

APPENDIX E
Projected Wayside Noise Levels
and Maximum Groundborne Vibration

APPENDIX E LIST OF TABLES

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TABLE E-1 PROPOSED PROJECT - BART WARM SPRINGS EXTENSION
PROJECTED WAYSIDE NOISE LEVELS

Station Number and Direction from BART Alignment	Type of Transit Structure	Type of Receptor (N)	Distance From Nearest Track to Receptor (ft)	Maximum Train Speed (mph)	APTA Passby Noise Guidelines (dBA)	Alternative Projected Ambient (No Build) Year: 2010			Predicted Operational Noise Levels Without Mitigation		Predicted Operational Noise Levels With Mitigation			
						Leq (dBA)	Ldn (dBA)	Passby (dBA)	ΔLeq	ΔLdn	Passby (dBA)	ΔLeq	ΔLdn	
2229+00 to 2234+00 (SB)	B	Multi-Family Residence (Fremont Villas) (4)	90	50	75	56-58	57-59	78-80	10	7	69-71	3	2	(1)
2234+00 to 2243+00 (SB)	A	Multi-Family Residence (Fremont Villas) (4)	80	50	75	56-58	57-59	83-85	15	12	72-74	5	3	(2)
2230+00 to 2235+00 (NB)	B	Multi-Family Residence (MW) (2)	750	50	75	54-56	56-58	65-67	4	2	56-58	1	0	(2)
2234+00 to 2243+00 (NB)	A	Multi-Family Residence (Sun Pointe) (2)	650	50	75	56-58	58-60	71-73	6	3	62-64	1	1	(2)
2245+00 to 2266+00 (NB/SB)	A	Baseball Fields (Central Park) (4)	150	70	75	56-58	59-61	84-86	14	9	72-74	4	2	(2)
2258+00 to 2268+00 (NB)	A	Soccer Fields (Central Park) (5)	700	70	75	58-60	61-63	74-76	6	3	64-66	1	0	(1)
2260+00 to 2285+00 (NB)	A	Central Park	150	70	75	59-61	61-63	84-86	11	8	72-74	2	1	(2)
2260+00 to 2275+00 (SB)	A	Lake Elizabeth (Central Park)	300	70	70	55-57	58-60	80-82	12	7	68-70	3	1	(2)

TABLE E-1 (Continued)

Station Number and Direction from BART Alignment	Type of Transit Structure	Type of Receptor (N)*	Distance From Nearest Track to Receptor (ft)	Maximum Train Speed (mph)	APTA Passby Noise Guidelines (dBA)	Alternative Projected Ambient (No Build) Year: 2010			Predicted Operational Noise Levels Without Mitigation		Predicted Operational Noise Levels With Mitigation			
						Leq (dBA)	Ldn (dBA)	Passby (dBA)	ΔLeq	ΔLdn	Passby (dBA)	ΔLeq	ΔLdn	
						Passby (dBA)	Leq (dBA)	Ldn (dBA)	Passby (dBA)	ΔLeq	ΔLdn	Passby (dBA)	ΔLeq	ΔLdn
2275+00 to 2300+00	A	Central Park	150	70	75	63-65	63-65	84-86	8	6	72-74	1	1	(2)
2278+00 to 2293+00	A	Single-Family Residence (25)	600	70	75	67-69	63-65	75-77	2	2	66-68	0	0	(2)
2293+00 to 2296+00	A	Single-Family Residence (2)	400	70	75	67-69	63-65	78-80	2	3	66-68	0	0	(2)
2296+00 to 2303+00	A	Single-Family Residence (7)	400	80	75	67-69	63-65	79-81	3	3	67-69	0	0	(2)
2305+00 to 2308+00	A	Multi-Family Residence (3)	350	80	75	67-69	63-65	80-82	3	4	68-70	0	0	(2)
2307+50 to 2318+00	A	Single-Family Residence (13)	310	80	75	67-69	63-65	81-83	3	4	69-71	0	1	(2)
2319+00 to 2324+00	B	Churches (2)	420	80	75	66-68	69-71	76-78	2	1	66-68	0	0	(1)
2324+00 to 2328+00	B	Single-Family Residence (3)	220	80	80	72-74	73-75	80-82	1	0	70-72	0	0	(1)

TABLE E-1 (Continued)

Station Number and Direction from BART Alignment	Type of Transit Structure	Type of Receptor (N)*	Distance From Near Track to Nearest Receptor (ft)	Maximum Train Speed (mph)	APTA Passby Noise Guidelines (dBA)	Alternative Projected Ambient (No Build) Year: 2010			Predicted Operational Noise Levels Without Mitigation		Predicted Operational Noise Levels With Mitigation		
						Leq (dBA)	Ldn (dBA)	Passby (dBA)	ΔLeq	ΔLdn	Passby (dBA)	ΔLeq	ΔLdn
						(dBA)	(dBA)	(dBA)			(dBA)		
2306+00 to 2324+00	B	Multi-Family Residence/ Single-Family Residence (14)	240	80	72-74	73-75	79-81	1	0	69-71	0	0	(1)
2365+80 to 2367+90	B	Single-Family Residence (3)	100	50 x-over	72-74	73-75	84-86	3	2	75-77	0	0	(1)
2369+50 to 2371+70	B	Single-Family Residence (5)	85	50 x-over	72-74	73-75	84-86	3	2	75-77	0	0	(1)
2364+00 to 2367+00	B	Commercial/ Industrial (1)	70	50 x-over	73-75	74-76	85-87	3	2	76-78	0	0	(1)
2381+00 to 2387+00	B	Grimmer Elementary Playground	50	50	72-74	73-75	81-83	1	1	72-74	0	0	(1)
2387+50 to 2396+00	B	Single-Family Residence (13)	90	65	72-74	73-75	81-83	1	1	72-74	0	0	(1)
2396+00 to 2401+00	B	Single-Family Residence (8)	90	75	72-74	73-75	83-85	2	1	73-75	0	0	(1)
2403+00 to 2412+00	B	Single-Family Residence (12)	90	80	72-74	73-75	84-86	2	1	74-76	0	0	(1)

TABLE E-1 (Continued)

Station Number and Direction from BART Alignment	Type of Transit Structure	Type of Receptor (N)*	Distance From Track to Nearest Receptor (ft)	Maximum Train Speed (mph)	APTA Passby Noise Guidelines (dBA)	Alternative Projected Ambient (No Build) Year: 2010			Predicted Operational Noise Levels Without Mitigation		Predicted Operational Noise Levels With Mitigation			
						Leq (dBA)	Ldn (dBA)	Passby (dBA)	ΔLeq	ΔLdn	Passby (dBA)	ΔLeq	ΔLdn	
2425+00 to 2442+00	NB/SB A	Industrial (6)	80	80	85	72-74	73-75	88-90	4	2	78-80	1	0	(1)
2441+50 to 2446+00	(SB) A	Single-Family Residence (4)	140	70	80	73-75	74-76	84-86	2	1	74-76	0	0	(1)
2442+00 to 2447+00	(NB) A	Industrial (1)	60	70	85	74-76	75-77	88-90	3	2	78-80	0	0	(1)
2493+00 to 2513+00	(NB) B	Indus./Office (2)	50	80	85	72-74	73-75	87-89	3	2	77-79	0	0	(1)
2533+00 to 2540+00	(NB) B	Office (5)	60	80	80	73-75	74-76	86-88	2	1	76-78	0	0	(1)
2559+00 to 2570+00	(NB) B	Office (3)	50	80	80	73-75	74-76	87-89	3	2	77-79	0	0	(1)

Key to Mitigation:

- (1): Sound Barrier Wall; Aerial with Absorption or At-Grade
- (2): Aerial Sound Barrier Wall with Closed Deck and Absorptor

- (NB): Northbound Line
- (SB): Southbound Line
- (N)*: Number of Buildings x-over: Crossover
- U: U-Wall Structure
- A: Aerial Structure
- B: At-Grade Structure

TABLE E-2 PROPOSED ALTERNATIVE (OPTIONS 2 & 3)- BART WARM SPRINGS EXTENSION
PROJECTED WAYSIDE NOISE LEVELS

Station Number and Direction from BART Alignment	Type of Transit Structure	Type of Receptor (N)*	Distance From Nearest Receptor (ft)	Maximum Train Speed (mph)	APTA Passby Noise Guidelines (dBA)	Alternative Projected Ambient (No Build) Year 2010		Predicted Operational Noise Levels Without Mitigation		Predicted Operational Noise Levels With Mitigation				
						Leq (dBA)	Ldn (dBA)	Passby (dBA)	ΔLeq	ΔLdn	Passby (dBA)	ΔLeq	ΔLdn	
						(dBA)	(dBA)	(dBA)			(dBA)			
DESIGN OPTION 2														
2244+00 to 2276+00	A	Baseball Fields (Central Park) (3)	150	50	75	56-58	59-61	80-82	12	8	71-73	5	2	(1)
2260+00 to 2275+00	A	Central Park	150	50	70	59-61	61-63	80-82	9	6	69-71	2	1	(2)
2261+00 to 2271+00	A	Soccer Fields (Central Park) (5)	300	50	75	58-60	61-63	76-78	7	4	67-69	2	1	(1)
2270+00 to 2290+00	A	Lake Elizabeth (Central Park)	200	50	70	55-57	58-60	79-81	12	7	68-70	3	1	(2)
2285+00 to 2295+00	A	Central Park	300	50	75	64-66	64-66	76-78	3	2	67-69	1	0	(1)
2280+00 to 2308+00	A	Single-Family Residence (31)	390	70	75	67-69	63-65	78-80	2	3	68-70	0	0	(1)
2310+00 to 2322+50	A	Multi-Family Residence Single-Family Residence (18)	290	80	75	67-69	63-65	81-83	3	4	71-73	0	1	(1)

TABLE E-2 (Continued)

Station Number and Direction from BART Alignment	Type of Transit Structure	Type of Receptor (N)*	Distance From Nearest Track to Receptor (ft)	Maximum Train Speed (mph)	APTA Passby Noise Guidelines (dBA)	Alternative Projected Ambient (No Build) Year 2010		Predicted Operational Noise Levels Without Mitigation		Predicted Operational Noise Levels With Mitigation				
						Leq (dBA)	Ldn (dBA)	Passby (dBA)	ΔLeq	ΔLdn	Passby (dBA)	ΔLeq	ΔLdn	Noise Mitigation
2311+00 to 2324+00	A	Multi-Family Residence	280	80	75	67-69	63-65	81-83	3	4	71-73	0	1	(1)
		Single-Family Residence (10)												
CONTINUES TO ALT. 5,6,8,9,10														
2319+00 to 2324+00	A	Churches (2)	420	80	75	66-68	69-71	79-81	3	1	69-71	0	0	(1)
DESIGN OPTION 3														
2311+00 to 2323+00	A	Multi-Family Residence	160	50	75	67-69	63-65	80-82	3	4	71-73	1	1	(1)
		Single-Family Residence (18)												
2312+00 to 2332+00	A	Multi-Family Residence	320	50	75	67-69	63-65	76-78	2	3	67-69	0	0	(1)
		Single-Family Residence (10)												
2327+00 to 2331+00	A	Churches (2)	400	80	75	66-68	69-71	79-81	3	1	69-71	0	0	(1)
CONTINUES TO ALT. 4,7														

TABLE E-2 (Continued)

Station Number and Direction from BART Alignment	Type of Transit Structure	Type of Receptor (N)*	Distance From Track to Nearest Receptor (ft)	Maximum Train Speed (mph)	APTA Passby Noise Guidelines (dBA)	Alternative Projected Ambient (No Build) Year 2010		Predicted Operational Noise Levels Without Mitigation		Predicted Operational Noise Levels With Mitigation				
						Leq (dBA)	Ldn (dBA)	Passby (dBA)	ΔLeq	ΔLdn	Passby (dBA)	ΔLeq	ΔLdn	Noise Mitigation
2311+00 to 2323+00	A	Multi-Family Residence Single-Family Residence (18)	110	50	75	67-69	63-65	82-84	4	6	73-75	1	1	(1)
2312+00 to 2332+00	A	Multi-Family Residence Single-Family Residence (10)	420	50	75	67-69	63-65	74-76	2	2	65-67	0	0	(1)
2327+00 to 2331+00	A	Churches (2)	300	80	75	66-68	69-71	81-83	4	1	71-73	1	0	(1)

Key to Mitigation:
 (1): Sound Barrier Wall; Aerial with Absorption or At-Grade
 (2): Aerial Sound Barrier Wall with Absorption and Closed Deck
 (NB): Northbound Line
 (SB): Southbound Line
 (N)*: Number of Buildings
 x-over: Crossover
 U: U-Wall Structure
 A: Aerial Structure
 B: At-Grade Structure

TABLE E-3 PROPOSED PROJECT - BART WARM SPRINGS EXTENSION
PROJECTED MAXIMUM GROUNDBORNE VIBRATION

Station Number and Direction from BART Alignment	Type of Transit Structure	Type of Receptor (N)*	Minimum Total Distance From Near Track Centerline (ft)	Maximum Train Speed (mph)	Criterion for Allowable Vibration Levels (dB)	Ground-borne Vibration Predictions		
						Predicted Maximum Ground-borne Vibration 10-car Train (dB)	Required Distance for Criterion Compliance (ft)	Predicted Ground-borne Vibration With Mitigation Measures
2229+00 to 2234+00	B	Multi-Family Residence (Fremont Villas) (4)	90	50	70	69-74	160	66-71 (1)
2234+00 to 2243+00	A	Multi-Family Residence (Fremont Villas) (4)	80	50	70	62-67	--	--
2324+00 to 2328+00	B	Single-Family Residence (3)	220	80	75	71-76	--	--
2315+00 to 2324+00	B	Single-Family Residence (8)	240	80	75	71-76	--	--
2347+00 to 2383+00	B	Single-Family Residence (38)	85	50	75	73-78	130	70-75 (1)
2365+80 to 2367+90	B	Single-Family Residence (3)	100	50 x-over	75	79-84	410	71-76 (2)
2369+50 to 2371+70	B	Single-Family Residence (5)	85	50 x-over	75	80-85	410	72-77 (2)
2364+00 to 2367+00	B	Commercial/Industrial (1)	70	50 x-over	85	77-82	--	--

TABLE E-3 (Continued)

Station Number and Direction from BART Alignment	Type of Transit Structure	Type of Receptor (N)*	Minimum Total Distance From Near Track Centerline (ft)	Maximum Train Speed (mph)	Criterion for Allowable Vibration Levels (dB)	Predicted Maximum Ground-borne Vibration 10-car Train (dB)	Required Distance for Criterion Compliance (ft)	Predicted Ground-borne Vibration With Mitigation Measures	Recommended Mitigation Measure
2381+00 to 2387+00	(SB) B	Grimmer Elementary Playground	50	50	80	72-77	--	--	
2387+50 to 2396+00	(SB) B	Single-Family Residence (13)	90	65	75	75-80	190	67-72	(2)
2396+00 to 2401+00	(SB) B	Single-Family Residence (8)	90	75	75	76-81	230	68-73	(2)
2403+00 to 2412+00	(SB) B	Single-Family Residence (12)	90	80	75	77-82	250	69-74	(2)
2533+00 to 2540+00	(NB) B	Office (5)	60	80	80	77-82	80	74-79	(1)
2559+00 to 2570+00	(NB) B	Office (3)	50	80	80	78-83	80	75-80	(1)

Key to Mitigation:
 (1): Resiliently Supported Ties
 (2): Floating Slab

(NB): Northbound Line
 (SB): Southbound Line
 (N)*: Number of Buildings
 x-over: Crossover
 U: U-Wall Structure
 A: Aerial Structure
 B: At-Grade Structure

TABLE E-4 ALTERNATIVE 4- BART WARM SPRINGS EXTENSION
PROJECTED WAYSIDE NOISE LEVELS

Station Number and Direction from BART Alignment	Type of Transit Structure	Type of Receptor (N)*	Distance From Nearest Track to Receptor (ft)	Maximum Train Speed (mph)	APTA Passby Noise Guidelines (dBA)	Alternative Projected Ambient (No Build) Year: 2010				Predicted Operational Noise Levels Without Mitigation		Predicted Operational Noise Levels With Mitigation		
						Leq (dBA)	Ldn (dBA)	Passby (dBA)	ΔLeq	ΔLdn	Passby (dBA)	ΔLeq	ΔLdn	
														72-74
2324+00 to 2326+00	B	Single-Family Residence (2)	110	70	75	72-74	73-75	82-84	1	1	72-74	0	0	(1)
2326+00 to 2328+00	U	Single-Family Residence (2)	110	60	75	72-74	73-75	71-73	0	0	--	--	--	--
2328+00 to 2334+00	U	Multi-Family Residence (10)	190	75	80	72-74	73-75	71-73	0	0	--	--	--	--
2338+00 to 2347+00	U	Single-Family Residence (7)	440	50	80	72-74	73-75	60-62	0	0	--	--	--	--
2365+20 to 2367+20	B	Single-Family Residence (2)	120	50 x-over	80	72-74	73-75	83-85	3	3	74-76	1	1	(1)
2369+70 to 2371+70	B	Single-Family Residence (4)	130	50 x-over	80	72-74	73-75	82-84	3	3	73-75	1	1	(1)
2364+00 to 2367+00	B	Commercial/Industrial (2)	45	50 x-over	85	73-75	74-76	87-89	5	4	78-80	2	1	(1)
2381+00 to 2387+00	B	Glimmer School Playground (1)	80	50	75	72-74	73-75	78-80	2	2	69-71	1	1	(1)

TABLE E-4 (Continued)

Station Number and Direction from BART Alignment	Type of Transit Structure	Type of Receptor (N)*	Distance From Track to Nearest Receptor (ft)	Maximum Train Speed (mph)	APTA Passby Noise Guidelines (dBA)	Alternative Projected Ambient (No Build) Year: 2010			Predicted Operational Noise Levels Without Mitigation		Predicted Operational Noise Levels With Mitigation			
						Leq (dBA)	Ldn (dBA)	Passby (dBA)	ΔLeq	ΔLdn	Passby (dBA)	ΔLeq	ΔLdn	
						Leq (dBA)	Ldn (dBA)	Passby (dBA)	ΔLeq	ΔLdn	Passby (dBA)	ΔLeq	ΔLdn	
2387+50 to 2390+00	B	Single-Family Residence (13)	110	65	80	72-74	73-75	81-83	2	2	71-73	1	1	(1)
2396+00 to 2401+00	B	Single-Family Residence (8)	110	75	80	72-74	73-75	83-85	3	2	72-74	1	1	(1)
2403+00 to 2412+00	B	Single-Family Residence (12)	130	80	80	72-74	73-75	83-85	2	2	72-74	1	1	(1)
2437+00 to 2448+00	B	Industrial (2)	40	70	85	72-74	73-75	86-88	3	2	76-78	0	0	(1)
2441+50 to 2446+00	B	Single-Family Residence (1)	160	50	85	73-75	74-76	75-77	0	0	--	--	--	--
2449+00 to 2451+50	A	Single-Family Residence (1)	240	50	85	73-75	74-76	78-80	1	0	--	--	--	--
2468+00 to 2472+00	B	Industrial (1)	170	36 x-over	85	72-74	73-75	77-79	1	1	--	--	--	--
2473+00 to 2487+00	B	S.P.T.C. Commercial/Office (8)	50	36	85	74-76	75-77	77-79	1	0	--	--	--	--

TABLE E-4 (Continued)

Station Number and Direction from BART Alignment	Type of Transit Structure	Type of Receptor (N)*	Distance From Track to Nearest Receptor (ft)	Maximum Train Speed (mph)	APTA Passby Noise Guidelines (dBA)	Alternative Projected Ambient (No Build) Year: 2010		Predicted Operational Noise Levels Without Mitigation		Predicted Operational Noise Levels With Mitigation		
						Leq (dBA)	Ldn (dBA)	Passby (dBA)	ΔLeq ΔLdn	Passby (dBA)	ΔLeq ΔLdn	Passby (dBA)
2489+00 to NB/SB	B	Indus./Office (2)	50	36	80	72-74	73-75	77-79	1	1	--	--
2495+00												

Key to Mitigation:

- (1): Sound Barrier Wall; Aerial with Absorption or At-Grade
- (2): Aerial Sound Barrier Wall with Absorption and Closed Deck

- (NB): Northbound Line
- (SB): Southbound Line
- (N)*: Number of Buildings x-over: Crossover
- U: U-Wall Structure
- A: Aerial Structure
- B: At-Grade Structure

TABLE E-5 ALTERNATIVE 7-BART WARM SPRINGS EXTENSION
PROJECTED WAYSIDE NOISE LEVELS

Station Number and Direction from BART Alignment	Type of Transit Structure	Type of Receptor (N)	Distance From Near Track to Nearest Receptor (ft)	Maximum Train Speed (mph)	APTA Passby Noise Guidelines (dBA)	Alternative Projected Ambient (No Build) Year: 2010			Predicted Operational Noise Levels Without Mitigation		Predicted Operational Noise Levels With Mitigation			
						Leq (dBA)	Ldn (dBA)	Passby (dBA)	ΔLeq	ΔLdn	Passby (dBA)	ΔLeq	ΔLdn	
														Leq (dBA)
2324+00 to 2328+00	A	Single-Family Residence (3)	240	80	75	72-74	73-75	82-84	1	1	72-74	0	0	(1)
2330+00 to 2333+50	A	Single-Family Residence Senior Citizens Residence (3)	280	80	80	76-78	72-74	81-83	1	1	71-73	0	0	(1)
2328+00 to 2334+00	A	Multi-Family Residence (10)	310	80	75	75-77	76-78	81-83	1	0	71-73	0	0	(1)
2338+00 to 2347+00	A	Single-Family Residence (7)	570	80	80	72-74	73-75	77-79	1	0				--
2334+00 to 2336+00	A	Commercial (4)	210	80	85	72-74	73-75	83-85	2	1	73-75	0	0	--
2337+50 to 2347+00	A	Multi-Family Residence (12)	220	80	80	72-74	73-75	83-85	2	1	73-75	0	0	(1)
2347+00 to 2354+00	A	Church Single-Family Residence (4)	260	80	75	72-74	73-75	82-84	1	1	72-74	0	0	(1)
2354+00 to 2381+00	A	Single-Family Residence (31)	190	80	80	72-74	73-75	84-86	2	1	74-76	0	0	(1)

TABLE E-5 (Continued)

Station Number and Direction from BART Alignment	Type of Transit Structure	Type of Receptor (N)*	Distance From Track to Nearest Receptor (ft)	Maximum Train Speed (mph)	APTA Passby Noise Guidelines (dBA)	Alternative Projected Ambient (No Build) Year: 2010				Predicted Operational Noise Levels Without Mitigation		Predicted Operational Noise Levels With Mitigation		
						Leq (dBA)	Ldn (dBA)	Passby (dBA)	ΔLeq	ΔLdn	Passby (dBA)	ΔLeq	ΔLdn	
						Leq (dBA)	Ldn (dBA)	Passby (dBA)	ΔLeq	ΔLdn	Passby (dBA)	ΔLeq	ΔLdn	
2347+00 to 2351+00	A	Single-Family Residence (3)	150	80	80	72-74	73-75	85-87	2	1	75-77	0	0	(1)
2351+00 to 2364+00	A	Commercial/Industrial (4)	60	80	85	73-75	74-76	89-91	4	2	79-81	1	0	(1)
2364+00 to 2367+00	A	Commercial/Industrial (2)	30	80	85	73-75	74-76	92-94	5	4	82-84	1	1	(1)
2368+00 to 2369+00	A	Single-Family Residence (1)	410	80	80	72-74	73-75	79-81	1	0	69-71	0	0	(1)
2378+50 to 2383+00	A	Single-Family Residence (3)	460	80	80	72-74	73-75	78-80	1	0				
2384+00 to 2410+00	A	Industrial (6)	150	80	85	73-75	74-76	85-87	2	1	75-77	0	0	(1)
2381+00 to 2387+00	A	Grimmer School Playground	160	80	80	72-74	73-75	84-86	2	1	74-76	0	0	(1)
2381+00 to 2387+00	A	Grimmer School Classrooms	500	80	75	72-74	73-75	78-80	1	0	68-70	0	0	(1)

TABLE E-5 (Continued)

Station Number and Direction from BART Alignment	Type of Transit Structure	Type of Receptor (N)*	Distance From Track to Nearest Receptor (ft)	Maximum Train Speed (mph)	APTA Passby Noise Guidelines (dBA)	Alternative Projected Ambient (No Build) Year: 2010				Predicted Operational Noise Levels Without Mitigation		Predicted Operational Noise Levels With Mitigation		
						Leq (dBA)	Ldn (dBA)	Passby (dBA)	ΔLeq	ΔLdn	Passby (dBA)	ΔLeq	ΔLdn	
														Leq (dBA)
2387+50 to 2401+00	A	Single-Family Residence (21)	190	80	80	72-74	73-75	84-86	2	1	74-76	0	0	(1)
2403+00 to 2412+00	A	Single-Family Residence (12)	200	80	80	72-74	73-75	83-85	2	1	73-75	0	0	(1)
2412+00 to 2420+00	B	Commercial/Industrial (2)	260	80	85	72-74	73-75	79-81	1	0				-
2420+00 to 2437+00	B	Industrial (6)	210	80	85	72-74	73-75	80-82	1	1				-
2437+00 to 2448+00	B	Industrial (2)	21	80	85	72-74	73-75	91-93	5	4	80-82	1	1	(1)
2441+50 to 2446+00	B	Single-Family Residence (4)	200	80	80	73-75	74-76	80-82	1	0	70-72	0	0	(1)
2449+00 to 2451+50	A	Single-Family Residence (1)	250	80	80	73-75	74-76	82-84	1	1	72-74	0	0	(1)
2455+00 to 2462+00		Warm Springs Station												

TABLE E-5 (Continued)

Station Number and Direction from BART Alignment	Type of Transit Structure	Type of Receptor (N)*	Distance From Near Track to Nearest Receptor (ft)	Maximum Train Speed (mph)	APTA Passby Noise Guidelines (dBA)	Alternative Projected Ambient (No Build) Year: 2010			Predicted Operational Noise Levels Without Mitigation		Predicted Operational Noise Levels With Mitigation		Noise Mitigation	
						Leq (dBA)	Ldn (dBA)	Passby (dBA)	ΔLeq	ΔLdn	Passby (dBA)	ΔLeq		ΔLdn
2468+00 to 2473+00	(NB) A	Industrial (MPFs) (2)	150	36	85	73-75	74-76	77-79	1	0			--	
2468+00 to 2473+00	(NB) A	Industrial (Crossover) (2)	150	36 x-over	85	73-75	74-76	83-85	2	2			--	
2473+00 to 2482+00	NB/SB B	S.P.T.C. Commercial/Office (4)	90	70	80	73-75	74-76	82-84	1	1	72-74	0	0	(1)
2483+00 to 2487+00	NB/SB B	Commercial/Office (4)	90	60	80	72-74	73-75	80-82	1	1	71-73	0	0	(1)
2489+00 to 2495+00	NB/SB B	Commercial/Office (2)	90	80	80	72-74	73-75	84-86	2	1	74-76	0	0	(1)
2495+00 to 2513+00	(NB) B	Commercial/Office (5)	60	70	80	73-75	74-76	84-86	2	1	74-76	0	0	(1)

(NB): Northbound Line
 (SB): Southbound Line
 (N)*: Number of Buildings
 x-over: Crossover
 U: U-Wall Structure
 A: Aerial Structure
 B: At-Grade Structure

Key to Mitigation:
 (1): Sound Barrier Wall; Aerial with Absorption or At-Grade
 (2): Aerial Sound Barrier Wall with Absorption and Closed Deck

TABLE E-6 ALTERNATIVE 8- BART WARM SPRINGS EXTENSION
PROJECTED WAYSIDE NOISE LEVELS

Station Number and Direction from BART Alignment	Type of Transit Structure	Type of Receptor (N)*	Distance From Near Track to Nearest Receptor (ft)	Maximum Train Speed (mph)	APTA Passby Noise Guidelines (dBA)	Alternative Projected Ambient (No Build) Year: 2010				Predicted Operational Noise Levels Without Mitigation		Predicted Operational Noise Levels With Mitigation		
						Leq (dBA)	Ldn (dBA)	Passby (dBA)	ΔLeq	ΔLdn	Passby (dBA)	ΔLeq	ΔLdn	
														Leq (dBA)
2325+00 to 2330+00	A	Commercial (1)	120	80	85	74-76	70-72	86-88	2	3	76-78	0	0	(1)
2330+00 to 2333+50	A	Single-Family Residence Senior Citizens Residence (3)	220	80	80	74-76	71-73	83-85	1	1	73-75	0	0	(1)
2328+00 to 2334+00	A	Multi-Family Residence (10)	340	80	80	74-76	72-74	80-82	1	1	70-72	0	0	(1)
2338+00 to 2347+00	A	Single-Family Residence (7)	400	80	80	70-72	69-71	79-81	1	1	69-71	0	0	(1)
2337+50 to 2347+00	A	Multi-Family Residence (12)	330	80	80	75-77	76-78	80-82	1	0	70-72	0	0	(1)
2347+00 to 2355+00	A	Single-Family Residence (12)	550	80	80	74-76	72-74	77-79	0	0	--	--	--	--
2347+00 to 2380+00	A	Commercial/ Industrial (6)	80	80	85	70-72	72-74	88-90	5	3	78-80	1	0	(1)
2379+00 to 2382+00	A	Industrial/ Single-Family Residence (3)	60	80	80	70-72	72-74	89-91	6	3	77-79	1	0	(2)

TABLE E-6 (Continued)

Station Number and Direction from BART Alignment	Type of Transit Structure	Type of Receptor (N)*	Distance From Track to Nearest Receptor (ft)	Maximum Train Speed (mph)	APTA Passby Noise Guidelines (dBA)	Alternative Projected Ambient (No Build) Year: 2010			Predicted Operational Noise Levels Without Mitigation		Predicted Operational Noise Levels With Mitigation		
						Leq (dBA)	Ldn (dBA)	Passby (dBA)	ΔLeq	ΔLdn	Passby (dBA)	ΔLeq	ΔLdn
						(dBA)	(dBA)	(dBA)					
2384+00 to 2387+00	A	Single-Family Residence (2)	40	80	70-72	72-74	91-93	7	4	79-81	1	0	(2)
2388+00 to 2390+00	A	Single-Family Residence (1)	100	80	71-73	72-74	87-89	4	2	77-79	1	0	(1)
2390+00 to 2399+00	A	Office Commercial (4)	70	80	72-74	72-74	88-90	4	3	78-80	1	0	(1)
2388+00 to 2390+00	A	Single-Family Residence (1)	100	80	71-73	72-74	93-95	8	7	81-83	1	1	(2)
2390+00 to 2399+00	A	Office Commercial (4)	70	80	72-74	72-74	94-96	8	8	82-84	1	1	(2)
2403+00 to 2409+00	A	Office Commercial (3)	60	80	73-75	72-74	89-91	4	3	79-81	1	0	(1)
2443+50 to 2445+50	A	Office Commercial (1)	30	50	76-78	72-74	87-89	2	3	78-80	0	1	(1)
2468+00 to 2472+00	A	Office Commercial (2)	60	50	73-75	73-75	84-86	2	2	75-77	0	0	(1)

TABLE E-6 (Continued)

Station Number and Direction from BART Alignment	Type of Transit Structure	Type of Receptor (N)*	Distance From Track to Nearest Receptor (ft)	Maximum Train Speed (mph)	APTA Passby Noise Guidelines (dBA)	Alternative Projected Ambient (No Build) Year: 2010			Predicted Operational Noise Levels Without Mitigation		Predicted Operational Noise Levels With Mitigation			
						Leq (dBA)	Ldn (dBA)	Passby (dBA)	ΔLeq	ΔLdn	Passby (dBA)	ΔLeq	ΔLdn	
2490+00 to 2492+00	A	Commercial Industrial (2)	100	80	85	72-74	70-72	87-89	3	3	77-79	0	0	(1)
2493+00 to 2494+00	A	Single-Family Residence (1)	120	80	80	71-73	70-72	86-88	3	3	76-78	0	0	(1)
2485+00 to 2509+00	A	Industrial Commercial (6)	80	80	85	72-74	70-72	88-90	4	4	78-80	1	1	(1)
2495+00 to 2508+00	A	Office Commercial (7)	70	80	80	71-73	70-72	88-90	5	4	78-80	1	1	(1)
2513+50 to 2529+00	A	Multi-Family Residence (6)	60	80	80	71-73	70-72	89-91	5	4	77-79	1	0	(2)
2510+00 to 2514+50	A	Motel (1)	110	80	80	71-73	71-73	86-88	3	2	76-78	0	0	(1)
2515+00 to 2555+00	A	Office Commercial (21)	60	80	80	72-74	70-72	89-91	4	4	77-79	0	0	(2)
2530+00 to 2538+00	A	Single-Family Residence (11)	90	80	80	72-74	69-71	87-89	3	4	77-79	0	1	(1)

TABLE E-6 (Continued)

Station Number and Direction from BART Alignment	Type of Transit Structure	Type of Receptor (N)*	Distance From Near Track to Nearest Receptor (ft)	Maximum Train Speed (mph)	APTA Passby Noise Guidelines (dBA)	Alternative Projected Ambient (No Build) Year: 2010		Predicted Operational Noise Levels Without Mitigation		Predicted Operational Noise Levels With Mitigation				
						Leq (dBA)	Ldn (dBA)	Passby (dBA)	ΔLeq	ΔLdn	Passby (dBA)	ΔLeq	ΔLdn	
2538+00 to 2542+00	A	School (1)	85	80	75	72-74	68-70	88-90	3	5	76-78	0	1	(2)
2543+00 to 2558+00	A	Single-Family Residence (21)	75	80	80	71-73	67-69	88-90	4	6	78-80	1	1	(1)
2559+00 to 2561+00	A	Commercial (4)	80	80	85	71-73	66-68	88-90	4	6	78-80	1	1	(1)
2561+00 to 2587+00	A	Single-Family Residence (31)	75	80	75	70-72	65-67	88-90	5	7	76-78	1	1	(2)
2588+00 to 2597+00	A	Single-Family Residence (12)	220	50	75	69-71	65-67	78-80	2	3	69-71	0	0	(1)
2587+00 to 2603+00	A	Office (5)	250	50	80	69-71	64-66	77-79	2	3	--	--	--	--
2602+00 to 2608+00	A	Office (3)	330	36	80	69-71	64-66	78-80	3	5	--	--	--	--

Key to Mitigation:
(1): Sound Barrier Wall; Aerial with Absorption or At-Grade
(2): Aerial Sound Barrier Wall with Absorption and Closed Deck

(NB): Northbound Line
(SB): Southbound Line
(N)*: Number of Buildings
x-over: Crossover
U: U-Wall Structure
A: Aerial Structure
B: At-Grade Structure

TABLE E-7 ALTERNATIVE 8 - BART WARM SPRINGS EXTENSION
PROJECTED MAXIMUM GROUND BORNE VIBRATION LEVELS

Station Number and Direction from BART Alignment	Type of Transit Structure	Type of Receptor (N)*	Minimum Total Distance From Near Track Centerline (ft)	Maximum Train Speed (mph)	Ground-borne Vibration Predictions				
					Criterion for Allowable Vibration Levels (dB)	Predicted Maximum Ground-borne Vibration 10-car Train (dB)	Required Distance for Criterion Compliance (ft)	Predicted Ground-borne Vibration With Mitigation Measures	Recommended Mitigation Measure
2306+00 to 2323+50	A	Multi-Family Residence (14)	110	80	75	64-69	--	--	
2330+00 to 2333+50	A	Single-Family Residence Senior Citizens Residence (3)	220	80	70	57-62	--	--	
2379+00 to 2382+00	A	Industrial/ Single-Family Residence (3)	60	80	75	70-75	--	--	
2384+00 to 2387+00	A	Single-Family Residence (2)	40	80	75	74-79	--	--	
2388+00 to 2390+00	A	Single-Family Residence (1)	100	80	75	65-70	--	--	
2390+00 to 2399+00	A	Office Commercial (4)	70	80	80	66-71	--	--	
2388+00 to 2390+00	A	Single-Family Residence (1)	100	80 x-over	75	72-77	--	--	
2390+00 to 2399+00	A	Office Commercial (4)	70	80 x-over	80	73-78	--	--	

TABLE E-7 (Continued)

Ground-borne Vibration Predictions									
Station Number and Direction from BART Alignment	Type of Transit Structure	Type of Receptor (N)*	Minimum Total Distance From Near Track Centerline (ft)	Maximum Train Speed (mph)	Criterion for Allowable Vibration Levels (dB)	Predicted Maximum Ground-borne Vibration 10-car Train (dB)	Required Distance for Compliance (ft)	Predicted Ground-borne Vibration With Mitigation Measures	Recommended Mitigation Measure
2403+00 to 2409+00	(NB/SB) A	Office Commercial (3)	60	80	80	68-73	--	--	--
2420+00 to 2448+00	(NB/SB) A	Office Commercial (6)	70	50	80	62-67	--	--	--
2443+50 to 2445+50	(SB) A	Office Commercial (1)	30	50	80	70-75	--	--	--
2468+00 to 2472+00	(SB) A	Office Commercial (2)	60	50	80	64-69	--	--	--
2490+00 to 2492+00	(SB) A	Commercial Industrial (2)	100	80	80	63-68	--	--	--
2493+00 to 2494+00	(SB) A	Single-Family Residence (1)	120	80	75	63-68	--	--	--
2485+00 to 2509+00	(NB) A	Industrial Commercial (6)	80	80	85	65-70	--	--	--
2495+00 to 2508+00	(SB) A	Office Commercial (7)	70	80	80	66-71	--	--	--

TABLE E-7 (Continued)

Station Number and Direction from BART Alignment		Ground-borne Vibration Predictions									
		Type of Transit Structure	Type of Receptor (N)*	Minimum Total Distance From Near Track Centerline (ft)	Maximum Train Speed (mph)	Criterion for Allowable Vibration Levels (dB)	Predicted Maximum Ground-borne Vibration 10-car Train (dB)	Required Distance for Criterion Compliance (ft)	Predicted Ground-borne Vibration With Mitigation Measures	Recommended Mitigation Measure	
2513+50 to 2529+00	(NB)	A	Multi-Family Residence (6)	60	80	75	69 - 74	--	--	--	
2510+00 to 2514+50	(SB)	A	Motel (1)	110	80	75	62 - 67	--	--	--	
2515+00 to 2585+00	(SB)	A	Office Commercial (21)	60	80	80	68 - 73	--	--	--	
2530+00 to 2538+00	(NB)	A	Single-Family Residence (11)	90	80	75	66 - 71	--	--	--	
2538+00 to 2542+00	(NB)	A	School (1)	85	80	75	66 - 71	--	--	--	
2543+00 to 2558+00	(NB)	A	Single-Family Residence (21)	75	80	75	68 - 73	--	--	--	
2559+00 to 2561+00	(NB)	A	Commercial (4)	80	80	80	63 - 68	--	--	--	
2561+00 to 2587+00	(NB)	A	Single-Family Residence (31)	75	80	70	68 - 73	--	--	--	

Key to Mitigation:
 (1): Sound Barrier Wall: At-Grade or Aerial with Absorption
 (2): Aerial Sound Barrier Wall with Absorption and Closed Deck
 (NB): Northbound Line
 (SB): Southbound Line
 (N)*: Number of Buildings
 x-over: Crossover
 U: U-Wall Structure
 A: Aerial Structure
 B: At-Grade Structure