Appendix G
Noise Data

ESA

Table G-1. 2019 Modified Project Variant - Project Related Construction Equipment

Project Equipment[1]	*FTA Equipment*[2]	*Construction Activities Requiring Equipment*	*Typical Noise Level (dBA)*	
			50 Feet from Source[3]	*100 Feet from Source*[4]
Compactors	Compactor	Site Preparation, Building Construction, and Roadway Improvements	82	76
Cement Truck	Concrete Mixer	Site Preparation and Building Construction	85	79
Pump Trucks	Concrete Pump	Site Preparation and Building Construction	82	76
Cranes	Crane, Mobile	Site Preparation and Building Construction	83	77
Dozers	Dozer	Site Preparation, Building Construction, and Roadway Improvements	85	79
Grader	Grader	Site Preparation, Building Construction, and Roadway Improvements	85	79
Soil stabilizer	Grader	Site Preparation, Building Construction, and Roadway Improvements	85	79
Loaders	Loader	Site Preparation, Building Construction, and Roadway Improvements	85	79
Excavators	Loader	Site Preparation, Building Construction, and Roadway Improvements	85	79
Bottom-drive wick inserter[5]	Excavator	Site Preparation	88	82
Rough Terrain Fork lift	Loader	Site Preparation and Building Construction	85	79
Asphalt Layer	Paver	Site Preparation, Building Construction, and Roadway Improvements	89	83
Pile Driver	Pile-driver (Impact)	Site Preparation and Building Construction	101	95
Drill Rig Truck	Drill Rig Truck[6]	Site Preparation (boreholes)	79	73
Roller	Roller	Site Preparation, Building Construction, and Roadway Improvements	74	68
Man Lifts	Roller	Site Preparation and Building Construction	74	68
Bobcat	Roller	Site Preparation, Building Construction, and Roadway Improvements	74	68
Sweeper	Roller	Site Preparation and Building Construction	74	68
Off Road Dump Trucks	Truck	Site Preparation, Building Construction, and Roadway Improvements	88	82
Water Trucks	Truck	Site Preparation, Building Construction, and Roadway Improvements	88	82

SOURCE: Noise levels for FTA equipment from FTA, *Transit Noise and Vibration Guidance Handbook* , May 2006. Project equipment and activities from 2019 Modified Project Variant Construction Phasing, revised May 2019.

NOTES:

[1] Project equipment categories for 2019 Modified Project Variant construction.

[2] FTA equipment category with similar noise emissions to project equipment.

[3] Typical noise levels for Project equipment based on similar FTA equipment operating at 50 feet.

[4] Typical noise level at 100 feet calculated assuming 6 dBA reduction per doubling of distance.

[5] "Bottom-drive wick inserter" noise level not found in FTA manual; sound level assumed similar to operation of an excavator (85 dBA) + 3 dBA.

[6] "Drill Rig Truck" noise level not found in FTA manual; sound level data from Federal Highway Administration (FHWA) Roadway Construction Noise Model (RCNM). Sound level data available at https://www.fhwa.dot.gov/Environment/noise/construction_noise/handbook/handbook09.cfm.

Table G-2. 2019 Modified Project Variant Construction-related Noise Results, by Activity and Area

Construction Activity [1]	*Construction Project Area* [2]	*Max Construction-Related Noise Levels without Pile-Driving (dBA)*		*Max Construction-Related Noise Levels with Pile-Driving (dBA)*	
		Off-site Receiver [3]	*On-site Receiver* [4]	*Off-site Receiver* [3,5]	*On-site Receiver* [4,5]
Abatement	CP-02	89	-	-	-
Abatement	CP-05	86	80	-	-
Abatement	CP-07	78	79	-	-
Abatement	CP-10	60	78	-	-
Demolition	CP-01	87	-	-	-
Demolition	CP-02	90	66	100	-
Demolition	CP-02 Parks (Bayview Hillside OS, Wedge Park 1, Last Port, Jamestown Walker)	82	61	-	-
Demolition	CP-03	73	-	-	-
Demolition	CP-04	70	-	-	-
Demolition	CP-05	87	81	-	-
Demolition	CP-06 Parks (The Neck)	70	83	-	-
Demolition	CP-07	79	80	-	-
Demolition	CP-08	63	58	-	-
Demolition	CP-09	62	57	-	-
Demolition	CP-09 Parks (The Heart of the Park and The Point)	62	76	-	-
Demolition	CP-10	61	79	-	-
Demolition	CP-11	76	81	-	-
Demolition	CP-12	66	81	-	-
Demolition	CP-13	60	73	-	-
Demolition	CP-13 Parks (The Last Rubble)	60	69	-	-
Demolition	CP-14	78	78	-	-
Demolition	CP-14 Parks (CP Neighborhood Park)	72	74	-	-
Demolition	CP-15	66	72	-	-
Demolition	CP-15 Parks (Bayview Gardens, Wedge Park 3)	62	99	-	-
Demolition	CP-16	97	77	-	-
Demolition	CP-16 Parks (Grassland S1)	87	81	-	-
Demolition	CP-17	66	68	-	-
Demolition	CP-17 Parks (Grassland S7)	67	73	-	-
Grading & Infrastructure	CP-01	87	-	-	-
Grading & Infrastructure	CP-02	91	67	-	-
Grading & Infrastructure	CP-02 Parks (Bayview Hillside OS, Wedge Park 1, Last Port, Jamestown Walker)	83	62	-	-
Grading & Infrastructure	CP-03	73	70	83	-
Grading & Infrastructure	CP-03 Parks (Wedge Park 2a)	62	62	-	-
Grading & Infrastructure	CP-04	70	60	80	69
Grading & Infrastructure	CP-05	88	82	-	-
Grading & Infrastructure	CP-05 Parks (AG Neighborhood P1)	78	74	-	-
Grading & Infrastructure	CP-06	73	58	83	67
Grading & Infrastructure	CP-06 Parks (The Neck)	70	84	-	-
Grading & Infrastructure	CP-07	80	81	-	-
Grading & Infrastructure	CP-07 Parks (AG Neighborhood Park 2)	73	92	-	-
Grading & Infrastructure	CP-08	64	59	73	68
Grading & Infrastructure	CP-09	63	67	72	67
Grading & Infrastructure	CP-09 Parks (The Heart of the Park and The Point)	62	76	-	-
Grading & Infrastructure	CP-10	61	79	71	69
Grading & Infrastructure	CP-10 Parks (Mini Wedge Park 1, Mini Wedge 2, Wind Meadow)	60	98	-	-
Grading & Infrastructure	CP-11	77	82	86	82
Grading & Infrastructure	CP-12	66	82	-	-
Grading & Infrastructure	CP-12 Parks (Wedge Park 2B)4	62	88	-	-
Grading & Infrastructure	CP-13	61	73	70	69
Grading & Infrastructure	CP-13 Parks (The Last Rubble)	61	69	-	-
Grading & Infrastructure	CP-14	78	79	88	82
Grading & Infrastructure	CP-14 Parks (CP Neighborhood Park)	73	75	-	-

Table G-2. 2019 Modified Project Variant Construction-related Noise Results, by Activity and Area

Construction Activity [1]	*Construction Project Area* [2]	*Max Construction-Related Noise Levels without Pile-Driving (dBA)*		*Max Construction-Related Noise Levels with Pile-Driving (dBA)*	
		Off-site Receiver [3]	*On-site Receiver* [4]	*Off-site Receiver* [3,5]	*On-site Receiver* [4,5]
Grading & Infrastructure	CP-15	66	73	76	74
Grading & Infrastructure	CP-15 Parks (Bayview Gardens, Wedge Park 3)	62	99	-	-
Grading & Infrastructure	CP-16	98	78	107	85
Grading & Infrastructure	CP-16 Parks (Grassland S1)	87	81	-	-
Grading & Infrastructure	CP-17	66	70	76	76
Grading & Infrastructure	CP-17 Parks (Grassland S7)	68	73	-	-
Improvements	CP-02 Roadway Improvements (Gilman Ave, Harney Way 1)	98	81	-	-
Improvements	CP-06 Roadway Improvements (Harney Way 2)	87	56	-	-
Improvements	CP-07 Roadway Improvements (Ing/Tho/Crl/Grif, Ingerson, Jamestown Ave)	106	87	-	-
Interior and Exterior Finishes	CP-01	84	-	-	-
Interior and Exterior Finishes	CP-02	87	79	-	-
Interior and Exterior Finishes	CP-02 Parks (Bayview Hillside OS, Wedge Park 1, Last Port, Jamestown Walker)	83	89	-	-
Interior and Exterior Finishes	CP-03	70	66	-	-
Interior and Exterior Finishes	CP-04	69	79	80	69
Interior and Exterior Finishes	CP-05	84	78	-	-
Interior and Exterior Finishes	CP-05 Parks (AG Neighborhood P1)	76	72	-	-
Interior and Exterior Finishes	CP-06	70	55	-	-
Interior and Exterior Finishes	CP-06 Parks (The Neck)	69	87	-	-
Interior and Exterior Finishes	CP-07	78	79	-	-
Interior and Exterior Finishes	CP-08	60	78	-	-
Interior and Exterior Finishes	CP-09	59	78	-	-
Interior and Exterior Finishes	CP-09 Parks (The Heart of the Park and The Point)	60	74	-	-
Interior and Exterior Finishes	CP-10	57	78	-	-
Interior and Exterior Finishes	CP-10 Parks (Mini Wedge Park 1, Mini Wedge 2, Wind Meadow)	59	96	-	-
Interior and Exterior Finishes	CP-11	73	78	-	-
Interior and Exterior Finishes	CP-12	63	78	-	-
Interior and Exterior Finishes	CP-12 Parks (Wedge Park 2B)4	61	86	-	-
Interior and Exterior Finishes	CP-13	57	70	-	-
Interior and Exterior Finishes	CP-14	75	75	-	-
Interior and Exterior Finishes	CP-14 Parks (CP Neighborhood Park)	71	82	-	-
Interior and Exterior Finishes	CP-15	63	77	-	-
Interior and Exterior Finishes	CP-15 Parks (Bayview Gardens, Wedge Park 3)	61	98	-	-
Interior and Exterior Finishes	CP-16	94	76	-	-
Interior and Exterior Finishes	CP-16 Parks (Grassland S1)	86	80	-	-
Interior and Exterior Finishes	CP-17	63	79	-	-
Interior and Exterior Finishes	CP-17 Parks (Grassland S7)	66	96	-	-
Foundation Piles/Structures/ Rough-In	CP-01	86	-	-	-
Foundation Piles/Structures/ Rough-In	CP-02	90	82	100	77
Foundation Piles/Structures/ Rough-In	CP-02 Parks (Bayview Hillside OS, Wedge Park 1, Last Port, Jamestown Walker)	81	60	-	-
Foundation Piles/Structures/ Rough-In	CP-03	71	68	83	80
Foundation Piles/Structures/ Rough-In	CP-03 Parks (Wedge Park 2a)	61	60	-	-
Foundation Piles/Structures/ Rough-In	CP-04	69	58	80	69
Foundation Piles/Structures/ Rough-In	CP-05	86	80	-	-
Foundation Piles/Structures/ Rough-In	CP-06	72	56	-	-
Foundation Piles/Structures/ Rough-In	CP-06 Parks (The Neck)	69	87	-	-
Foundation Piles/Structures/ Rough-In	CP-07	79	80	-	-

Table G-2. 2019 Modified Project Variant Construction-related Noise Results, by Activity and Area

Construction Activity [1]	*Construction Project Area* [2]	*Max Construction-Related Noise Levels without Pile-Driving (dBA)*		*Max Construction-Related Noise Levels with Pile-Driving (dBA)*	
		Off-site Receiver [3]	*On-site Receiver* [4]	*Off-site Receiver* [3,5]	*On-site Receiver* [4,5]
Foundation Piles/Structures/ Rough-In	CP-08	63	81	73	68
Foundation Piles/Structures/ Rough-In	CP-09	62	81	72	67
Foundation Piles/Structures/ Rough-In	CP-10	59	79	70	69
Foundation Piles/Structures/ Rough-In	CP-11	75	80	86	82
Foundation Piles/Structures/ Rough-In	CP-12	65	80	76	74
Foundation Piles/Structures/ Rough-In	CP-13	59	71	70	69
Foundation Piles/Structures/ Rough-In	CP-14	77	77	88	82
Foundation Piles/Structures/ Rough-In	CP-15	65	79	76	74
Foundation Piles/Structures/ Rough-In	CP-16	96	78	107	85
Foundation Piles/Structures/ Rough-In	CP-17	65	81	76	92

SOURCE: Noise levels for FTA equipment from FTA, *Transit Noise and Vibration Guidance Handbook* , May 2006. Project equipment activities and schedule from 2019 Modified Project Variant Construction Schedule and Resources, revised May 2019. Calculations by Ramboll, June 2019.

NOTES:

Noise levels were calculated at the nearest noise-sensitive receiving location assuming the top two loudest equipment (with and without pile driving) operate simultaneously.

[1] See Table G-1 for typical equipment associated with Site Preparation (Abatement, Demolition, and Grading), Building Construction (Foundation Piles/Structure/Rough-In and Interior & Exterior Finishes), and Roadway Improvements.

[2] Construction project areas based on the 2019 Modified Project Variant.

[3] Off-site noise-sensitive uses include existing residences and places of worship in the Bayview and Hunters Point neighborhoods.

[4] On-site noise-sensitive uses include future residential units and the hotel proposed under the 2019 Modified Project Variant. A dash (-) indicates no on-site noise-sensitive use would be occupied during construction.

[5] Dashes (-) indicate sustained pile driving would not be utilized.

Table G-3. 2019 Modified Project Variant Traffic Volumes and Speeds Assumed for Operational Impact Assessment

Roadway Segment	*Model Scenario*	*Total PM-Peak Period Traffic Volume (vph)*	*Speed Limit (mph)* [2]
Gilman Avenue east of 3rd Street	Existing	431	25
Paul Avenue west of 3rd Street	Existing	507	25
Arelious Walker Drive north of Gilman Avenue	Existing	98	25
Jamestown Ave north of Harney Way	Existing	204	30
Harney Way west of Jamestown Ave	Existing	146	30
Gilman Avenue east of 3rd Street	Existing + Project	1,993	25
Paul Avenue west of 3rd Street	Existing + Project	1,764	25
Arelious Walker Drive north of Gilman Avenue	Existing + Project	1,628	25
Jamestown Ave north of Harney Way	Existing + Project	907	30
Harney Way west of Jamestown Ave	Existing + Project	2,237	30
Gilman Avenue east of 3rd Street	Future Background	970	25
Paul Avenue west of 3rd Street	Future Background	1,210	25
Arelious Walker Drive north of Gilman Avenue	Future Background	590	25
Jamestown Ave north of Harney Way	Future Background	940	30
Harney Way west of Jamestown Ave	Future Background	1,930	30
Gilman Avenue east of 3rd Street	Project Only	1,562	25
Paul Avenue west of 3rd Street	Project Only	1,257	25
Arelious Walker Drive north of Gilman Avenue	Project Only	1,530	25
Jamestown Ave north of Harney Way	Project Only	703	30
Harney Way west of Jamestown Ave	Project Only	2,091	30
Gilman Avenue east of 3rd Street	Future Background + Project	1,889	25
Paul Avenue west of 3rd Street	Future Background + Project	1,968	25
Arelious Walker Drive north of Gilman Avenue	Future Background + Project	1,832	25
Jamestown Ave north of Harney Way	Future Background + Project	1,334	30
Harney Way west of Jamestown Ave	Future Background + Project	3,426	30

SOURCE: Total Existing and Future Background PM-peak period traffic volumes from 2010 FEIR. Total Project Only and Future Background + Project PM-peak period traffic volumes from 2019 Modified Project Variant Traffic Impact Analysis.

NOTES:
[1] Traffic composition assumes 97% light-duty vehicles (LDV), 2% medium duty vehicles (MDV), and 1% heavy duty vehicles (HDV).
[2] Speed limits based on existing signage, assessed with Google Street View, June 2019.

Table G-4. 2010 FEIR Traffic Volumes (PM) Provided by Fehrs & Peers

Roadway Intersections	*Model Scenario*	*Turning Movement*											
		EBL	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
Third Street and Gilman Avenue	Existing	80	143	21	36	119	32	37	376	34	67	540	107
Harney Way and Jamestown/Arelious Walker	Existing	22	5	80	0	24	1	58	2	0	3	6	15
Arelious Walker Drive and Gilman Avenue	Existing	8	27			29	25				60		5
Harney Way and Executive Park Blvd	Existing	11	73			27	12				15		15
Third Street and Gilman Avenue	Background	120	440	130	40	270	50	40	1,130	40	70	1,610	210
Harney Way and Jamestown/Arelious Walker	Background	10	40	310	450	40	10	520	10	390	10	10	20
Arelious Walker Drive and Gilman Avenue	Background	190	260			330	50				160		190
Harney Way and Executive Park Blvd	Background	540	920			430	380				200		210
Third Street and Gilman Avenue	Project	42	520		20	382	162	46	212	21	193	261	31
Harney Way and Jamestown/Arelious Walker	Project	48		304				150	854			757	24
Arelious Walker Drive and Gilman Avenue	Project	273	122	333		20	53	338	397		49	527	182
Harney Way and Executive Park Blvd	Project		980			1,050							
Third Street and Gilman Avenue	Cumulative	160	960	130	60	650	210	80	1,260	60	260	1,750	220
Harney Way and Jamestown/Arelious Walker	Cumulative	90	0	530	0	0	0	420	960	0	0	970	60
Arelious Walker Drive and Gilman Avenue	Cumulative	430	140	520	10	30	80	520	540	10	110	640	200
Harney Way and Executive Park Blvd	Cumulative	540	1,560	0	0	1,200	380	0	0	0	200	0	210

NOTES:

[1] Existing and Background traffic volumes are applied to both 2010 FEIR and 2019 Modified Project Variant traffic noise analyses

[2] Roadway segments used in the traffic noise model analyses are based on highest instersection approach and departure volumes. Volumes are calculated using the above turning movements

Table G-5. 2019 Modified Project Variant Traffic Volumes (PM) Provided by Fehrs & Peers

Roadway Segment	*Model Scenario*	*Turning Movement*											
		EBL	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
Third Street and Gilman Avenue	Project	31	610	9	21	500	197	82	195	18	216	230	25
Harney Way and Jamestown/Arelious Walker	Project			465				238	700			688	
Ingalls and Egbert Avenue	Project				11				25	42		39	
Arelious Walker Drive and Gilman Avenue	Project	72	415	356	0	226	153	279	387	0	150	571	197
Harney Way and Executive Park Blvd	Project		938			1,153							
Third Street and Gilman Avenue	Cumulative	166	795	128	57	581	193	69	1,305	55	208	1,791	229
Harney Way and Jamestown/Arelious Walker	Cumulative	90	0	693	0	0	0	491	769	0	0	875	60
Ingalls and Egbert Avenue	Cumulative	10	20	30	18	10	20	10	186	48	20	210	10
Arelious Walker Drive and Gilman Avenue	Cumulative	152	406	300	10	227	177	264	474	10	211	645	173
Harney Way and Executive Park Blvd	Cumulative	540	1,494	0	0	1,352	380	0	0	0	200	0	210

NOTES:

[1] Roadway segments used in the traffic noise model analyses are based on highest instersection approach and departure volumes. Volumes are calculated using the above turning movements