft =	pile driver (impact)	0.644
	Vibratory Roller	0.21
	Bulldozer (large)	0.089
	Truck(loaded)	0.076
	Jackhammer	0.035

Enter distance = 370 Adjacent Buildings

Resultant PPV =	pile driver (impact)	0.011311
	Vibratory Roller	0.003688
	Bulldozer (large)	0.001563
	Truck(loaded)	0.001335
	Jackhammer	0.000615

	Lv@25 ft
pile driver (impact)	104
Vibratory Roller	94
Bulldozer (large)	87
Truck(loaded)	86
Jackhammer	79

Formula from FTA 2006 = Lv(D) = Lv(25 ft) – 30log(D/25)

Resultant Lv =	pile driver (impact)	68.89215
	Vibratory Roller	58.89215
	Bulldozer (large)	51.89215
	Truck(loaded)	50.89215
	Jackhammer	43.89215

Vibration propogation from Construction Equipment

Express Bus/BRT Alternative

Formula from FTA, 2006 = PPVequip = PPVref x (25/D)^1.5
where

Segment 4 - Hopyard to Hacienda Drive

		PPV@25ft
PPV refs @ 25 ft =	pile driver (impact)	0.644
	Vibratory Roller	0.21
	Bulldozer (large)	0.089
	Truck(loaded)	0.076
	Jackhammer	0.035

Enter distance = 370 Adjacent Buildings

Resultant PPV =	pile driver (impact)	0.011311
	Vibratory Roller	0.003688
	Bulldozer (large)	0.001563
	Truck(loaded)	0.001335
	Jackhammer	0.000615

	Lv@25 ft
pile driver (impact)	104
Vibratory Roller	94
Bulldozer (large)	87
Truck(loaded)	86
Jackhammer	79

Formula from FTA 2006 = Lv(D) = Lv(25 ft) – 30log(D/25)

Resultant Lv =	pile driver (impact)	68.89215
	Vibratory Roller	58.89215
	Bulldozer (large)	51.89215
	Truck(loaded)	50.89215
	Jackhammer	43.89215

Vibration propogation from Construction Equipment

Express Bus/BRT Alternative

Formula from FTA, 2006 = PPVequip = PPVref x (25/D)^1.5
where

Segment 5 - Hacienda Interchange

		PPV@25ft
PPV refs @ 25 ft =	pile driver (impact)	0.644
	Vibratory Roller	0.21
	Bulldozer (large)	0.089
	Truck(loaded)	0.076
	Jackhammer	0.035

Enter distance = 1150 Adjacent Buildings

Resultant PPV =	pile driver (impact)	0.002064
	Vibratory Roller	0.000673
	Bulldozer (large)	0.000285
	Truck(loaded)	0.000244
	Jackhammer	0.000112

	Lv@25 ft
pile driver (impact)	104
Vibratory Roller	94
Bulldozer (large)	87
Truck(loaded)	86
Jackhammer	79

Formula from FTA 2006 = Lv(D) = Lv(25 ft) – 30log(D/25)

Resultant Lv =	pile driver (impact)	54.11727
	Vibratory Roller	44.11727
	Bulldozer (large)	37.11727
	Truck(loaded)	36.11727
	Jackhammer	29.11727

Vibration propogation from Construction Equipment

Express Bus/BRT Alternative

Formula from FTA, 2006 = PPVequip = PPVref x (25/D)^1.5
where

Laughlin Lot

		PPV@25ft
PPV refs @ 25 ft =	pile driver (impact)	0.644
	Vibratory Roller	0.21
	Bulldozer (large)	0.089
	Truck(loaded)	0.076
	Jackhammer	0.035

Enter distance = 460 Adjacent Buildings

Resultant PPV =	pile driver (impact)	0.008159
	Vibratory Roller	0.002661
	Bulldozer (large)	0.001128
	Truck(loaded)	0.000963
	Jackhammer	0.000443

	Lv@25 ft
pile driver (impact)	104
Vibratory Roller	94
Bulldozer (large)	87
Truck(loaded)	86
Jackhammer	79

Formula from FTA 2006 = Lv(D) = Lv(25 ft) – 30log(D/25)

Resultant Lv =	pile driver (impact)	66.05547
	Vibratory Roller	56.05547
	Bulldozer (large)	49.05547
	Truck(loaded)	48.05547
	Jackhammer	41.05547

G.5 Noise Model Data – Noise Monitoring Summary Sheets

Calculated Ldn from long-term noise monitoring data - LT-1 DP Station Unadjusted

		TIME	dBA	Remove LOG	10 dBA Penalized Values	5 dBA Penalized Values
9/12/2016	Midnight	0 / 24	54.2	263027	2630268	831764
	am 1:00	100	52.4	173780	1737801	549541
	2:00	200	53.3	213796	2137962	676083
	3:00	300	55.5	354813	3548134	1122018
	4:00	400	58.3	676083	6760830	2137962
	5:00	500	58.1	645654	6456542	2041738
	6:00	600	58.3	676083	6760830	2137962
	7:00	700	57.7	588844	5888437	1862087
	8:00	800	56.9	489779	4897788	1548817
	9:00	900	58.1	645654	6456542	2041738
	10:00	1000	59.6	912011	9120108	2884032
	11:00	1100	59.8	954993	9549926	3019952
	12:00	1200	62.3	1698244	16982437	5370318
	pm 1:00	1300	61.2	1318257	13182567	4168694
	2:00	1400	62.7	1862087	18620871	5888437
	3:00	1500	64.6	2884032	28840315	9120108
	4:00	1600	63.6	2290868	22908677	7244360
	5:00	1700	65.4	3467369	34673685	10964782
	6:00	1800	64.2	2630268	26302680	8317638
	7:00	1900	60.7	1174898	11748976	3715352
	8:00	2000	59.6	912011	9120108	2884032
	9:00	2100	57.1	512861	5128614	1621810
	10:00	2200	56.6	457088	4570882	1445440
	pm 11:00	2300	54.6	288403	2884032	912011

Leq Morning Peak Hour 7:00-10:00 a.m.
58 dBA

Leq Evening Peak Hour 4:00-8:00 p.m.
64 dBA

Leq Nighttime 10:00 pm-7:00 a.m. (not penalized)
56 dBA

Leq Daytime 7:00 am-10:00 p.m.
62 dBA

Leq 24-Hour
60 dBA

Ldn: 10 dBA penalty for noise between 10:00 p.m. and 7:00 a.m.
64 dBA

CNEL: 5 dBA penalty for noise between 7:00p.m. and 10:00 p.m.,
64 dBA **and 10 dBA penalty for noise between**
10:00 p.m. and 7:00 a.m.

CNEL - Ldn 0.39000439

Calculated Ldn from long-term noise monitoring data - LT-1 DP Station - Adjusted to reflect front of structure at 5200 Iron Horse Pkwy

			TIME	dBA	Remove LOG	10 dBA Penalized Values	5 dBA Penalized Values
9/12/2016	Midnight	0 / 24		56.5	446684	4466836	1412538
	am	1:00	100	54.7	295121	2951209	933254
		2:00	200	55.6	363078	3630781	1148154
		3:00	300	57.8	602560	6025596	1905461
		4:00	400	60.6	1148154	11481536	3630781
		5:00	500	60.4	1096478	10964782	3467369
		6:00	600	60.6	1148154	11481536	3630781
		7:00	700	60.0	1000000	10000000	3162278
		8:00	800	59.2	831764	8317638	2630268
		9:00	900	60.4	1096478	10964782	3467369
		10:00	1000	61.9	1548817	15488166	4897788
		11:00	1100	62.1	1621810	16218101	5128614
		12:00	1200	64.6	2884032	28840315	9120108
	pm	1:00	1300	63.5	2238721	22387211	7079458
		2:00	1400	65.0	3162278	31622777	10000000
		3:00	1500	66.9	4897788	48977882	15488166
		4:00	1600	65.9	3890451	38904514	12302688
		5:00	1700	67.7	5888437	58884366	18620871
		6:00	1800	66.5	4466836	44668359	14125375
		7:00	1900	63.0	1995262	19952623	6309573
		8:00	2000	61.9	1548817	15488166	4897788
		9:00	2100	59.4	870964	8709636	2754229
		10:00	2200	58.9	776247	7762471	2454709
	pm	11:00	2300	56.9	489779	4897788	1548817

Leq Morning Peak Hour 7:00-10:00 a.m.
59.9 dBA

Leq Evening Peak Hour 4:00-8:00 p.m.
66 dBA

Leq Nighttime 10:00 pm-7:00 a.m. (not penalized)
58 dBA

Leq Daytime 7:00 am-10:00 p.m.
64 dBA

Leq 24-Hour
63 dBA

Ldn: 10 dBA penalty for noise between 10:00 p.m. and 7:00 a.m.
66.3 dBA

CNEL: 5 dBA penalty for noise between 7:00p.m. and 10:00 p.m.,
67 dBA **and 10 dBA penalty for noise between**
10:00 p.m. and 7:00 a.m.

CNEL - Ldn 0.39000439

	monitored Leq	Leq at receptor	Adjustment increase
	64.6	66.9	2.3

```
                                        dp station.TXT

METROSONICS db-308 SN 2458 V2.3  3/87

CURRENT DATE:  9/13/16
CURRENT TIME: 12:52:50

Long-term monitoring Dublin Pleasanton Station area LT-1

_____________________________________

_____________________________________

_____________________________________


CALIBRATED:   9/11/16  @   9:26:23

DISPLAY RANGE:  42.5dB TO 138.5dB

DOUBLING RATE:  3 dB

FILTER: A WGHT

RESPONSE:  SLOW

SCHEDULED RUN: OFF

   START DATE: 9/12/16
   START TIME: 0:00:00
   LENGTH:    26:00:00


** OVERALL REPORT **

TEST STARTING DATE:   9/12/16
TEST STARTING TIME:   0:00:19
TEST LENGTH:     1DAYS  2:00:00

Lav    = 60.1dB
Lav  80= 52.1dB
Lav  90= 43.2dB
SEL    =109.6dB

Lmax = 90.5dB  ON  9/12/16 @ 17:54:49
Lpk  =  125dB  ON  9/12/16 @ 17:53:25

TIME OVER 115dB  0D  0:00:00.00

DOSE CRITERION:  90dB

 8 HR DOSE ( 80dB CUTOFF)=  0.05%
 8 HR DOSE ( 90dB CUTOFF)=  0.00%


** TIME HISTORY REPORT **

MODE: CONTINUOUS
PERIOD LENGTH:  1:00:00
TIME HISTORY CUTOFF: NONE
Ln(1): 10.0%  Ln(2): 90.0%

 INT#   START    Lav    Lmax   Lpk
 TAG#   TIME      ET     L1    L2
```

dp station.TXT

INT# TAG#	START TIME	Lav ET	Lmax L1	Lpk L2
1 0	9/12/16 0:00:19	54.2 1:00:00	63.4 56	<117 51
2 0	9/12/16 1:00:19	52.4 1:00:00	65.5 54	<117 48
3 0	9/12/16 2:00:19	53.3 1:00:00	62.2 56	<117 48
4 0	9/12/16 3:00:19	55.5 1:00:00	61.9 57	<117 51
5 0	9/12/16 4:00:19	58.3 1:00:00	65.5 59	<117 56
6 0	9/12/16 5:00:19	58.1 1:00:00	64.9 60	<117 55
7 0	9/12/16 6:00:19	58.3 1:00:00	63.9 59	<117 56
8 0	9/12/16 7:00:19	57.7 1:00:00	70.9 59	<117 54
9 0	9/12/16 8:00:19	56.9 1:00:00	75.1 58	<117 53
10 0	9/12/16 9:00:19	58.1 1:00:00	80.2 58	119 53
11 0	9/12/16 10:00:19	59.6 1:00:00	77.7 61	119 54
12 0	9/12/16 11:00:19	59.8 1:00:00	77.9 60	118 56
13 0	9/12/16 12:00:19	62.3 1:00:00	82.8 62	120 57
14 0	9/12/16 13:00:19	61.2 1:00:00	81.3 62	118 56
15 0	9/12/16 14:00:19	62.7 1:00:00	84.5 63	123 57
16 0	9/12/16 15:00:19	64.6 1:00:00	89.7 64	124 54
17 0	9/12/16 16:00:19	63.6 1:00:00	85.7 65	123 54
18 0	9/12/16 17:00:19	65.4 1:00:00	90.5 63	125 52
19 0	9/12/16 18:00:19	64.2 1:00:00	85.4 64	122 54

dp station.TXT

20	9/12/16	60.7	80.9	119	
0	19:00:19	1:00:00	61	57	
21	9/12/16	59.6	77.4	117	
0	20:00:19	1:00:00	60	56	
22	9/12/16	57.1	64.5	<117	
0	21:00:19	1:00:00	58	54	
23	9/12/16	56.6	75.9	<117	
0	22:00:19	1:00:00	58	52	
24	9/12/16	54.6	62.1	<117	
0	23:00:19	1:00:00	56	51	
25	9/13/16	53.7	61.0	<117	
0	0:00:19	1:00:00	56	50	
26	9/13/16	51.7	59.5	<117	
0	1:00:19	PARTIAL	54	46	

** AMPLITUDE DISTRIBUTION REPORT **

TOTAL SAMPLES = 748800

dB	SAMPLES		% OF TOTAL
42	43		.00
43	136	.	.01
44	528	.	.07
45	1483	+	.19
46	2400	+	.32
47	4447	*	.59
48	6991	*	.93
49	11936	**	1.59
50	19088	***	2.54
51	24871	***	3.32
52	38402	*****	5.12
53	53763	*******	7.17
54	60814	********	8.12
55	68527	*********	9.15
56	84537	**********	11.28
57	92106	**********	12.30
58	101678	**********	13.57
59	70451	*********	9.40
60	43644	******	5.82
61	21094	***	2.81
62	11152	*	1.48
63	6557	*	.87
64	4519	*	.60
65	3610	+	.48
66	2518	+	.33
67	2299	+	.30
68	2295	+	.30
69	1852	+	.24
70	1628	+	.21
71	1036	+	.13
72	940	+	.12
73	785	+	.10
74	655	.	.08
75	472	.	.06

dp station.TXT

76	378 .		.05
77	274 .		.03
78	178 .		.02
79	184 .		.02
80	169 .		.02
81	105 .		.01
82	75 .		.01
83	37		.00
84	41		.00
85	38		.00
86	19		.00
87	24		.00
88	13		.00
89	6		.00
90	2		.00

Ln(0.0) = 90dB
Ln(10.0) = 60dB
Ln(50.0) = 56dB
Ln(99.9) = 45dB

	NO CUTOFF	80.0dB CUTOFF	90.0dB CUTOFF
Ldod	58.3dB	45.5dB	42.0dB
Losha	57.7dB	43.3dB	42.0dB
Leq(6)	57.4dB	42.6dB	42.0dB

Calculated Ldn from long-term noise monitoring data - LT-2 Pimlico

		TIME		dBA	Remove LOG	10 dBA Penalized Values	5 dBA Penalized Values
9/12/2016	Midnight	0 / 24		53.6	229087	2290868	724436
	am	1:00	100	52.4	173780	1737801	549541
		2:00	200	52.9	194984	1949845	616595
		3:00	300	55.1	323594	3235937	1023293
		4:00	400	58.0	630957	6309573	1995262
		5:00	500	58.2	660693	6606934	2089296
		6:00	600	60.3	1071519	10715193	3388442
		7:00	700	60.6	1148154	11481536	3630781
		8:00	800	59.7	933254	9332543	2951209
		9:00	900	59.4	870964	8709636	2754229
		10:00	1000	59.9	977237	9772372	3090295
		11:00	1100	60.5	1122018	11220185	3548134
		12:00	1200	60.9	1230269	12302688	3890451
	pm	1:00	1300	61.0	1258925	12589254	3981072
		2:00	1400	61.4	1380384	13803843	4365158
		3:00	1500	62.0	1584893	15848932	5011872
		4:00	1600	61.4	1380384	13803843	4365158
		5:00	1700	59.2	831764	8317638	2630268
		6:00	1800	59.9	977237	9772372	3090295
		7:00	1900	59.2	831764	8317638	2630268
		8:00	2000	58.5	707946	7079458	2238721
		9:00	2100	57.0	501187	5011872	1584893
		10:00	2200	57.0	501187	5011872	1584893
	pm	11:00	2300	56.8	478630	4786301	1513561

Leq Morning Peak Hour 7:00-10:00 a.m.
60 dBA

Leq Evening Peak Hour 4:00-8:00 p.m.
60 dBA

Leq Nighttime 10:00 pm-7:00 a.m. (not penalized)
57 dBA

Leq Daytime 7:00 am-10:00 p.m.
60 dBA

Leq 24-Hour
59 dBA

Ldn: 10 dBA penalty for noise between 10:00 p.m. and 7:00 a.m.
64 dBA

CNEL: 5 dBA penalty for noise between 7:00p.m. and 10:00 p.m.,
64 dBA **and 10 dBA penalty for noise between 10:00 p.m. and 7:00 a.m.**

CNEL - Ldn 0.31646673

Pimlico.TXT

METROSONICS db-308 SN 2456 V2.3 3/87

CURRENT DATE: 9/13/16
CURRENT TIME: 13:15:12

Long-term monitoring LT-2 Pimlico

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CALIBRATED: 9/11/16 @ 10:02:37

DISPLAY RANGE: 41.9dB TO 137.9dB

DOUBLING RATE: 3 dB

FILTER: A WGHT

RESPONSE: SLOW

SCHEDULED RUN: OFF

   START DATE: 9/12/16
   START TIME: 0:00:00
   LENGTH: 26:00:00

** OVERALL REPORT **

TEST STARTING DATE: 9/12/16
TEST STARTING TIME: 0:00:19
TEST LENGTH: 1DAYS 2:00:00

Lav   = 59.0dB
Lav 80= 41.9dB
Lav 90= 41.9dB
SEL   =108.5dB

Lmax = 79.1dB ON 9/12/16 @ 16:51:34
Lpk = 120dB ON 9/12/16 @ 15:14:08

TIME OVER 115dB 0D 0:00:00.00

DOSE CRITERION: 90dB

 8 HR DOSE (80dB CUTOFF)= 0.00%
 8 HR DOSE (90dB CUTOFF)= 0.00%

** TIME HISTORY REPORT **

MODE: CONTINUOUS
PERIOD LENGTH: 1:00:00
TIME HISTORY CUTOFF: NONE
Ln(1): 33.0% Ln(2): 90.0%

 INT#   START   Lav   Lmax   Lpk
 TAG#   TIME   ET   L1   L2

Pimlico.TXT

INT# TAG#	START TIME	Lav ET	Lmax L1	Lpk L2
1 0	9/12/16 0:00:19	53.6 1:00:00	66.1 <116 53	49
2 0	9/12/16 1:00:19	52.4 1:00:00	63.8 <116 52	47
3 0	9/12/16 2:00:19	52.9 1:00:00	62.9 <116 53	47
4 0	9/12/16 3:00:19	55.1 1:00:00	63.3 <116 55	50
5 0	9/12/16 4:00:19	58.0 1:00:00	68.2 <116 58	55
6 0	9/12/16 5:00:19	58.2 1:00:00	66.8 <116 58	54
7 0	9/12/16 6:00:19	60.3 1:00:00	72.0 <116 60	57
8 0	9/12/16 7:00:19	60.6 1:00:00	72.8 <116 60	58
9 0	9/12/16 8:00:19	59.7 1:00:00	73.0 <116 59	56
10 0	9/12/16 9:00:19	59.4 1:00:00	74.2 <116 59	56
11 0	9/12/16 10:00:19	59.9 1:00:00	73.2 <116 60	56
12 0	9/12/16 11:00:19	60.5 1:00:00	72.6 <116 60	58
13 0	9/12/16 12:00:19	60.9 1:00:00	75.4 <116 60	58
14 0	9/12/16 13:00:19	61.0 1:00:00	73.9 <116 60	58
15 0	9/12/16 14:00:19	61.4 1:00:00	77.3 <116 61	58
16 0	9/12/16 15:00:19	62.0 1:00:00	77.9 120 61	58
17 0	9/12/16 16:00:19	61.4 1:00:00	79.1 <116 60	57
18 0	9/12/16 17:00:19	59.2 1:00:00	75.8 <116 58	55
19 0	9/12/16 18:00:19	59.9 1:00:00	72.5 <116 59	57

Pimlico.TXT

20	9/12/16	59.2	73.7	<116	
0	19:00:19	1:00:00	59	56	
21	9/12/16	58.5	73.0	<116	
0	20:00:19	1:00:00	58	55	
22	9/12/16	57.0	69.2	<116	
0	21:00:19	1:00:00	57	53	
23	9/12/16	57.0	74.1	<116	
0	22:00:19	1:00:00	56	52	
24	9/12/16	56.8	68.6	<116	
0	23:00:19	1:00:00	57	53	
25	9/13/16	54.9	67.4	<116	
0	0:00:19	1:00:00	55	49	
26	9/13/16	53.1	65.6	<116	
0	1:00:19	PARTIAL	53	46	

** AMPLITUDE DISTRIBUTION REPORT **

TOTAL SAMPLES = 748800

dB	SAMPLES		% OF TOTAL
41	613	.	.08
42	705	.	.09
43	879	+	.11
44	1441	+	.19
45	2267	+	.30
46	4180	*	.55
47	6319	*	.84
48	9311	*	1.24
49	13516	**	1.80
50	16814	**	2.24
51	21680	***	2.89
52	25778	***	3.44
53	29371	****	3.92
54	30292	****	4.04
55	47246	******	6.30
56	67924	*********	9.07
57	76775	**********	10.25
58	102112	**************	13.63
59	105482	**************	14.08
60	84817	***********	11.32
61	50365	*******	6.72
62	26434	****	3.53
63	10614	*	1.41
64	4872	*	.65
65	2619	+	.34
66	1638	+	.21
67	1320	+	.17
68	1054	+	.14
69	688	.	.09
70	611	.	.08
71	433	.	.05
72	269	.	.03
73	177	.	.02
74	86	.	.01

Pimlico.TXT

75	52	.00
76	27	.00
77	11	.00
78	5	.00
79	3	.00

Ln(0.0) = 79dB
Ln(10.0) = 61dB
Ln(50.0) = 58dB
Ln(99.9) = 42dB

	NO CUTOFF	80.0dB CUTOFF	90.0dB CUTOFF
Ldod	58.1dB	41.0dB	41.0dB
Losha	57.9dB	41.0dB	41.0dB
Leq(6)	57.7dB	41.0dB	41.0dB

Calculated Ldn from long-term noise monitoring data - LT-3 Future Isabel Neighborhood

			TIME	dBA	Remove LOG	10 dBA Penalized Values	5 dBA Penalized Values
9/14/2016	Midnight		0 / 24	50.4	109648	1096478	346737
	am	1:00	100	48.4	69183	691831	218776
		2:00	200	53.2	208930	2089296	660693
		3:00	300	54.4	275423	2754229	870964
		4:00	400	58.0	630957	6309573	1995262
		5:00	500	55.0	316228	3162278	1000000
		6:00	600	56.0	398107	3981072	1258925
		7:00	700	57.3	537032	5370318	1698244
		8:00	800	57.1	512861	5128614	1621810
		9:00	900	59.1	812831	8128305	2570396
		10:00	1000	57.0	501187	5011872	1584893
		11:00	1100	57.5	562341	5623413	1778279
		12:00	1200	57.0	501187	5011872	1584893
	pm	1:00	1300	57.1	512861	5128614	1621810
		2:00	1400	58.2	660693	6606934	2089296
		3:00	1500	56.5	446684	4466836	1412538
		4:00	1600	57.0	501187	5011872	1584893
		5:00	1700	58.5	707946	7079458	2238721
		6:00	1800	57.4	549541	5495409	1737801
		7:00	1900	56.9	489779	4897788	1548817
		8:00	2000	55.8	380189	3801894	1202264
		9:00	2100	55.0	316228	3162278	1000000
		10:00	2200	54.5	281838	2818383	891251
	pm	11:00	2300	52.1	162181	1621810	512861

Leq Morning Peak Hour 7:00-10:00 a.m.
57.9 dBA

Leq Evening Peak Hour 4:00-8:00 p.m.
57 dBA

Leq Nighttime 10:00 pm-7:00 a.m. (not penalized)
54 dBA

Leq Daytime 7:00 am-10:00 p.m.
57 dBA

Leq 24-Hour
56 dBA

Ldn: 10 dBA penalty for noise between 10:00 p.m. and 7:00 a.m.
61.3 dBA

CNEL: 5 dBA penalty for noise between 7:00p.m. and 10:00 p.m.,
62 dBA **and 10 dBA penalty for noise between**
10:00 p.m. and 7:00 a.m.

CNEL - Ldn 0.32971965

Future Isabel.TXT

METROSONICS db-308 SN 2593 V2.3 3/87

CURRENT DATE: 9/15/16
CURRENT TIME: 13:27:38

Long-term Monitoring LT-3

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CALIBRATED: 9/13/16 @ 14:17:51

DISPLAY RANGE: 41.9dB TO 137.9dB

DOUBLING RATE: 3 dB

FILTER: A WGHT

RESPONSE: SLOW

SCHEDULED RUN: OFF

START DATE: 9/14/16
START TIME: 0:00:00
LENGTH: 26:00:00

** OVERALL REPORT **

TEST STARTING DATE: 9/14/16
TEST STARTING TIME: 0:00:19
TEST LENGTH: 1DAYS 2:00:00

Lav = 56.1dB
Lav 80= 41.9dB
Lav 90= 41.9dB
SEL =105.7dB

Lmax = 78.0dB ON 9/14/16 @ 4:17:34
Lpk < 116dB

TIME OVER 115dB 0D 0:00:00.00

DOSE CRITERION: 90dB

8 HR DOSE (80dB CUTOFF)= 0.00%
8 HR DOSE (90dB CUTOFF)= 0.00%

** TIME HISTORY REPORT **

MODE: CONTINUOUS
PERIOD LENGTH: 1:00:00
TIME HISTORY CUTOFF: NONE
Ln(1): 10.0% Ln(2): 90.0%

INT# TAG#	START TIME	Lav ET	Lmax L1	Lpk L2

Future Isabel.TXT

1	9/14/16	50.4	62.3	<116	
0	0:00:19	1:00:00	52	47	
2	9/14/16	48.4	62.1	<116	
0	1:00:19	1:00:00	50	45	
3	9/14/16	53.2	64.8	<116	
0	2:00:19	1:00:00	55	49	
4	9/14/16	54.4	63.3	<116	
0	3:00:19	1:00:00	56	51	
5	9/14/16	58.0	78.0	<116	
0	4:00:19	1:00:00	59	55	
6	9/14/16	55.0	65.6	<116	
0	5:00:19	1:00:00	56	53	
7	9/14/16	56.0	62.7	<116	
0	6:00:19	1:00:00	57	54	
8	9/14/16	57.3	74.5	<116	
0	7:00:19	1:00:00	58	53	
9	9/14/16	57.1	71.4	<116	
0	8:00:19	1:00:00	59	53	
10	9/14/16	59.1	70.4	<116	
0	9:00:19	1:00:00	60	56	
11	9/14/16	57.0	66.8	<116	
0	10:00:19	1:00:00	61	51	
12	9/14/16	57.5	74.5	<116	
0	11:00:19	1:00:00	60	51	
13	9/14/16	57.0	69.7	<116	
0	12:00:19	1:00:00	59	53	
14	9/14/16	57.1	68.0	<116	
0	13:00:19	1:00:00	58	54	
15	9/14/16	58.2	66.1	<116	
0	14:00:19	1:00:00	59	55	

INT#	START	Lav	Lmax	Lpk
TAG#	TIME	ET	L1	L2
16	9/14/16	56.5	66.0	<116
0	15:00:19	1:00:00	58	53
17	9/14/16	57.0	68.7	<116
0	16:00:19	1:00:00	58	54
18	9/14/16	58.5	70.7	<116
0	17:00:19	1:00:00	60	56
19	9/14/16	57.4	71.8	<116
0	18:00:19	1:00:00	58	55

Future Isabel.TXT

```
20  9/14/16   56.9   68.3 <116                     *           +
 0 19:00:19  1:00:00  58     55

21  9/14/16   55.8   69.7 <116                   *              +
 0 20:00:19  1:00:00  57     53

22  9/14/16   55.0   63.7 <116                   *        +
 0 21:00:19  1:00:00  56     53

23  9/14/16   54.5   68.9 <116                  *               +
 0 22:00:19  1:00:00  56     51

24  9/14/16   52.1   74.5 <116               *                        +
 0 23:00:19  1:00:00  53     48

25  9/15/16   50.5   60.6 <116              *          +
 0  0:00:19  1:00:00  52     47

26  9/15/16   51.2   59.9 <116              *         +
 0  1:00:19  PARTIAL  53     47
```

** AMPLITUDE DISTRIBUTION REPORT **

TOTAL SAMPLES =   748800

dB	SAMPLES		% OF TOTAL
42	32		.00
43	616	.	.08
44	1750	+	.23
45	3416	+	.45
46	8557	*	1.14
47	14438	**	1.92
48	20353	***	2.71
49	31279	****	4.17
50	31899	****	4.26
51	36028	*****	4.81
52	45447	******	6.06
53	71865	**********	9.59
54	79154	***********	10.57
55	111757	***************	14.92
56	99825	*************	13.33
57	76700	**********	10.24
58	53544	*******	7.15
59	28159	****	3.76
60	15486	**	2.06
61	7828	*	1.04
62	4383	*	.58
63	2476	+	.33
64	1287	+	.17
65	676	.	.09
66	481	.	.06
67	495	.	.06
68	321	.	.04
69	227	.	.03
70	149	.	.01
71	52		.00
72	33		.00
73	41		.00
74	28		.00
75	3		.00

76	6	.00
77	8	.00
78	1	.00

Ln(0.0) = 78dB
Ln(10.0) = 58dB
Ln(50.0) = 55dB
Ln(99.9) = 44dB

	NO CUTOFF	80.0dB CUTOFF	90.0dB CUTOFF
Ldod	55.4dB	41.0dB	41.0dB
Losha	55.1dB	41.0dB	41.0dB
Leq(6)	55.0dB	41.0dB	41.0dB

Calculated Ldn from long-term noise monitoring data - LT-4 Campus Drive

			TIME	dBA	Remove LOG	10 dBA Penalized Values	5 dBA Penalized Values
9/14/2016	Midnight	0 / 24		51.2	131826	1318257	416869
	am	1:00	100	48.8	75858	758578	239883
		2:00	200	50.1	102329	1023293	323594
		3:00	300	53.7	234423	2344229	741310
		4:00	400	56.5	446684	4466836	1412538
		5:00	500	58.6	724436	7244360	2290868
		6:00	600	60.4	1096478	10964782	3467369
		7:00	700	62.6	1819701	18197009	5754399
		8:00	800	61.4	1380384	13803843	4365158
		9:00	900	62.9	1949845	19498446	6165950
		10:00	1000	64.1	2570396	25703958	8128305
		11:00	1100	62.0	1584893	15848932	5011872
		12:00	1200	64.5	2818383	28183829	8912509
	pm	1:00	1300	65.4	3467369	34673685	10964782
		2:00	1400	63.2	2089296	20892961	6606934
		3:00	1500	62.6	1819701	18197009	5754399
		4:00	1600	61.5	1412538	14125375	4466836
		5:00	1700	61.8	1513561	15135612	4786301
		6:00	1800	63.1	2041738	20417379	6456542
		7:00	1900	61.1	1288250	12882496	4073803
		8:00	2000	59.1	812831	8128305	2570396
		9:00	2100	60.9	1230269	12302688	3890451
		10:00	2200	56.8	478630	4786301	1513561
	pm	11:00	2300	52.3	169824	1698244	537032

Leq Morning Peak Hour 7:00-10:00 a.m.
62.3 dBA

Leq Evening Peak Hour 4:00-8:00 p.m.
62 dBA

Leq Nighttime 10:00 pm-7:00 a.m. (not penalized)
56 dBA

Leq Daytime 7:00 am-10:00 p.m.
63 dBA

Leq 24-Hour
61 dBA

Ldn: 10 dBA penalty for noise between 10:00 p.m. and 7:00 a.m.
64.2 dBA

CNEL: 5 dBA penalty for noise between 7:00p.m. and 10:00 p.m., and 10 dBA penalty for noise between 10:00 p.m. and 7:00 a.m.
65 dBA

CNEL - Ldn 0.47442345

montage.TXT

METROSONICS db-308 SN 2458 V2.3 3/87

CURRENT DATE: 9/15/16
CURRENT TIME: 12:58:56

Long Term Monitoring LT-4 Montage

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CALIBRATED: 9/13/16 @ 13:45:12

DISPLAY RANGE: 42.4dB TO 138.4dB

DOUBLING RATE: 3 dB

FILTER: A WGHT

RESPONSE: SLOW

SCHEDULED RUN: OFF

START DATE: 9/14/16
START TIME: 0:00:00
LENGTH: 26:00:00

** OVERALL REPORT **

TEST STARTING DATE: 9/14/16
TEST STARTING TIME: 0:00:19
TEST LENGTH: 1DAYS 2:00:00

Lav = 60.8dB
Lav 80= 52.7dB
Lav 90= 48.1dB
SEL =110.4dB

Lmax = 96.5dB ON 9/14/16 @ 13:24:06
Lpk = 124dB ON 9/14/16 @ 13:24:06

TIME OVER 115dB 0D 0:00:00.00

DOSE CRITERION: 90dB

8 HR DOSE (80dB CUTOFF)= 0.05%
8 HR DOSE (90dB CUTOFF)= 0.02%

** TIME HISTORY REPORT **

MODE: CONTINUOUS
PERIOD LENGTH: 1:00:00
TIME HISTORY CUTOFF: NONE
Ln(1): 10.0% Ln(2): 90.0%

INT# TAG#	START TIME	Lav ET	Lmax L1	Lpk L2

montage.TXT

1	9/14/16	51.2	71.4	<117	
0	0:00:19	1:00:00	52	46	
2	9/14/16	48.8	62.5	<117	
0	1:00:19	1:00:00	51	44	
3	9/14/16	50.1	63.7	<117	
0	2:00:19	1:00:00	52	46	
4	9/14/16	53.7	69.0	<117	
0	3:00:19	1:00:00	56	48	
5	9/14/16	56.5	71.9	<117	
0	4:00:19	1:00:00	57	53	
6	9/14/16	58.6	76.2	<117	
0	5:00:19	1:00:00	60	55	
7	9/14/16	60.4	74.7	<117	
0	6:00:19	1:00:00	62	56	
8	9/14/16	62.6	80.7	<117	
0	7:00:19	1:00:00	64	58	
9	9/14/16	61.4	72.6	<117	
0	8:00:19	1:00:00	64	56	
10	9/14/16	62.9	82.0	<117	
0	9:00:19	1:00:00	65	56	
11	9/14/16	64.1	90.3	<117	
0	10:00:19	1:00:00	65	55	
12	9/14/16	62.0	86.1	<117	
0	11:00:19	1:00:00	64	54	
13	9/14/16	64.5	92.5	<117	
0	12:00:19	1:00:00	65	56	
14	9/14/16	65.4	96.5	124	
0	13:00:19	1:00:00	66	56	
15	9/14/16	63.2	87.2	<117	
0	14:00:19	1:00:00	65	56	

INT#	START	Lav	Lmax	Lpk
TAG#	TIME	ET	L1	L2
16	9/14/16	62.6	82.4	<117
0	15:00:19	1:00:00	65	56
17	9/14/16	61.5	77.8	<117
0	16:00:19	1:00:00	64	55
18	9/14/16	61.8	78.3	<117
0	17:00:19	1:00:00	64	56
19	9/14/16	63.1	90.2	<117
0	18:00:19	1:00:00	64	56

montage.TXT

20	9/14/16	61.1	74.8	<117	
0	19:00:19	1:00:00	63	55	
21	9/14/16	59.1	71.8	<117	
0	20:00:19	1:00:00	62	53	
22	9/14/16	60.9	78.5	<117	
0	21:00:19	1:00:00	63	54	
23	9/14/16	56.8	73.2	<117	
0	22:00:19	1:00:00	60	50	
24	9/14/16	52.3	78.7	<117	
0	23:00:19	1:00:00	52	47	
25	9/15/16	50.4	67.9	<117	
0	0:00:19	1:00:00	51	46	
26	9/15/16	51.0	77.0	<117	
0	1:00:19	PARTIAL	51	45	

** AMPLITUDE DISTRIBUTION REPORT **

TOTAL SAMPLES = 748800

dB	SAMPLES		% OF TOTAL
42	176	.	.02
43	1635	+	.21
44	4930	*	.65
45	11212	*	1.49
46	18620	**	2.48
47	26336	****	3.51
48	30846	****	4.11
49	34930	*****	4.66
50	26895	****	3.59
51	22114	***	2.95
52	19127	***	2.55
53	23020	***	3.07
54	29914	****	3.99
55	40162	*****	5.36
56	56017	*******	7.48
57	60078	********	8.02
58	65405	*********	8.73
59	59147	********	7.89
60	54536	*******	7.28
61	46655	******	6.23
62	33184	****	4.43
63	25030	***	3.34
64	17650	**	2.35
65	12727	**	1.69
66	8289	*	1.10
67	6249	*	.83
68	5206	*	.69
69	3046	+	.40
70	1946	+	.25
71	1117	+	.14
72	723	.	.09
73	540	.	.07
74	287	.	.03
75	240	.	.03
76	174	.	.02

montage.TXT

77	153	.	.02
78	93	.	.01
79	55		.00
80	74		.00
81	49		.00
82	37		.00
83	25		.00
84	30		.00
85	32		.00
86	20		.00
87	14		.00
88	15		.00
89	16		.00
90	7		.00
91	5		.00
92	5		.00
93	1		.00

dB	SAMPLES	% OF TOTAL
94	2	.00
95	2	.00
96	2	.00

Ln(0.0) = 96dB
Ln(10.0) = 63dB
Ln(50.0) = 57dB
Ln(99.9) = 43dB

	NO CUTOFF	80.0dB CUTOFF	90.0dB CUTOFF
Ldod	59.1dB	45.3dB	43.0dB
Losha	58.4dB	43.1dB	42.2dB
Leq(6)	58.1dB	42.5dB	42.1dB

Calculated Ldn from long-term noise monitoring data - LT-5 Saddle Back Circle

			TIME	dBA	Remove LOG	10 dBA Penalized Values	5 dBA Penalized Values
9/14/2016	Midnight		0 / 24	56.6	457088	4570882	1445440
	am	1:00	100	55.0	316228	3162278	1000000
		2:00	200	55.5	354813	3548134	1122018
		3:00	300	58.5	707946	7079458	2238721
		4:00	400	61.1	1288250	12882496	4073803
		5:00	500	62.0	1584893	15848932	5011872
		6:00	600	62.6	1819701	18197009	5754399
		7:00	700	62.9	1949845	19498446	6165950
		8:00	800	62.6	1819701	18197009	5754399
		9:00	900	64.8	3019952	30199517	9549926
		10:00	1000	63.5	2238721	22387211	7079458
		11:00	1100	62.0	1584893	15848932	5011872
		12:00	1200	60.6	1148154	11481536	3630781
	pm	1:00	1300	62.2	1659587	16595869	5248075
		2:00	1400	61.5	1412538	14125375	4466836
		3:00	1500	64.7	2951209	29512092	9332543
		4:00	1600	62.7	1862087	18620871	5888437
		5:00	1700	63.5	2238721	22387211	7079458
		6:00	1800	63.5	2238721	22387211	7079458
		7:00	1900	62.1	1621810	16218101	5128614
		8:00	2000	60.5	1122018	11220185	3548134
		9:00	2100	60.1	1023293	10232930	3235937
		10:00	2200	58.8	758578	7585776	2398833
	pm	11:00	2300	56.9	489779	4897788	1548817

Leq Morning Peak Hour 7:00-10:00 a.m.
63.5 dBA

Leq Evening Peak Hour 4:00-8:00 p.m.
63 dBA

Leq Nighttime 10:00 pm-7:00 a.m. (not penalized)
59 dBA

Leq Daytime 7:00 am-10:00 p.m.
63 dBA

Leq 24-Hour
62 dBA

Ldn: 10 dBA penalty for noise between 10:00 p.m. and 7:00 a.m.
66.4 dBA

CNEL: 5 dBA penalty for noise between 7:00p.m. and 10:00 p.m.,
67 dBA **and 10 dBA penalty for noise between 10:00 p.m. and 7:00 a.m.**

CNEL - Ldn 0.32251707

Saddleback.TXT

METROSONICS db-308 SN 2456 V2.3 3/87

CURRENT DATE: 9/15/16
CURRENT TIME: 13:12:56

Long-term monitoring LT-5 Saddleback

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CALIBRATED: 9/13/16 @ 14:01:35

DISPLAY RANGE: 41.9dB TO 137.9dB

DOUBLING RATE: 3 dB

FILTER: A WGHT

RESPONSE: SLOW

SCHEDULED RUN: OFF

START DATE: 9/14/16
START TIME: 0:00:00
LENGTH: 26:00:00

** OVERALL REPORT **

TEST STARTING DATE: 9/14/16
TEST STARTING TIME: 0:00:19
TEST LENGTH: 1DAYS 2:00:00

Lav = 61.5dB
Lav 80= 48.5dB
Lav 90= 41.9dB
SEL =111.0dB

Lmax = 88.0dB ON 9/14/16 @ 8:09:30
Lpk < 116dB

TIME OVER 115dB 0D 0:00:00.00

DOSE CRITERION: 90dB

8 HR DOSE (80dB CUTOFF)= 0.02%
8 HR DOSE (90dB CUTOFF)= 0.00%

** TIME HISTORY REPORT **

MODE: CONTINUOUS
PERIOD LENGTH: 1:00:00
TIME HISTORY CUTOFF: NONE
Ln(1): 33.0% Ln(2): 90.0%

INT# TAG#	START TIME	Lav ET	Lmax L1	Lpk L2

Saddleback.TXT

1	9/14/16	56.6	75.6	<116	
0	0:00:19	1:00:00	56	50	
2	9/14/16	55.0	66.4	<116	
0	1:00:19	1:00:00	55	49	
3	9/14/16	55.5	65.9	<116	
0	2:00:19	1:00:00	56	49	
4	9/14/16	58.5	68.3	<116	
0	3:00:19	1:00:00	59	54	
5	9/14/16	61.1	74.3	<116	
0	4:00:19	1:00:00	61	58	
6	9/14/16	62.0	77.3	<116	
0	5:00:19	1:00:00	61	59	
7	9/14/16	62.6	73.6	<116	
0	6:00:19	1:00:00	62	59	
8	9/14/16	62.9	80.5	<116	
0	7:00:19	1:00:00	62	58	
9	9/14/16	62.6	88.0	<116	
0	8:00:19	1:00:00	60	57	
10	9/14/16	64.8	86.8	<116	
0	9:00:19	1:00:00	63	59	
11	9/14/16	63.5	74.2	<116	
0	10:00:19	1:00:00	63	60	
12	9/14/16	62.0	81.1	<116	
0	11:00:19	1:00:00	60	57	
13	9/14/16	60.6	72.6	<116	
0	12:00:19	1:00:00	60	57	
14	9/14/16	62.2	80.5	<116	
0	13:00:19	1:00:00	60	57	
15	9/14/16	61.5	71.8	<116	
0	14:00:19	1:00:00	61	57	

NT#	START	Lav	Lmax	Lpk
AG#	TIME	ET	L1	L2

16	9/14/16	64.7	85.7	<116	
0	15:00:19	1:00:00	62	58	
17	9/14/16	62.7	81.0	<116	
0	16:00:19	1:00:00	62	59	
18	9/14/16	63.5	75.5	<116	
0	17:00:19	1:00:00	63	60	
19	9/14/16	63.5	86.7	<116	
0	18:00:19	1:00:00	62	58	

Saddleback.TXT

20	9/14/16	62.1	86.4	<116	* +
0	19:00:19	1:00:00	60	56	
21	9/14/16	60.5	77.2	<116	* +
0	20:00:19	1:00:00	60	56	
22	9/14/16	60.1	77.7	<116	* +
0	21:00:19	1:00:00	60	56	
23	9/14/16	58.8	70.2	<116	* +
0	22:00:19	1:00:00	58	54	
24	9/14/16	56.9	70.2	<116	* +
0	23:00:19	1:00:00	57	52	
25	9/15/16	56.2	73.0	<116	* +
0	0:00:19	1:00:00	56	51	
26	9/15/16	55.8	66.8	<116	* +
0	1:00:19	PARTIAL	56	49	

** AMPLITUDE DISTRIBUTION REPORT **

TOTAL SAMPLES = 748800

dB	SAMPLES		% OF TOTAL
41	38		.00
42	104	.	.01
43	231	.	.03
44	456	.	.06
45	618	.	.08
46	1132	+	.15
47	1909	+	.25
48	3256	+	.43
49	6285	*	.83
50	8157	*	1.08
51	11682	**	1.56
52	15750	**	2.10
53	20594	***	2.75
54	21855	***	2.91
55	32858	****	4.38
56	48307	******	6.45
57	56649	********	7.56
58	77673	**********	10.37
59	90275	************	12.05
60	98726	*************	13.18
61	83502	***********	11.15
62	65374	*********	8.73
63	40046	*****	5.34
64	24630	***	3.28
65	13433	**	1.79
66	7605	*	1.01
67	5065	*	.67
68	3732	+	.49
69	2190	+	.29
70	1734	+	.23
71	1165	+	.15
72	1329	+	.17
73	937	+	.12
74	455	.	.06
75	310	.	.04

saddleback.TXT

76	204	.	.02
77	118	.	.01
78	85	.	.01
79	101	.	.01
80	75	.	.01
81	31		.00
82	20		.00
83	19		.00
84	30		.00
85	24		.00
86	27		.00
87	3		.00
88	1		.00

Ln(0.0) = 88dB
Ln(10.0) = 63dB
Ln(50.0) = 59dB
Ln(99.9) = 44dB

	NO CUTOFF	80.0dB CUTOFF	90.0dB CUTOFF
Ldod	60.4dB	43.1dB	41.0dB
Losha	60.0dB	41.7dB	41.0dB
Leq(6)	59.8dB	41.3dB	41.0dB

Calculated Ldn from long-term noise monitoring data - LT-6 Murietta Blvd.

		TIME		dBA	Remove LOG	10 dBA Penalized Values	5 dBA Penalized Values
9/16/2016	Midnight	0 / 24		53.9	245471	2454709	776247
	am	1:00	100	50.1	102329	1023293	323594
		2:00	200	50.6	114815	1148154	363078
		3:00	300	51.4	138038	1380384	436516
		4:00	400	56.6	457088	4570882	1445440
		5:00	500	59.5	891251	8912509	2818383
		6:00	600	61.7	1479108	14791084	4677351
		7:00	700	64.7	2951209	29512092	9332543
		8:00	800	64.6	2884032	28840315	9120108
		9:00	900	64.7	2951209	29512092	9332543
		10:00	1000	63.1	2041738	20417379	6456542
		11:00	1100	63.2	2089296	20892961	6606934
		12:00	1200	63.3	2137962	21379621	6760830
	pm	1:00	1300	63.2	2089296	20892961	6606934
		2:00	1400	63.4	2187762	21877616	6918310
		3:00	1500	64.8	3019952	30199517	9549926
		4:00	1600	63.8	2398833	23988329	7585776
		5:00	1700	64.0	2511886	25118864	7943282
		6:00	1800	64.0	2511886	25118864	7943282
		7:00	1900	62.6	1819701	18197009	5754399
		8:00	2000	65.5	3548134	35481339	11220185
		9:00	2100	60.5	1122018	11220185	3548134
		10:00	2200	59.7	933254	9332543	2951209
	pm	11:00	2300	57.4	549541	5495409	1737801

Leq Morning Peak Hour 7:00-10:00 a.m.
64.7 dBA

Leq Evening Peak Hour 4:00-8:00 p.m.
64 dBA

Leq Nighttime 10:00 pm-7:00 a.m. (not penalized)
57 dBA

Leq Daytime 7:00 am-10:00 p.m.
64 dBA

Leq 24-Hour
62 dBA

Ldn: 10 dBA penalty for noise between 10:00 p.m. and 7:00 a.m.
65.5 dBA

CNEL: 5 dBA penalty for noise between 7:00p.m. and 10:00 p.m.,
66 dBA **and 10 dBA penalty for noise between 10:00 p.m. and 7:00 a.m.**

CNEL - Ldn 0.66090831

Murietta.txt

METROSONICS db-308 SN 2456 V2.3 3/87

CURRENT DATE: 9/19/16
CURRENT TIME: 9:00:11

Long-term Monitoring LT-6 Murrietta

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CALIBRATED: 9/15/16 @ 13:17:06

DISPLAY RANGE: 41.9dB TO 137.9dB

DOUBLING RATE: 3 dB

FILTER: A WGHT

RESPONSE: SLOW

SCHEDULED RUN: OFF

   START DATE: 9/16/16
   START TIME: 0:00:00
   LENGTH: 26:00:00

** OVERALL REPORT **

TEST STARTING DATE: 9/16/16
TEST STARTING TIME: 0:00:19
TEST LENGTH: 1DAYS 2:00:00

Lav   = 62.1dB
Lav 80= 51.1dB
Lav 90= 48.2dB
SEL   =111.6dB

Lmax = 96.7dB ON 9/16/16 @ 20:25:37
Lpk < 116dB

TIME OVER 115dB 0D 0:00:00.00

DOSE CRITERION: 90dB

 8 HR DOSE (80dB CUTOFF)= 0.04%
 8 HR DOSE (90dB CUTOFF)= 0.02%

** TIME HISTORY REPORT **

MODE: CONTINUOUS
PERIOD LENGTH: 1:00:00
TIME HISTORY CUTOFF: NONE
Ln(1): 33.0% Ln(2): 90.0%

 INT#   START   Lav   Lmax   Lpk
 TAG#   TIME   ET   L1   L2

Murietta.txt

INT# TAG#	START TIME	Lav ET	Lmax L1	Lpk L2	
1 0	9/16/16 0:00:19	53.9 1:00:00	68.9 45	<116 41	
2 0	9/16/16 1:00:19	50.1 1:00:00	68.7 41	<116 41	
3 0	9/16/16 2:00:19	50.6 1:00:00	68.3 42	<116 41	
4 0	9/16/16 3:00:19	51.4 1:00:00	68.9 43	<116 41	
5 0	9/16/16 4:00:19	56.6 1:00:00	75.3 51	<116 43	
6 0	9/16/16 5:00:19	59.5 1:00:00	75.4 58	<116 43	
7 0	9/16/16 6:00:19	61.7 1:00:00	73.5 61	<116 46	
8 0	9/16/16 7:00:19	64.7 1:00:00	76.4 64	<116 52	
9 0	9/16/16 8:00:19	64.6 1:00:00	75.4 65	<116 51	
10 0	9/16/16 9:00:19	64.7 1:00:00	87.1 63	<116 51	
11 0	9/16/16 10:00:19	63.1 1:00:00	76.4 63	<116 49	
12 0	9/16/16 11:00:19	63.2 1:00:00	74.5 63	<116 50	
13 0	9/16/16 12:00:19	63.3 1:00:00	79.1 63	<116 52	
14 0	9/16/16 13:00:19	63.2 1:00:00	79.8 63	<116 50	
15 0	9/16/16 14:00:19	63.4 1:00:00	75.7 64	<116 51	
16 0	9/16/16 15:00:19	64.8 1:00:00	85.0 65	<116 52	
17 0	9/16/16 16:00:19	63.8 1:00:00	76.7 64	<116 52	
18 0	9/16/16 17:00:19	64.0 1:00:00	75.6 64	<116 53	
19 0	9/16/16 18:00:19	64.0 1:00:00	83.5 64	<116 53	

Murietta.txt

```
 20  9/16/16   62.6    74.1 <116                    *       +
  0 19:00:19  1:00:00  63      49

 21  9/16/16   65.5    96.7 <116                     *                     +
  0 20:00:19  1:00:00  61      47

 22  9/16/16   60.5    75.0 <116                  *          +
  0 21:00:19  1:00:00  60      45

 23  9/16/16   59.7    79.7 <116                  *             +
  0 22:00:19  1:00:00  58      44

 24  9/16/16   57.4    74.5 <116                *           +
  0 23:00:19  1:00:00  55      42

 25  9/17/16   56.0    72.5 <116               *           +
  0  0:00:19  1:00:00  53      41

 26  9/17/16   55.0    73.3 <116               *            +
  0  1:00:19  PARTIAL  47      41
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** AMPLITUDE DISTRIBUTION REPORT **

TOTAL SAMPLES =    748800

   dB    SAMPLES                                                 % OF TOTAL
____________________________________________________________________________
   41      85798 ***********                                          11.45
   42      24560 ***                                                   3.27
   43      25037 ***                                                   3.34
   44      20776 ***                                                   2.77
   45      20412 ***                                                   2.72
   46      18889 ***                                                   2.52
   47      14312 **                                                    1.91
   48      11973 **                                                    1.59
   49      12558 **                                                    1.67
   50      11243 **                                                    1.50
   51      12691 **                                                    1.69
   52      14186 **                                                    1.89
   53      14758 **                                                    1.97
   54      16575 **                                                    2.21
   55      19878 ***                                                   2.65
   56      28570 ****                                                  3.81
   57      27407 ****                                                  3.66
   58      32328 ****                                                  4.31
   59      32409 ****                                                  4.32
   60      35386 *****                                                 4.72
   61      35770 *****                                                 4.77
   62      39743 *****                                                 5.30
   63      39103 *****                                                 5.22
   64      38368 *****                                                 5.12
   65      33167 ****                                                  4.42
   66      28305 ****                                                  3.78
   67      24164 ***                                                   3.22
   68      16794 **                                                    2.24
   69       6933 *                                                      .92
   70       3633 +                                                      .48
   71       1441 +                                                      .19
   72        581 .                                                      .07
   73        310 .                                                      .04
   74        208 .                                                      .02
```

Murietta.txt

75	155	.	.02
76	72		.00
77	34		.00
78	35		.00
79	34		.00
80	24		.00
81	29		.00
82	27		.00
83	34		.00
84	24		.00
85	25		.00
86	16		.00
87	3		.00
88	3		.00
89	1		.00
90	2		.00
91	2		.00
92	3		.00

dB	SAMPLES	% OF TOTAL
93	2	.00
94	2	.00
95	3	.00
96	4	.00

Ln(0.0) = 96dB
Ln(10.0) = 66dB
Ln(50.0) = 57dB
Ln(99.9) = 41dB

	NO CUTOFF	80.0dB CUTOFF	90.0dB CUTOFF
Ldod	60.4dB	43.7dB	42.2dB
Losha	59.6dB	41.8dB	41.2dB
Leq(6)	59.0dB	41.4dB	41.1dB

Calculated Ldn from long-term noise monitoring data - LT-7 Laughlin road

		TIME	dBA	Remove LOG	10 dBA Penalized Values	5 dBA Penalized Values
9/16/2016	Midnight	0 / 24	53.2	208930	2089296	660693
	am 1:00	100	52.6	181970	1819701	575440
	2:00	200	54.1	257040	2570396	812831
	3:00	300	56.4	436516	4365158	1380384
	4:00	400	60.4	1096478	10964782	3467369
	5:00	500	61.0	1258925	12589254	3981072
	6:00	600	59.4	870964	8709636	2754229
	7:00	700	59.9	977237	9772372	3090295
	8:00	800	58.3	676083	6760830	2137962
	9:00	900	54.9	309030	3090295	977237
	10:00	1000	53.3	213796	2137962	676083
	11:00	1100	53.9	245471	2454709	776247
	12:00	1200	51.7	147911	1479108	467735
	pm 1:00	1300	51.8	151356	1513561	478630
	2:00	1400	50.9	123027	1230269	389045
	3:00	1500	52.8	190546	1905461	602560
	4:00	1600	54.5	281838	2818383	891251
	5:00	1700	55.3	338844	3388442	1071519
	6:00	1800	56.2	416869	4168694	1318257
	7:00	1900	57.9	616595	6165950	1949845
	8:00	2000	56.7	467735	4677351	1479108
	9:00	2100	56.8	478630	4786301	1513561
	10:00	2200	58.5	707946	7079458	2238721
	pm 11:00	2300	56.6	457088	4570882	1445440

Leq Morning Peak Hour 7:00-10:00 a.m.
58.2 dBA

Leq Evening Peak Hour 4:00-8:00 p.m.
56 dBA

Leq Nighttime 10:00 pm-7:00 a.m. (not penalized)
58 dBA

Leq Daytime 7:00 am-10:00 p.m.
56 dBA

Leq 24-Hour
57 dBA

Ldn: 10 dBA penalty for noise between 10:00 p.m. and 7:00 a.m.
64.0 dBA

CNEL: 5 dBA penalty for noise between 7:00p.m. and 10:00 p.m.,
64 dBA **and 10 dBA penalty for noise between**
10:00 p.m. and 7:00 a.m.

CNEL - Ldn 0.23647004

Laughlin.txt

METROSONICS db-308 SN 2458 V2.3 3/87

CURRENT DATE: 9/19/16
CURRENT TIME: 9:17:48

Long-term monitoring Laughlin Road LT-7

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CALIBRATED: 9/15/16 @ 13:03:21

DISPLAY RANGE: 42.5dB TO 138.5dB

DOUBLING RATE: 3 dB

FILTER: A WGHT

RESPONSE: SLOW

SCHEDULED RUN: OFF

START DATE: 9/16/16
START TIME: 0:00:00
LENGTH: 26:00:00

** OVERALL REPORT **

TEST STARTING DATE: 9/16/16
TEST STARTING TIME: 0:00:19
TEST LENGTH: 1DAYS 2:00:00

Lav = 56.6dB
Lav 80= 42.5dB
Lav 90= 42.5dB
SEL =106.2dB

Lmax = 75.8dB ON 9/16/16 @ 17:26:45
Lpk < 117dB

TIME OVER 115dB 0D 0:00:00.00

DOSE CRITERION: 90dB

8 HR DOSE (80dB CUTOFF)= 0.00%
8 HR DOSE (90dB CUTOFF)= 0.00%

** TIME HISTORY REPORT **

MODE: CONTINUOUS
PERIOD LENGTH: 1:00:00
TIME HISTORY CUTOFF: NONE
Ln(1): 10.0% Ln(2): 90.0%

INT# TAG#	START TIME	Lav ET	Lmax L1	Lpk L2

Laughlin.txt

1	9/16/16	53.2	64.9	<117	
0	0:00:19	1:00:00	55	50	
2	9/16/16	52.6	60.6	<117	
0	1:00:19	1:00:00	54	50	
3	9/16/16	54.1	60.9	<117	
0	2:00:19	1:00:00	56	51	
4	9/16/16	56.4	65.1	<117	
0	3:00:19	1:00:00	58	53	
5	9/16/16	60.4	67.1	<117	
0	4:00:19	1:00:00	61	59	
6	9/16/16	61.0	70.6	<117	
0	5:00:19	1:00:00	62	59	
7	9/16/16	59.4	68.3	<117	
0	6:00:19	1:00:00	60	57	
8	9/16/16	59.9	70.6	<117	
0	7:00:19	1:00:00	61	57	
9	9/16/16	58.3	74.9	<117	
0	8:00:19	1:00:00	59	55	
10	9/16/16	54.9	70.0	<117	
0	9:00:19	1:00:00	57	51	
11	9/16/16	53.3	70.5	<117	
0	10:00:19	1:00:00	55	49	
12	9/16/16	53.9	70.6	<117	
0	11:00:19	1:00:00	55	49	
13	9/16/16	51.7	63.5	<117	
0	12:00:19	1:00:00	53	48	
14	9/16/16	51.8	63.8	<117	
0	13:00:19	1:00:00	54	48	
15	9/16/16	50.9	68.1	<117	
0	14:00:19	1:00:00	53	46	

NT#	START	Lav	Lmax	Lpk
AG#	TIME	ET	L1	L2
16	9/16/16	52.8	68.8	<117
0	15:00:19	1:00:00	55	47
17	9/16/16	54.5	69.9	<117
0	16:00:19	1:00:00	56	51
18	9/16/16	55.3	75.8	<117
0	17:00:19	1:00:00	56	51
19	9/16/16	56.2	64.4	<117
0	18:00:19	1:00:00	58	53

Laughlin.txt

20	9/16/16	57.9	65.5	<117	
0	19:00:19	1:00:00	59	55	
21	9/16/16	56.7	66.7	<117	
0	20:00:19	1:00:00	58	54	
22	9/16/16	56.8	65.6	<117	
0	21:00:19	1:00:00	58	54	
23	9/16/16	58.5	69.2	<117	
0	22:00:19	1:00:00	60	55	
24	9/16/16	56.6	64.1	<117	
0	23:00:19	1:00:00	58	53	
25	9/17/16	55.2	68.0	<117	
0	0:00:19	1:00:00	57	51	
26	9/17/16	56.8	64.9	<117	
0	1:00:19	PARTIAL	59	52	

** AMPLITUDE DISTRIBUTION REPORT **

TOTAL SAMPLES = 748800

dB	SAMPLES		% OF TOTAL
42	9		.00
43	129	.	.01
44	428	.	.05
45	861	+	.11
46	4051	*	.54
47	9150	*	1.22
48	16735	**	2.23
49	31041	****	4.14
50	42583	******	5.68
51	54409	*******	7.26
52	67659	*********	9.03
53	71017	*********	9.48
54	66871	*********	8.93
55	65429	*********	8.73
56	74620	**********	9.96
57	59571	********	7.95
58	59532	********	7.95
59	50065	*******	6.68
60	43552	******	5.81
61	20034	***	2.67
62	5837	*	.77
63	2303	+	.30
64	1041	+	.13
65	671	.	.08
66	402	.	.05
67	246	.	.03
68	230	.	.03
69	129	.	.01
70	86	.	.01
71	18		.00
72	19		.00
73	21		.00
74	16		.00
75	35		.00

Laughlin.txt

Ln(0.0) = 75dB
Ln(10.0) = 59dB
Ln(50.0) = 55dB
Ln(99.9) = 45dB

	NO CUTOFF	80.0dB CUTOFF	90.0dB CUTOFF
Ldod	55.8dB	42.0dB	42.0dB
Losha	55.5dB	42.0dB	42.0dB
Leq(6)	55.4dB	42.0dB	42.0dB

Calculated Ldn from long-term noise monitoring data - LT-8 Vasco Road

		TIME	dBA	Remove LOG	10 dBA Penalized Values	5 dBA Penalized Values
9/16/2016	Midnight	0 / 24	56.3	426580	4265795	1348963
	am 1:00	100	53.5	223872	2238721	707946
	2:00	200	54.6	288403	2884032	912011
	3:00	300	57.5	562341	5623413	1778279
	4:00	400	63.4	2187762	21877616	6918310
	5:00	500	64.9	3090295	30902954	9772372
	6:00	600	65.2	3311311	33113112	10471285
	7:00	700	67.1	5128614	51286138	16218101
	8:00	800	67.4	5495409	54954087	17378008
	9:00	900	65.4	3467369	34673685	10964782
	10:00	1000	72.8	19054607	190546072	60255959
	11:00	1100	65.7	3715352	37153523	11748976
	12:00	1200	68.8	7585776	75857758	23988329
	pm 1:00	1300	66.3	4265795	42657952	13489629
	2:00	1400	66.0	3981072	39810717	12589254
	3:00	1500	66.6	4570882	45708819	14454398
	4:00	1600	67.0	5011872	50118723	15848932
	5:00	1700	66.5	4466836	44668359	14125375
	6:00	1800	65.9	3890451	38904514	12302688
	7:00	1900	64.4	2754229	27542287	8709636
	8:00	2000	63.4	2187762	21877616	6918310
	9:00	2100	62.8	1905461	19054607	6025596
	10:00	2200	61.9	1548817	15488166	4897788
	pm 11:00	2300	60.4	1096478	10964782	3467369

Leq Morning Peak Hour 7:00-10:00 a.m.
66.7 dBA

Leq Evening Peak Hour 4:00-8:00 p.m.
66 dBA

Leq Nighttime 10:00 pm-7:00 a.m. (not penalized)
62 dBA

Leq Daytime 7:00 am-10:00 p.m.
67 dBA

Leq 24-Hour
66 dBA

Ldn: 10 dBA penalty for noise between 10:00 p.m. and 7:00 a.m.
69.3 dBA

CNEL: 5 dBA penalty for noise between 7:00p.m. and 10:00 p.m.,
70 dBA **and 10 dBA penalty for noise between 10:00 p.m. and 7:00 a.m.**

CNEL - Ldn 0.30308699

Vasco.txt

METROSONICS db-308 SN 2593 V2.3 3/87

CURRENT DATE: 9/19/16
CURRENT TIME: 9:21:05

Long-term monitoring LT-8 Vasco

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CALIBRATED: 9/15/16 @ 13:32:37

DISPLAY RANGE: 41.9dB TO 137.9dB

DOUBLING RATE: 3 dB

FILTER: A WGHT

RESPONSE: SLOW

SCHEDULED RUN: OFF

   START DATE: 9/16/16
   START TIME: 0:00:00
   LENGTH: 26:00:00

** OVERALL REPORT **

TEST STARTING DATE: 9/16/16
TEST STARTING TIME: 0:00:19
TEST LENGTH: 1DAYS 2:00:00

Lav   = 65.5dB
Lav 80= 58.9dB
Lav 90= 56.1dB
SEL   =115.0dB

Lmax = 95.4dB ON 9/16/16 @ 10:16:40
Lpk = 116dB ON 9/16/16 @ 10:16:40

TIME OVER 115dB 0D 0:00:00.00

DOSE CRITERION: 90dB

 8 HR DOSE (80dB CUTOFF)= 0.24%
 8 HR DOSE (90dB CUTOFF)= 0.12%

** TIME HISTORY REPORT **

MODE: CONTINUOUS
PERIOD LENGTH: 1:00:00
TIME HISTORY CUTOFF: NONE
Ln(1): 10.0% Ln(2): 90.0%

 INT#   START   Lav   Lmax   Lpk
 TAG#   TIME   ET   L1   L2

Vasco.txt

INT# TAG#	START TIME	Lav ET	Lmax L1	Lpk L2	
1 0	9/16/16 0:00:19	56.3 1:00:00	83.6 59	<116 41	
2 0	9/16/16 1:00:19	53.5 1:00:00	72.1 57	<116 41	
3 0	9/16/16 2:00:19	54.6 1:00:00	72.9 56	<116 41	
4 0	9/16/16 3:00:19	57.5 1:00:00	83.4 59	<116 41	
5 0	9/16/16 4:00:19	63.4 1:00:00	88.8 66	<116 43	
6 0	9/16/16 5:00:19	64.9 1:00:00	80.4 69	<116 46	
7 0	9/16/16 6:00:19	65.2 1:00:00	80.2 69	<116 48	
8 0	9/16/16 7:00:19	67.1 1:00:00	83.8 70	<116 50	
9 0	9/16/16 8:00:19	67.4 1:00:00	83.6 70	<116 51	
10 0	9/16/16 9:00:19	65.4 1:00:00	77.3 69	<116 48	
11 0	9/16/16 10:00:19	72.8 1:00:00	95.4 70	116 51	
12 0	9/16/16 11:00:19	65.7 1:00:00	82.7 68	<116 53	
13 0	9/16/16 12:00:19	68.8 1:00:00	92.3 71	<116 56	
14 0	9/16/16 13:00:19	66.3 1:00:00	85.1 69	<116 52	
15 0	9/16/16 14:00:19	66.0 1:00:00	86.6 69	<116 52	
16 0	9/16/16 15:00:19	66.6 1:00:00	83.7 69	<116 56	
17 0	9/16/16 16:00:19	67.0 1:00:00	84.9 69	<116 57	
18 0	9/16/16 17:00:19	66.5 1:00:00	82.6 69	<116 57	
19 0	9/16/16 18:00:19	65.9 1:00:00	81.0 69	<116 50	

Vasco.txt

20	9/16/16	64.4	80.6	<116	
0	19:00:19	1:00:00	68	49	
21	9/16/16	63.4	76.7	<116	
0	20:00:19	1:00:00	67	47	
22	9/16/16	62.8	77.6	<116	
0	21:00:19	1:00:00	67	47	
23	9/16/16	61.9	77.3	<116	
0	22:00:19	1:00:00	66	48	
24	9/16/16	60.4	76.7	<116	
0	23:00:19	1:00:00	64	47	
25	9/17/16	57.2	73.9	<116	
0	0:00:19	1:00:00	62	44	
26	9/17/16	56.1	76.9	<116	
0	1:00:19	PARTIAL	60	44	

** AMPLITUDE DISTRIBUTION REPORT **

TOTAL SAMPLES = 748800

dB	SAMPLES		% OF TOTAL
41	63205	********	8.44
42	11542	**	1.54
43	11911	**	1.59
44	21279	***	2.84
45	20115	***	2.68
46	18001	**	2.40
47	17681	**	2.36
48	17452	**	2.33
49	20440	***	2.72
50	17138	**	2.28
51	15933	**	2.12
52	14197	**	1.89
53	12930	**	1.72
54	13003	**	1.73
55	15303	**	2.04
56	20772	***	2.77
57	19639	***	2.62
58	23134	***	3.08
59	25132	***	3.35
60	29795	****	3.97
61	31460	****	4.20
62	35026	*****	4.67
63	35152	*****	4.69
64	37789	*****	5.04
65	34659	*****	4.62
66	33611	****	4.48
67	35278	*****	4.71
68	32923	****	4.39
69	21341	***	2.85
70	16703	**	2.23
71	9728	*	1.29
72	5893	*	.78
73	3308	+	.44
74	2091	+	.27

Vasco.txt

75	1443	+	.19
76	976	+	.13
77	643	.	.08
78	442	.	.05
79	396	.	.05
80	246	.	.03
81	210	.	.02
82	227	.	.03
83	171	.	.02
84	99	.	.01
85	61		.00
86	51		.00
87	43		.00
88	32		.00
89	25		.00
90	37		.00
91	40		.00
92	50		.00

dB	SAMPLES	% OF TOTAL
93	21	.00
94	15	.00
95	8	.00

Ln(0.0) = 95dB
Ln(10.0) = 68dB
Ln(50.0) = 59dB
Ln(99.9) = 41dB

	NO CUTOFF	80.0dB CUTOFF	90.0dB CUTOFF
Ldod	63.2dB	48.8dB	43.5dB
Losha	62.2dB	45.2dB	42.7dB
Leq(6)	61.5dB	43.1dB	41.6dB

Croak.txt

METROSONICS db-308 SN 2456 V2.3 3/87

CURRENT DATE: 2/15/17
CURRENT TIME: 8:36:42

Croak Road Residennce Short-term monitoring

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CALIBRATED: 2/14/17 @ 15:03:44

DISPLAY RANGE: 42.0dB TO 138.0dB

DOUBLING RATE: 3 dB

FILTER: A WGHT

RESPONSE: SLOW

SCHEDULED RUN: OFF

   START DATE: 1/01/85
   START TIME: 0:00:00
   LENGTH: 1:00:00

** OVERALL REPORT **

TEST STARTING DATE: 2/14/17
TEST STARTING TIME: 17:37:19
TEST LENGTH: 0DAYS 0:21:41

Lav   = 66.0dB
Lav 80= 42.0dB
Lav 90= 42.0dB
SEL   = 97.0dB

Lmax = 78.9dB ON 2/14/17 @ 17:38:02
Lpk < 117dB

TIME OVER 115dB 0D 0:00:00.00

DOSE CRITERION: 90dB

 8 HR DOSE (80dB CUTOFF)= 0.00%
 8 HR PROJ. DOSE (80dB CUTOFF)= 0.00%
 8 HR DOSE (90dB CUTOFF)= 0.00%
 8 HR PROJ. DOSE (90dB CUTOFF)= 0.00%

** TIME HISTORY REPORT **

MODE: CONTINUOUS
PERIOD LENGTH: 0:20:00
TIME HISTORY CUTOFF: NONE
Ln(1): 10.0% Ln(2): 90.0%

Croak.txt

INT# TAG#	START TIME	Lav ET	Lmax L1	Lpk L2				
1	2/14/17	65.7	78.9	<117	*			+
0	17:37:19	0:20:00	66	64				
2	2/14/17	68.2	74.1	<117		*	+	
0	17:57:19	PARTIAL	71	65				

** AMPLITUDE DISTRIBUTION REPORT **

TOTAL SAMPLES = 10411

dB	SAMPLES		% OF TOTAL
62	107	*	1.02
63	625	******	6.00
64	2340	**********	22.47
65	3707	**********	35.60
66	2526	**********	24.26
67	625	******	6.00
68	191	**	1.83
69	94	*	.90
70	75	*	.72
71	49	+	.47
72	30	+	.28
73	26	+	.24
74	8	.	.07
75	2	.	.01
76	1		.00
77	3	.	.02
78	2	.	.01

Ln(0.0) = 78dB
Ln(10.0) = 67dB
Ln(50.0) = 65dB
Ln(99.9) = 62dB

	NO CUTOFF	80.0dB CUTOFF	90.0dB CUTOFF
Ldod	65.4dB	42.0dB	42.0dB
Losha	65.4dB	42.0dB	42.0dB
Leq(6)	65.3dB	42.0dB	42.0dB

Summary	
File Name on Meter	LxT_Data.107
File Name on PC	SLM_0004338_LxT_Data_107.00.ldbin
Serial Number	0004338
Model	SoundTrack LxT®
Firmware Version	2.301
User	C Sanchez
Location	Hartman Road
Job Description	BART Extension to Livermore
Note	Coordinate location: 37 43 19.91/121 47 02.15

Measurement	
Description	
Start	2018-01-22 11:00:22
Stop	2018-01-23 16:01:26
Duration	29:01:04.203
Run Time	29:01:04.203
Pause	00:00:00.0
Pre Calibration	2018-01-22 09:26:23
Post Calibration	None
Calibration Deviation	---

Overall Settings	
RMS Weight	A Weighting
Peak Weight	Z Weighting
Detector	Slow
Preamp	PRMLxT2L
Microphone Correction	Off
Integration Method	Linear
Overload	126.6 dB

	A	**C**	**Z**	
Under Range Peak	82.9	79.9	**84.9**	dB
Under Range Limit	**27.5**	27.7	32.6	dB
Noise Floor	18.4	18.5	23.4	dB

Results			
LA_{eq}	52.9	dB	
LAE	103.1	dB	
EA	2.264	mPa^2h	
EA8	624.049	μPa^2h	
EA40	3.120	mPa^2h	
$LZ_{peak\ (max)}$	2018-01-23 11:24:46	105.4	dB
LAS_{max}	2018-01-23 10:51:40	83.4	dB
LAS_{min}	2018-01-23 01:05:08	22.5	dB
SEA	-99.9	dB	
LAS > 85.0 dB (Exceedance Counts / Duration)	0	0.0	s
LAS > 115.0 dB (Exceedance Counts / Duration)	0	0.0	s
LZ_{peak} > 135.0 dB (Exceedance Counts / Duration)	0	0.0	s
LZ_{peak} > 137.0 dB (Exceedance Counts / Duration)	0	0.0	s
LZ_{peak} > 140.0 dB (Exceedance Counts / Duration)	0	0.0	s
LC_{eq}	59.3	dB	
LA_{eq}	52.9	dB	
$LCeq - LAeq$	6.4	dB	
LAI_{eq}	57.3	dB	
LA_{eq}	52.9	dB	
$LAI_{eq} - LA_{eq}$	4.4	dB	

Record #	Record Type	Date	Time	LAeq	LZpeak	LASmax	LASmin	Int. Temp (°F)	OVLD	OBA OVLD	Marker
1	Run	2018-01-22	11:00:22								
2		2018-01-22	11:00:22	51.1	94.5	76.8	37.2	62.1	No	No	
3		2018-01-22	12:00:22	52.8	95.4	77.8	33.2	62.1	No	No	
4		2018-01-22	13:00:22	53.0	99.4	80.6	30.7	61.6	No	No	
5		2018-01-22	14:00:22	53.7	94.2	76.9	31.4	61.6	No	No	
6		2018-01-22	15:00:22	53.3	98.4	80.1	36.3	59.2	No	No	
7		2018-01-22	16:00:22	57.2	99.2	78.9	34.9	57.8	No	No	
8		2018-01-22	17:00:22	53.7	95.3	75.2	36.0	56.9	No	No	
9		2018-01-22	18:00:22	53.5	98.3	81.4	33.7	56.4	No	No	
10		2018-01-22	19:00:22	50.3	95.7	78.2	28.8	54.5	No	No	
11		2018-01-22	20:00:22	51.4	97.5	79.2	24.7	54.5	No	No	
12		2018-01-22	21:00:22	48.0	98.1	77.3	25.5	54.0	No	No	
13		2018-01-22	22:00:22	35.1	89.9	45.4	24.1	53.5	No	No	
14		2018-01-22	23:00:22	28.4	77.1	50.7	24.2	53.9	No	No	
15		2018-01-23	0:00:22	46.0	91.7	73.6	23.0	53.1	No	No	
16		2018-01-23	1:00:22	27.8	79.6	44.7	22.5	53.4	No	No	
17		2018-01-23	2:00:22	27.3	81.9	42.5	22.6	52.1	No	No	
18		2018-01-23	3:00:22	33.7	68.6	46.4	24.7	50.2	No	No	
19		2018-01-23	4:00:22	39.6	76.8	51.0	31.1	49.3	No	No	
20		2018-01-23	5:00:22	43.3	86.0	66.5	31.3	48.8	No	No	
21		2018-01-23	6:00:22	46.5	93.9	75.8	32.6	49.7	No	No	
22		2018-01-23	7:00:22	55.0	101.5	82.8	38.9	50.6	No	No	
23		2018-01-23	8:00:22	56.3	103.3	82.1	38.7	51.9	No	No	
24		2018-01-23	9:00:22	55.3	100.0	83.0	33.8	54.0	No	No	
25		2018-01-23	10:00:22	57.9	101.0	83.4	34.1	55.4	No	No	
26		2018-01-23	11:00:22	56.3	105.4	81.9	34.2	57.8	No	No	
27		2018-01-23	12:00:22	53.1	93.5	77.3	34.4	60.2	No	No	
28		2018-01-23	13:00:22	56.3	96.3	78.0	34.8	62.6	No	No	
29		2018-01-23	14:00:22	51.4	99.3	81.3	34.4	63.5	No	No	
30		2018-01-23	15:00:22	55.5	102.3	82.7	34.7	64.0	No	No	
31		2018-01-23	16:00:22	63.4	102.5	74.9	41.5	64.0	No	No	
32	Stop	2018-01-23	16:01:26								

Calculated Ldn from long-term noise monitoring data - Hartman Road LT-9

			TIME	dBA	Remove LOG	10 dBA Penalized Values	5 dBA Penalized Values
1/23/2018	Midnight	0 / 24		46.0	40109	401095	126837
	am 1:00	100		27.8	607	6068	1919
	2:00	200		27.3	532	5316	1681
	3:00	300		33.7	2322	23215	7341
	4:00	400		39.6	9064	90645	28664
	5:00	500		43.3	21240	212401	67167
	6:00	600		46.5	44690	446905	141324
	7:00	700		55.0	316859	3168590	1001996
	8:00	800		56.3	425910	4259102	1346846
	9:00	900		55.3	340373	3403729	1076354
	10:00	1000		57.9	614896	6148965	1944473
1/22/2018	11:00	1100		51.1	128418	1284177	406093
	12:00	1200		52.8	192211	1922113	607826
	pm 1:00	1300		53.0	201187	2011866	636208
	2:00	1400		53.7	232892	2328917	736468
	3:00	1500		53.3	214767	2147667	679152
	4:00	1600		57.2	527258	5272578	1667336
	5:00	1700		53.7	236607	2366072	748218
	6:00	1800		53.5	221492	2214925	700421
	7:00	1900		50.3	106781	1067812	337672
	8:00	2000		51.4	137993	1379930	436372
	9:00	2100		48.0	62557	625569	197822
	10:00	2200		35.1	3226	32257	10201
	pm 11:00	2300		28.4	696	6957	2200

Leq Morning Peak Hour 7:00-10:00 a.m.
56 dBA

Leq Evening Peak Hour 4:00-8:00 p.m.
54 dBA

Leq Nighttime 10:00 pm-7:00 a.m. (not penalized)
41 dBA

Leq Daytime 7:00 am-10:00 p.m.
54 dBA

Leq 24-Hour
52 dBA

Ldn: 10 dBA penalty for noise between 10:00 p.m. and 7:00 a.m.
53 dBA

CNEL: 5 dBA penalty for noise between 7:00p.m. and 10:00 p.m.,
54 dBA **and 10 dBA penalty for noise between 10:00 p.m. and 7:00 a.m.**

Average of 5 Quietest Nighttime Leq
32

Summary	
File Name on Meter	LxT_Data.077
File Name on PC	SLM_0004338_LxT_Data_077.00.ldbin
Serial Number	0004338
Model	SoundTrack LxT®
Firmware Version	2.301
User	Chris Sanchez
Location	Ratto Residence of North Livermore Drive
Job Description	Bart Extension
Note	2 day plus measurement to establish existing background sound levels.

Measurement	
Description	
Start	2018-01-02 10:55:07
Stop	2018-01-04 14:16:04
Duration	51:18:14.609
Run Time	51:18:07.406
Pause	00:00:07.2
Pre Calibration	2018-01-02 08:36:28
Post Calibration	None
Calibration Deviation	---

Overall Settings			
RMS Weight	A Weighting		
Peak Weight	Z Weighting		
Detector	Slow		
Preamp	PRMLxT2L		
Microphone Correction	Off		
Integration Method	Linear		
Overload	126.4 dB		
	A	**C**	**Z**
Under Range Peak	82.7	79.7	**84.7** dB
Under Range Limit	**27.5**	27.6	32.5 dB
Noise Floor	18.3	18.5	23.3 dB

Results		
L_{Aeq}	54.8 dB	
LAE	107.4 dB	
EA	6.169 mPa²h	
EA8	962.023 µPa²h	
EA40	4.810 mPa²h	
$LZ_{peak\ (max)}$	2018-01-04 14:15:17	126.8 dB
LAS_{max}	2018-01-04 14:13:11	95.0 dB
LAS_{min}	2018-01-04 12:55:21	36.2 dB
SEA	142.8 dB	
LAS > 85.0 dB (Exceedance Counts / Duration)	6	14.8 s
LAS > 115.0 dB (Exceedance Counts / Duration)	0	0.0 s
LZ_{peak} > 135.0 dB (Exceedance Counts / Duration)	0	0.0 s
LZ_{peak} > 137.0 dB (Exceedance Counts / Duration)	0	0.0 s
LZ_{peak} > 140.0 dB (Exceedance Counts / Duration)	0	0.0 s
LC_{eq}	61.3 dB	
LA_{eq}	54.8 dB	
LC_{eq} - LA_{eq}	6.6 dB	
LAI_{eq}	66.0 dB	
LA_{eq}	54.8 dB	
LAI_{eq} - LA_{eq}	11.2 dB	

Record #	Record Type	Date	Time	LAeq	LZpeak	LASmax	LASmin	Int. Temp (°F)	OVLD	OBA OVLD	Marker
1	alibration Chang	2018-01-02	8:36:28								
2	Run	2018-01-02	10:55:07								
3		2018-01-02	10:55:07	63.7	99.0	77.3	54.4	62.6	No	No	
4	Pause	2018-01-02	10:55:17								
5		2018-01-02	10:55:07	63.7	99.0	77.3	54.4	62.6	No	No	
6	Stop	2018-01-02	10:55:25								
7	Run	2018-01-02	10:58:07								
8		2018-01-02	10:58:07	61.2	125.2	92.1	42.0	67.8	No	No	Discard this period due to conversation with property owner
9		2018-01-02	11:58:07	51.1	104.2	63.9	44.5	66.3	No	No	
10		2018-01-02	12:58:07	52.2	99.7	71.8	45.0	65.9	No	No	
11		2018-01-02	13:58:07	51.5	99.0	71.0	42.9	65.4	No	No	
12		2018-01-02	14:58:07	52.1	93.9	70.7	43.1	65.4	No	No	
13		2018-01-02	15:58:07	52.6	91.5	70.1	46.4	64.0	No	No	
14		2018-01-02	16:58:07	51.8	94.7	64.7	45.7	62.1	No	No	
15		2018-01-02	17:58:07	53.0	93.0	73.6	44.9	61.1	No	No	
16		2018-01-02	18:58:07	52.0	92.0	71.9	45.0	60.2	No	No	
17		2018-01-02	19:58:07	50.8	89.7	73.3	45.0	60.7	No	No	
18		2018-01-02	20:58:07	49.7	95.7	68.9	42.4	61.6	No	No	
19		2018-01-02	21:58:07	47.9	89.5	65.3	42.2	62.6	No	No	
20		2018-01-02	22:58:07	47.0	94.1	56.7	40.6	62.1	No	No	
21		2018-01-02	23:58:07	46.9	97.7	61.5	40.4	62.0	No	No	
22		2018-01-03	0:58:07	45.6	90.1	57.9	38.8	61.1	No	No	
23		2018-01-03	1:58:07	47.0	90.0	56.0	39.1	61.1	No	No	
24		2018-01-03	2:58:07	48.1	86.2	54.7	41.9	60.2	No	No	
25		2018-01-03	3:58:07	50.1	98.3	70.3	42.8	58.8	No	No	
26		2018-01-03	4:58:07	51.2	82.6	58.5	46.1	57.2	No	No	
27		2018-01-03	5:58:07	50.7	83.2	56.6	46.7	56.5	No	No	
28		2018-01-03	6:58:07	52.2	87.2	68.3	45.1	55.6	No	No	
29		2018-01-03	7:58:07	51.8	95.6	66.8	45.2	56.4	No	No	
30		2018-01-03	8:58:07	50.0	90.8	65.5	45.0	58.4	No	No	
31		2018-01-03	9:58:07	57.6	103.9	85.0	39.2	60.2	No	No	
32		2018-01-03	10:58:07	47.0	87.3	64.9	38.0	61.6	No	No	
33		2018-01-03	11:58:07	47.8	99.2	67.3	39.3	62.2	No	No	
34		2018-01-03	12:58:07	44.6	96.4	65.9	36.8	61.6	No	No	
35		2018-01-03	13:58:07	51.5	109.5	78.4	37.0	60.7	No	No	
36		2018-01-03	14:58:07	59.6	113.5	80.0	50.0	58.3	No	No	
37		2018-01-03	15:58:07	56.7	109.0	76.7	52.0	56.9	No	No	
38		2018-01-03	16:58:07	54.3	105.2	82.6	47.2	57.6	No	No	
39		2018-01-03	17:58:07	53.8	96.2	71.1	47.0	57.3	No	No	
40		2018-01-03	18:58:07	52.8	96.1	74.9	45.8	56.9	No	No	
41		2018-01-03	19:58:07	50.0	101.3	69.1	42.6	56.9	No	No	
42		2018-01-03	20:58:07	56.7	114.3	80.6	40.0	56.9	No	No	
43		2018-01-03	21:58:07	58.5	112.7	79.0	40.9	56.9	No	No	
44		2018-01-03	22:58:07	60.9	114.5	81.0	40.2	56.9	No	No	
45		2018-01-03	23:58:07	55.5	116.1	80.6	40.2	56.9	No	No	
46		2018-01-04	0:58:07	52.9	112.0	78.3	43.8	56.4	No	No	
47		2018-01-04	1:58:07	52.5	105.4	72.8	44.3	55.4	No	No	
48		2018-01-04	2:58:07	54.1	106.1	67.7	48.9	55.0	No	No	
49		2018-01-04	3:58:07	54.1	89.3	60.2	49.6	55.0	No	No	
50		2018-01-04	4:58:07	52.5	82.0	59.9	46.4	54.7	No	No	
51		2018-01-04	5:58:07	52.3	84.1	61.0	47.4	54.5	No	No	
52		2018-01-04	6:58:07	52.2	97.0	71.0	46.9	54.1	No	No	
53		2018-01-04	7:58:07	52.9	95.2	68.9	47.8	55.1	No	No	
54		2018-01-04	8:58:07	49.2	99.0	65.6	46.1	58.4	No	No	
55		2018-01-04	9:58:07	49.7	88.5	68.9	44.3	62.6	No	No	
56		2018-01-04	10:58:07	47.8	90.5	66.8	42.6	66.0	No	No	
57		2018-01-04	11:58:07	45.3	96.0	63.3	36.2	69.7	No	No	
58		2018-01-04	12:58:07	47.9	93.3	70.9	36.9	74.4	No	No	
59		2018-01-04	13:58:07	71.0	126.8	95.0	39.1	75.0	Yes	No	Discard this period due to operater activity
60	Stop	2018-01-04	14:16:04								

Calculated Ldn from long-term noise monitoring data - Ratto Residence 2294 N. Livermore Road LT-10

		TIME		dBA	Remove LOG	10 dBA Penalized Values	5 dBA Penalized Values
1/4/2018	Midnight	0 / 24		46.9	49481	494814	156474
	am	1:00	100	45.6	36103	361031	114168
		2:00	200	47.0	49954	499539	157968
		3:00	300	48.1	64026	640261	202468
		4:00	400	50.1	101524	1015241	321047
		5:00	500	51.2	132229	1322288	418144
		6:00	600	50.7	118004	1180035	373160
		7:00	700	52.2	167531	1675309	529779
		8:00	800	51.8	152031	1520309	480764
		9:00	900	50.0	99578	995784	314894
		10:00	1000	57.6	580460	5804596	1835574
1/3/2018		11:00	1100	47.0	50171	501713	158655
		12:00	1200	51.1	128485	1284855	406307
	pm	1:00	1300	52.2	165910	1659102	524654
		2:00	1400	51.5	142802	1428016	451578
		3:00	1500	52.1	160643	1606427	507997
		4:00	1600	52.6	183758	1837579	581093
		5:00	1700	51.8	150936	1509364	477303
		6:00	1800	53.0	197652	1976519	625030
		7:00	1900	52.0	159462	1594623	504264
		8:00	2000	50.8	119704	1197035	378536
		9:00	2100	49.7	93746	937463	296452
		10:00	2200	47.9	61855	618547	195602
	pm	11:00	2300	47.0	50360	503601	159253

Leq Morning Peak Hour 7:00-10:00 a.m.
51 dBA

Leq Evening Peak Hour 4:00-8:00 p.m.
52 dBA

Leq Nighttime 10:00 pm-7:00 a.m. (not penalized)
49 dBA

Leq Daytime 7:00 am-10:00 p.m.
52 dBA

Leq 24-Hour
51 dBA

Ldn: 10 dBA penalty for noise between 10:00 p.m. and 7:00 a.m.
56 dBA

CNEL: 5 dBA penalty for noise between 7:00p.m. and 10:00 p.m.,
56 dBA **and 10 dBA penalty for noise between**
10:00 p.m. and 7:00 a.m.

Average of 5 Quietest Nighttime Leq
47

G.6 Noise Model Data – Sound Level Meter Certification

3M Oconomowoc
Personal Safety Division

3M Detection Solutions
1060 Corporate Center Drive
Oconomowoc, WI 53066-4828
www.3M.com/detection
262 567 9157 800 245 0779
262 567 4047 Fax

An ISO 9001 Registered Company

3M

Certificate of Calibration

Certificate No: 55147172456DB308

Submitted By: ESA ENERGY
2600 CAPITOL AVE STE 200
SACRAMENTO, CA 95816

Serial Number: 2456DB308
Customer ID:
Model: DB-308 V2 DOSIMETER

Test Conditions:
Temperature: 18°C to 29°C
Humidity: 20% to 80%
Barometric Pressure: 890 mbar to 1050 mbar

SubAssemblies:
Description: **Serial Number:**

Date Received: 10/2/2015
Date Issued: 10/5/2015
Valid Until: 10/5/2016

Model Conditions:
As Found: IN TOLERANCE
As Left: IN TOLERANCE

Calibrated per Procedure: 308V-020-02

Reference Standard(s):

I.D. Number	Device	Last Calibration	Date Calibration Due
EF000138	QUEST-CAL	12/16/2014	12/16/2015
ET0000556	B&K ENSEMBLE	10/15/2014	10/15/2015

Measurement Uncertainty:
+/- 2.2% ACOUSTIC (0.19DB)
Estimated at 95% Confidence Level (k=2)

Calibrated By: Bryan Rasmussen 10/5/2015
BRYAN RASMUSSEN Service Technician

This report certifies that all calibration equipment used in the test is traceable to NIST, and applies only to the unit identified under equipment above. This report must not be reproduced except in its entirety without the written approval of 3M Detection Solutions.

3M Oconomowoc
Personal Safety Division

3M Detection Solutions
1060 Corporate Center Drive
Oconomowoc, WI 53066-4828
www.3M.com/detection
262 567 9157 800 245 0779
262 567 4047 Fax

An ISO 9001
Registered Company

3M

Certificate of Calibration

Certificate No: 55147172458DB308

Submitted By: ESA ENERGY
2600 CAPITOL AVE STE 200
SACRAMENTO, CA 95816

Serial Number: 2458DB308
Customer ID:
Model: DB-308 V2 DOSIMETER
Test Conditions:
Temperature: 18°C to 29°C
Humidity: 20% to 80%
Barometric Pressure: 890 mbar to 1050 mbar

Date Received: 10/2/2015
Date Issued: 10/5/2015
Valid Until: 10/5/2016
Model Conditions:
As Found: IN TOLERANCE
As Left: IN TOLERANCE

SubAssemblies:
Description: **Serial Number:**

Calibrated per Procedure: 308V-020-02

Reference Standard(s):

I.D. Number	Device	Last Calibration	Date Calibration Due
EF000138	QUEST-CAL	12/16/2014	12/16/2015
ET0000556	B&K ENSEMBLE	10/15/2014	10/15/2015

Measurement Uncertainty:
+/- 2.2% ACOUSTIC (0.19DB)
Estimated at 95% Confidence Level (k=2)

Calibrated By: _____ 10/5/2015
BRYAN RASMUSSEN **Service Technician**

This report certifies that all calibration equipment used in the test is traceable to NIST, and applies only to the unit identified under equipment above. This report must not be reproduced except in its entirety without the written approval of 3M Detection Solutions.

3M Oconomowoc
Personal Safety Division

3M Detection Solutions
1060 Corporate Center Drive
Oconomowoc, WI 53066-4828
www.3M.com/detection
262 567 9157 800 245 0779
262 567 4047 Fax

SUMMARY REPORT

WORK ORDER: 5514717 **10/5/2015**

Related Event Type	Model Name	Serial Number	Performed By
CALIBRATION - STANDARD	DB-308 V2 DOSIMETER	2456DB308	BRYAN RASMUSSEN

Repair Notes: This unit passed test.

CALIBRATION - STANDARD	DB-308 V2 DOSIMETER	2458DB308	BRYAN RASMUSSEN

Repair Notes: This unit passed test.

Calibration Certificate

Certificate Number 2017002074
Customer:
ESA Energy
2600 Capital Avenue
Sacramento, CA 95816, United States

Model Number	LxT2	***Procedure Number***	D0001.8378
Serial Number	0004338	***Technician***	Ron Harris
Test Results	**Pass**	***Calibration Date***	24 Feb 2017
Initial Condition	AS RECEIVED same as shipped	***Calibration Due***	24 Feb 2018
Description	SoundTrack LxT Class 2 Class 2 Sound Level Meter Firmware Revision: 2.301	***Temperature***	22.84 °C ± 0.25 °C
		Humidity	51 %RH ± 2.0 %RH
		Static Pressure	86.02 kPa ± 0.13 kPa

Evaluation Method Tested electrically using Larson Davis PRMLxT2B S/N 036170 and an 18.0 pF capacitor to simulate microphone capacitance. Data reported in dB re 20 µPa assuming a microphone sensitivity of 35.5 mV/Pa.

Compliance Standards Compliant to Manufacturer Specifications and the following standards when combined with Calibration Certificate from procedure D0001.8384:

IEC 60651:2001 Type 2	ANSI S1.4-2014 Class 2
IEC 60804:2000 Type 2	ANSI S1.4 (R2006) Type 2
IEC 61252:2002	ANSI S1.11 (R2009) Class 2
IEC 61260:2001 Class 2	ANSI S1.25 (R2007)
IEC 61672:2013 Class 2	ANSI S1.43 (R2007) Type 2

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the International System of Units (SI) through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2005. **Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.**

The quality system is registered to ISO 9001:2008.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

Correction data from Larson Davis LxT Manual for SoundTrack LxT & SoundExpert Lxt, I770.01 Rev J Supporting Firmware Version 2.301, 2015-04-30

Calibration Check Frequency: 1000 Hz; Reference Sound Pressure Level: 114 dB re 20 µPa

Larson Davis, a division of PCB Piezotronics, Inc
1681 West 820 North
Provo, UT 84601, United States
716-684-0001

ACCREDITED Cert. #3622.01

LARSON DAVIS
A PCB PIEZOTRONICS DIV.

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APPENDIX B.2
REVISED AIR QUALITY APPENDIX

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Table 38
Roadway Screening Health Impacts
BART to Livermore Extension
Livermore, California

Description[1]	Segment[2]	Distance from Roadway to MEISR[3] (ft)	Average Daily Traffic[4] (vehicles/day)	MEISR	Road Direction[5]	Direction to MEISR from Roadway	BAAQMD Screening Impacts[6,7,8]	
							Lifetime Excess Cancer Risk[6] (in a million)	$PM_{2.5}$[6] Concentration ($\mu g/m^3$)
Project Impact								
Conventional BART (2025)	606172-4173220	600	10,884	Cancer Risk and $PM_{2.5}$	E-W	N	0.26	0.0054
DMU Alternative (EMU Option) (2025)[9]	606172-4173220	600	10,596	DMU/EMU Cancer Risk and EMU PM2.5	E-W	N	0.26	--
Conventional BART (2040)	606515-4173176	923	10,658	Cancer Risk and $PM_{2.5}$	E-W	N	0.17	0.0034
Cumulative Impact								
Conventional BART (2025)	605925-4173249	621	11,260	Cancer Risk and $PM_{2.5}$	E-W	N	2.0	0.026
	605948-4173331	454	14,722		E-W	N	3.3	0.043
	606172-4173220	600	10,158		E-W	N	1.8	0.024
	606234-4173316	239	25,081		E-W	N	8.8	0.12
	I-580	--	--		--	N	107	0.57
						Total:	**123**	**0.78**
DMU Alternative (EMU Option) (2025)[9]	605925-4173249	621	11,296	DMU/EMU Cancer Risk and EMU $PM_{2.5}$[9]	E-W	N	2.0	0.026
	605948-4173331	454	11,972		E-W	N	2.7	0.035
	606234-4173316	239	25,361		E-W	N	8.9	0.12
	606515-4173176	918	12,363		E-W	N	1.5	0.019
	I-580	--	--		--	N	107	0.57
						Total:	**122**	**0.77**
DMU Alternative (2025)	604438-4173353	503	12,919	DMU $PM_{2.5}$	N-S	W	**--**	0.019
	605037-4173335	279	24,752		E-W	S	**--**	0.056
	I-580	--	--		--	S	**--**	1.1
						Total:	**--**	**1.1**
Express Bus/BRT Alternative (2025)	596980-4173664	709	12,174	Cancer Risk and $PM_{2.5}$	N-S	E	1.9	0.027
	597135-4173152	620	11,452		N-S	W	1.1	0.014
	597145-4173387	105	10,588		E-W	N	6.9	0.10
	597160-4173283	318	11,452		N-S	W	2.0	0.025
	597129-4173351	106	18,593		E-W	N	12	0.17
	597216-4173509	386	10,608		N-S	W	1.5	0.019
	I-580	--	--		--	N	102	0.51
						Total:	**127**	**0.86**

Table 38
Roadway Screening Health Impacts
BART to Livermore Extension
Livermore, California

Description[1]	Segment[2]	Distance from Roadway to MEISR[3] (ft)	Average Daily Traffic[4] (vehicles/day)	MEISR	Road Direction[5]	Direction to MEISR from Roadway	BAAQMD Screening Impacts[6,7,8]	
							Lifetime Excess Cancer Risk[6]	$PM_{2.5}$[6] Concentration
Enhanced Bus Alternative (2025)	597214-4173694	97	12,178	Cancer Risk and $PM_{2.5}$	N-S	E	8.4	0.12
	596980-4173664	875	12,163		N-S	E	1.5	0.022
	597298-4173795	44	28,282		E-W	S	17	0.24
	I-580	--	--		--	N	40	0.20
						Total:	**67**	**0.58**
Conventional BART (2040)	605864-4173514	680	10,375	Cancer Risk and $PM_{2.5}$	N-S	E	1.7	0.024
	605891-4173459	675	30,148		N-S	E	4.8	0.069
	605948-4173331	454	18,003		E-W	N	4.0	0.053
	606172-4173220	601	11,891		E-W	N	2.2	0.029
	I-580	--	--		--	N	107	0.57
						Total:	**120**	**0.75**
DMU Alternative (EMU Option) (2040)[9]	605864-4173514	680	10,229	DMU/EMU Cancer Risk and EMU $PM_{2.5}$[9]	N-S	E	1.6	0.024
	605891-4173459	675	29,085		N-S	E	4.6	0.067
	605948-4173331	454	14,633		E-W	N	3.2	0.043
	606172-4173220	601	11,844		E-W	N	2.1	0.028
	I-580	--	--		--	N	107	0.57
						Total:	**119**	**0.73**
DMU Alternative (2040)	604438-4173353	503	15,239	DMU $PM_{2.5}$	N-S	W	**--**	0.023
	I-580	--	--		--	S	**--**	1.1
						Total:	**--**	**1.1**
Express Bus/BRT Alternative (2040)	596763-4173745	87	43,702	Cancer Risk and $PM_{2.5}$	E-W	S	17	0.23
	596980-4173664	10	13,842		N-S	E	20	0.29
	597214-4173694	763	13,946		N-S	W	0.98	0.012
	I-580	--	--		--	N	40	0.20
						Total:	**78**	**0.73**
Enhanced Bus Alternative (2040)	597214-4173694	97	13,959	Cancer Risk and $PM_{2.5}$	N-S	E	9.6	0.14
	596980-4173664	875	14,143		N-S	E	1.7	0.025
	597298-4173795	44	38,478		E-W	S	21	0.30
	I-580	--	--		--	N	40	0.20
						Total:	**73**	**0.66**

Table 38
Roadway Screening Health Impacts
BART to Livermore Extension
Livermore, California

Notes:

[1] For the Project analysis, only Alternatives that have road segments with an increase in average daily traffic volume > 10,000 vehicles per day are shown. For the cumulative analysis, all roadway segments with average daily traffic volume > 10,000 vehicles per day are included.

[2] Unique road segment identifier based on the UTM Coordinates of the midpoint of the road segment (UTM Zone 10, NAD83).

[3] For a screening assessment, the table provides health impacts to the maximally exposed individual sensitive receptor (MEISR). Distances presented represent the distance from the nearest edge of the roadway to the MEISR.

[4] Peak hourly traffic volumes were provided by ARUP for 2025 and 2050 for the Proposed Project, each Alternative, and the No Project Alternative. Peak hourly traffic volumes were then scaled to average daily traffic volume. For the Project analysis, the difference in average daily traffic volume was then calculated between the Proposed Project and the No Project Alternative and each Alternative and the No Project Alternative. The above screening analysis for the Project includes individual road segments with an increase in average daily traffic volume > 10,000 vehicles per

[5] For road segments that are neither North-South nor East-West, road direction was set to the orientation that results in higher concentrations/risks.

[6] BAAQMD screening tools' calculated impacts are based on previous OEHHA guidance. Per BAAQMD recommendations, cancer risks were conservatively scaled by a factor of 1.37 to account for the updated exposure parameters and calculation methodologies in OEHHA 2015 guidance. Project cancer risk and $PM_{2.5}$ impacts were scaled for emissions reductions between 2014 and 2025

[7] Screening estimates of health impacts were estimated with the BAAQMD Roadway Screening Analysis Calculator (BAAQMD 2015). The screening tool does not allow calculation of impacts from roadways that are over 1,000 ft from the MEIR. Roadways outside of the 1,000 ft "zone of influence" were not considered in the analysis.

[8] Screening estimates of health impacts for I-580 were estimated with the BAAQMD Highway Screening Analysis Calculator (BAAQMD 2011).

[9] Values are applicable for the DMU Alternative cancer risk and EMU Option cancer risk and $PM_{2.5}$ concentration. The DMU $PM_{2.5}$ MEISR is at a separate location.

Abbreviations:

ADT - Average Daily Traffic
BAAQMD: Bay Area Air Quality Management District
BART - Bay Area Rapid Transit
BRT - Bus Rapid Transit
DMU - Diesel Multiple Units
EMU - Electrical Multiple Units
ft - feet
INP - Isabel Neighborhood Plan
MEISR - Maximally Exposed Individual Sensitive Receptor
$\mu g/m^3$ - microgram per cubic meter
NAD83 - North American Datum 1983
OEHHA - Office of Environmental Health Hazard Assessment
$PM_{2.5}$ - particulate matter with an aerodynamic diameter of 2.5 microns or less
UTM - Universal Transverse Mercator

References:

BAAQMD. 2015. Roadway Screening Analysis Calculator. Available online at: http://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/ceqa-tools
BAAQMD. 2011. Highway Screening Analysis Calculator. Available online at: http://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/ceqa-tools
OEHHA. 2015. Air Toxics Hot Spots Program Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. February.

Table 41
Highway Screening Health Impacts
BART to Livermore Extension
Livermore, California

Description[1]	MEISR	Distance from Highway to MEISR[2]		Relocation Distance[2]		Direction to MEISR from Roadway	BAAQMD Screening Impacts[3]	
		Near Edge	Far Edge	Moving Closer	Moving Further		Scaled Lifetime Excess Cancer Risk[4,5,6] (in a million)	Scaled $PM_{2.5}$ Concentration ($\mu g/m^3$)
		(ft)						
Conventional BART (2025)	Cancer Risk $PM_{2.5}$	266	338	11	-36	N	-1.1	-0.0040
DMU Alternative (EMU Option) (2025)[7]	Cancer Risk $PM_{2.5}$ (EMU only)	266	338	11	-36	N	-1.1	-0.0040
DMU Alternative (2025)	$PM_{2.5}$ (DMU only)	85	177	21	-4.9	S	-	0.024
Express Bus/BRT Alternative (2025)	Cancer Risk $PM_{2.5}$	246	413	43	-69	N	1.4	0.0049
Conventional BART (2040)	Cancer Risk $PM_{2.5}$	266	338	11	-36	N	-1.1	-0.0040
DMU Alternative (EMU Option) (2040)[7]	Cancer Risk $PM_{2.5}$ (EMU only)	266	338	11	-36	N	-1.1	-0.0040
DMU Alternative (2040)	$PM_{2.5}$ (DMU only)	85	177	21	-4.9	S	-	0.026
Express Bus/BRT Alternative (2040)[8]	Cancer Risk $PM_{2.5}$	1,316	1,483	43	-69	N	-	-

Notes:

[1] For a screening assessment, the table provides health impacts to the maximally exposed individual sensitive receptor (MEISR) from relocating highway traffic.

[2] Highway relocation moves the closest lanes of traffic nearer to the MEISRs and moves the distant lanes of traffic further away from the MEISRs. Distances presented represent the distance from the closest edge of each direction of traffic on the highway to the MEISR.

[3] Screening estimates of health impacts were estimated based on the BAAQMD Highway Screening Analysis Tool (BAAQMD 2011).

[4] BAAQMD screening tools' calculated impacts are based on previous OEHHA guidance. Per BAAQMD recommendations, cancer risks were conservatively scaled by a factor of 1.37 to account for the updated exposure parameters and calculation methodologies in OEHHA 2015 guidance.

Table 41
Highway Screening Health Impacts
BART to Livermore Extension
Livermore, California

[5] BAAQMD screening tools' calculated impacts are based on fleet average emissions for calendar year 2014, calculated using EMFAC2007. In order to compare against project health impacts in 2025, a scaling factor was applied to account for lower fleet-average emissions of diesel particulate matter from vehicle exhaust at the time of Project operations. The scaling factor of 0.13 was calculated using EMFAC2014 and compares fleet-average per-mile running emissions of PM_{10} from diesel vehicles, when weighted by the age-specific exposure parameters recommended in OEHHA guidance. Lower fleet-average emissions are expected due to regulations requiring lower-emitting vehicles. It was conservatively assumed that 80% of cancer risk from vehicle exhaust is from diesel particulate matter. Note, the same scaling factor of 0.13 was applied for 2040 even though emissions are expected to be even lower than in 2025.

[6] BAAQMD screening tools' calculated impacts are based on 2014 traffic volumes. In order to compare against project health impacts in 2025, a scaling factor was applied to account for changing traffic patterns in Alameda County over time. Traffic modeling conducted for I-580 road segments was used to develop the traffic scaling factors. When 2013 No Project volumes were compared against 2025 Project volumes for each scenario, it was estimated that volumes increased between 3% and 12%, depending on scenario. Scaling factors were only applied to the scenarios that were found to have increased cancer risk or $PM_{2.5}$ concentrations from highway relocation.

[7] Values are applicable for the DMU Alternative cancer risk and EMU Option cancer risk and $PM_{2.5}$ concentration. The DMU $PM_{2.5}$ MEISR is at a separate location.

[8] The screening tool does not allow for interpolation of impacts from roadways that are over 1,000 ft from the MEISR. Though a net benefit to health impacts is expected from highway relocation at the Express Bus/BRT Alternative MEISR in 2040, impacts are conservatively identified as negligible.

Abbreviations:
BAAQMD: Bay Area Air Quality Management District
BART - Bay Area Rapid Transit
BRT - Bus Rapid Transit
DMU - Diesel Multiple Units
EMU - Electrical Multiple Units
ft - feet

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