Appendix A
Public and Agency Participation

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DEPARTMENT OF DEFENSE
DEPARTMENT OF THE NAVY

NOTICE OF AVAILABILITY OF A DRAFT ENVIRONMENTAL ASSESSMENT AND OPEN HOUSE PUBLIC MEETINGS FOR HOMEPORTING CONSTELLATION-CLASS FRIGATES AT NAVAL STATION EVERETT, WASHINGTON

The U.S. Department of the Navy (Navy) invites the public to review and comment on the Draft Environmental Assessment (EA) prepared for Homeporting Constellation-class frigates at Naval Station Everett, Washington (WA).

Under the Proposed Action, the Navy would homeport up to 12 Constellation-class frigates; construct training and support facilities for ships, commands, and crews; and station approximately 2,900 military personnel, plus their family members. The Navy would phase in homeported ships over a 10-year time period, with personnel arriving and facilities established beginning no earlier than fiscal year 2026 and arrival of the first Constellation-class frigate no earlier than fiscal year 2028. Homeporting of ships and personnel would occur incrementally as existing homeported ships and personnel depart Naval Station Everett.

The Draft EA is available on the Navy's website, https://www.nepa.navy.mil/FFGEverett and at local libraries (Everett Public Library (2702 Hoyt Ave., Everett, WA 98201) and Everett Public Library-Evergreen Branch (9512 Evergreen Way, Everett, WA 98204). The Navy invites the public to attend an open house public meeting at Hotel Indigo, Harbor Ballroom, 1028 13th Street, Everett, WA 98201 on either Tuesday, February 27 from 5 P.M. to 7 P.M. or Wednesday, February 28 from 2 P.M. to 4 P.M.

The Navy is accepting written comments on the Draft EA during the 30-day public comment period from February 9 through March 11, 2024. Comments may be submitted at the open house, electronically via the project website https://www.nepa.navy.mil/FFGEverett, or by mail to: FFG EA Project Manager, Naval Facilities Engineering Systems Command Atlantic, Attn: Code EV21JB, 6506 Hampton Blvd, Norfolk, Virginia 23508. All comments must be received or postmarked by 11:59 p.m. on March 11, 2024 to be considered.

For additional information regarding the EA and media queries, please contact, U.S. Fleet Forces Command Public Affairs at 757-836-4427, or email to theodore.c.brown4.civ@us.navy.mil.

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Appendix B
Coastal Zone Management Act Documentation

To be included in the Final EA.

Appendix C
Air Quality Calculations

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This appendix presents an export of results directly from the Air Conformity Applicability Model (ACAM) air quality modeling software, retaining the organizational headings, text, and table formatting produced by the software.

C.1 ALTERNATIVE 1 DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location

Base: NAVSTA EVERETT

State: Washington

County(s): Snohomish

Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: Homeporting of Constellation-Class Frigates at Naval Station Everett, Washington

- Project Number/s (if applicable):

- Projected Action Start Date: 1 / 2026

- Action Purpose and Need:

The purpose of the Proposed Action is to support homeporting of up to 12 Constellation-class guided-missile frigates (FFGs) on the West Coast of the United States to provide the Pacific Fleet with the next generation of multi-mission small surface combatants with the ability to operate independently or as part of a strike group.

The need for the Proposed Action is to provide capabilities for manning, training, and equipping combat-capable naval forces ready to deploy worldwide. In this regard, the Proposed Action furthers the Navy's execution of its congressionally mandated roles and responsibilities under 10 U.S. Code (U.S.C.) Section 8062.

- Action Description:

Under Alternative 1, the Navy would homeport up to 12 FFGs; construct training and support facilities for ships, commands, and crews; and station approximately 2,900 personnel, plus their family members. The homeporting of ships and personnel would be phased in over a period of approximately 10 years. Based on the production and testing timeline, the first ship is expected to arrive at NAVSTA Everett beginning no earlier than fiscal year 2028. Personnel will be stationed at NAVSTA Everett in a phased-in approach over approximately 10 years beginning no earlier than approximately fiscal year 2026.

Between fiscal years 2023 and 2031, 10 existing homeported Navy ships berthed at NAVSTA Everett would gradually be reduced to zero through changes in homeport or changes in mission. Over time, approximately 3,100 personnel associated with the departing vessels would also depart NAVSTA Everett.

Facilities construction under the Alternative 1 would occur within existing NAVSTA Everett property boundaries from fiscal year 2026 to fiscal year 2028 (approximately 2.5 years) and is described in detail below.

New stand-alone facilities construction:

• Administrative Support Facility (up to 3 stories) – Approximately 50,000 square feet. The Administrative Support Facility may be a stand-alone structure or an addition to an existing building. The facility would be located within the "Administrative District" of NAVSTA Everett.

Building additions:

• Two shelter additions along the pier (1 story) – total 400 square feet. Each consists of a 200 square foot steel-framed, reinforced concrete addition.

• Fleet Region Readiness Center multistory addition – 41,000 square feet. Provides classroom and training space.

Note: All building square footages listed above are estimated at this early stage in planning.

Renovations:

• No major interior renovations. Minor interior renovations (i.e., 2,500 sf of interior renovations) may occur.

Other supporting facilities and infrastructure:

• Stormwater management facilities

• Electrical and mechanical utilities

• Road and parking lot resurfacing

Potential locations of construction and additions under Alternative 1 are shown in Figure 2.3-1 of the EA.

- Point of Contact

Name: Brad Boykin
Title: CTR
Organization: Leidos
Email: boykinb@leidos.com
Phone Number: 571.521.8765

- Activity List:

Activity Type		Activity Title
2.	Construction / Demolition	Construction of New Facilities/Additions
3.	Emergency Generator	Emergency Generator
4.	Personnel	Personnel 2026
5.	Personnel	Personnel 2027
6.	Personnel	Personnel 2028

7.	Personnel	Personnel 2029
8.	Personnel	Personnel 2030
9.	Personnel	Personnel 2031
10.	Personnel	Personnel 2032
11.	Personnel	Personnel 2036
12.	Personnel	Personnel 2037
13.	Personnel	Existing Navy and USCGC Personnel

Emission factors and air emission estimating methods come from the United States Air Force's Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and Air Emissions Guide for Air Force Transitory Sources.

2. Construction / Demolition

2.1 General Information & Timeline Assumptions

- Activity Location

County: Snohomish

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construction of New Facilities/Additions

- Activity Description:

New:

Admin Support Fac - 50,000 sq ft

Additions:

2 Shelter Additions - 400 sq ft each

Fleet Readiness Center - 41,000 sq ft

Paving:

Resurfacing up to 35 parking spaces - 5,600 sq ft

Utilities upgrades:

Excavating/trenching - up to 30,000 linear ft

- Activity Start Date

Start Month: 1

Start Month: 2026

- Activity End Date

Indefinite: False

End Month: 6

End Month: 2029

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	2.831894
SO_x	0.028845
NO_x	8.027388
CO	12.210456
PM 10	55.961352

Pollutant	Total Emissions (TONs)
PM 2.5	0.290266
Pb	0.000000
NH_3	0.008557
CO_2e	2801.3

2.1 Site Grading Phase

2.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 1

Start Quarter: 1

Start Year: 2026

- Phase Duration

Number of Month: 12

Number of Days: 0

2.1.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft^2): 106350

Amount of Material to be Hauled On-Site (yd^3): 106

Amount of Material to be Hauled Off-Site (yd^3): 106

- Site Grading Default Settings

Default Settings Used: Yes

Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.201	000.002	000.113	003.107	000.004	000.004		000.024	00296.374
LDGT	000.211	000.003	000.199	003.490	000.006	000.005		000.026	00386.238
HDGV	000.798	000.006	000.859	013.035	000.024	000.021		000.051	00897.042
LDDV	000.081	000.001	000.080	002.872	000.003	000.002		000.008	00298.880
LDDT	000.084	000.001	000.120	001.978	000.003	000.003		000.009	00348.850
HDDV	000.115	000.004	002.431	001.505	000.041	000.038		000.032	01249.474
MC	002.292	000.003	000.725	012.519	000.022	000.020		000.054	00390.892

2.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Work Days (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Work Days (days)

H: Hours Worked per Day (hours)

EF_{POL}: Emission Factor for Pollutant (lb/hour)

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)

$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)

HC: Average Hauling Truck Capacity (yd^3)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Work Days (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

2.2 Trenching/Excavating Phase

2.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date

Start Month: 7

Start Quarter: 1

Start Year: 2026

- Phase Duration

Number of Month: 24

Number of Days: 0

2.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information

Area of Site to be Trenched/Excavated (ft^2): 180000

Amount of Material to be Hauled On-Site (yd^3): 180

Amount of Material to be Hauled Off-Site (yd^3): 180

- Trenching Default Settings

Default Settings Used: Yes

Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.201	000.002	000.113	003.107	000.004	000.004		000.024	00296.374
LDGT	000.211	000.003	000.199	003.490	000.006	000.005		000.026	00386.238
HDGV	000.798	000.006	000.859	013.035	000.024	000.021		000.051	00897.042
LDDV	000.081	000.001	000.080	002.872	000.003	000.002		000.008	00298.880
LDDT	000.084	000.001	000.120	001.978	000.003	000.003		000.009	00348.850

HDDV	000.115	000.004	002.431	001.505	000.041	000.038		000.032	01249.474
MC	002.292	000.003	000.725	012.519	000.022	000.020		000.054	00390.892

2.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Work Days (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Work Days (days)

H: Hours Worked per Day (hours)

EF_{POL}: Emission Factor for Pollutant (lb/hour)

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)

$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)

HC: Average Hauling Truck Capacity (yd^3)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Work Days (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

2.3 Building Construction Phase

2.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 1

Start Quarter: 1

Start Year: 2026

- Phase Duration

Number of Month: 30

Number of Days: 0

2.3.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial

Area of Building (ft^2): 91400

Height of Building (ft): 30

Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: Yes

Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

2.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0680	0.0013	0.4222	0.3737	0.0143	0.0143	0.0061	128.77
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0236	0.0006	0.0859	0.2147	0.0025	0.0025	0.0021	54.449
Generator Sets Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0287	0.0006	0.2329	0.2666	0.0080	0.0080	0.0025	61.057
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0214	0.0003	0.1373	0.1745	0.0051	0.0051	0.0019	25.650

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.201	000.002	000.113	003.107	000.004	000.004		000.024	00296.374
LDGT	000.211	000.003	000.199	003.490	000.006	000.005		000.026	00386.238
HDGV	000.798	000.006	000.859	013.035	000.024	000.021		000.051	00897.042
LDDV	000.081	000.001	000.080	002.872	000.003	000.002		000.008	00298.880
LDDT	000.084	000.001	000.120	001.978	000.003	000.003		000.009	00348.850
HDDV	000.115	000.004	002.431	001.505	000.041	000.038		000.032	01249.474
MC	002.292	000.003	000.725	012.519	000.022	000.020		000.054	00390.892

2.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase

$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)

BA: Area of Building (ft^2)

BH: Height of Building (ft)

(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

2.4 Architectural Coatings Phase

2.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date

Start Month: 7

Start Quarter: 1

Start Year: 2028

- Phase Duration

Number of Month: 12

Number of Days: 0

2.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information

Building Category: Non-Residential

Total Square Footage (ft^2): 115400

Number of Units: N/A

- Architectural Coatings Default Settings

Default Settings Used: Yes

Average Day(s) worked per week: 5 (default)

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.201	000.002	000.113	003.107	000.004	000.004		000.024	00296.374
LDGT	000.211	000.003	000.199	003.490	000.006	000.005		000.026	00386.238
HDGV	000.798	000.006	000.859	013.035	000.024	000.021		000.051	00897.042
LDDV	000.081	000.001	000.080	002.872	000.003	000.002		000.008	00298.880
LDDT	000.084	000.001	000.120	001.978	000.003	000.003		000.009	00348.850
HDDV	000.115	000.004	002.431	001.505	000.041	000.038		000.032	01249.474
MC	002.292	000.003	000.725	012.519	000.022	000.020		000.054	00390.892

2.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

1: Conversion Factor man days to trips (1 trip / 1 man * day)

WT: Average Worker Round Trip Commute (mile)

PA: Paint Area (ft^2)

800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$VOC_{AC} = (BA * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)

BA: Area of Building (ft^2)

2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)

0.0116: Emission Factor (lb/ft^2)

2000: Conversion Factor pounds to tons

2.5 Paving Phase

2.5.1 Paving Phase Timeline Assumptions

- Phase Start Date

Start Month: 1

Start Quarter: 1

Start Year: 2027

- Phase Duration

Number of Month: 12

Number of Days: 0

2.5.2 Paving Phase Assumptions

- General Paving Information

Paving Area (ft^2): 5600

- Paving Default Settings

Default Settings Used: Yes

Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.201	000.002	000.113	003.107	000.004	000.004		000.024	00296.374
LDGT	000.211	000.003	000.199	003.490	000.006	000.005		000.026	00386.238
HDGV	000.798	000.006	000.859	013.035	000.024	000.021		000.051	00897.042
LDDV	000.081	000.001	000.080	002.872	000.003	000.002		000.008	00298.880
LDDT	000.084	000.001	000.120	001.978	000.003	000.003		000.009	00348.850
HDDV	000.115	000.004	002.431	001.505	000.041	000.038		000.032	01249.474
MC	002.292	000.003	000.725	012.519	000.022	000.020		000.054	00390.892

2.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Work Days (days)

H: Hours Worked per Day (hours)

EF_{POL}: Emission Factor for Pollutant (lb/hour)

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

PA: Paving Area (ft^2)

0.25: Thickness of Paving Area (ft)

(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)

HC: Average Hauling Truck Capacity (yd^3)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Work Days (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$VOC_P = ((2.62 * PA) / 43560)/2000$

VOC_P: Paving VOC Emissions (TONs)

2.62: Emission Factor (lb/acre)

PA: Paving Area (ft^2)

43560: Conversion Factor square feet to acre (43560 ft2 / $acre)^2$ / acre)

2000: Conversion Factor pounds to tons

3. Emergency Generator

3.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Snohomish

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Emergency Generator

- Activity Description:

500 kW emergency generator

- Activity Start Date

Start Month: 1

Start Year: 2027

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.007196
SO_x	0.000126
NO_x	0.260295
CO	0.069144
PM 10	0.008130

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.008130
Pb	0.000000
NH_3	0.000000
CO_2e	13.4

3.2 Emergency Generator Assumptions

- Emergency Generator

Type of Fuel used in Emergency Generator: Diesel

Number of Emergency Generators: 1

- Default Settings Used: No

- Emergency Generators Consumption

Emergency Generator's Horsepower: 670

Average Operating Hours Per Year (hours): 30

3.3 Emergency Generator Emission Factor(s)

- Emergency Generators Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
0.000716	0.0000125	0.0259	0.00688	0.000809	0.000809			1.33

3.4 Emergency Generator Formula(s)

- Emergency Generator Emissions per Year

$AE_{POL} = (NGEN * HP * OT * EF_{POL}) / 2000$

AE_{POL}: Activity Emissions (TONs per Year)

NGEN: Number of Emergency Generators

HP: Emergency Generator's Horsepower (hp)

OT: Average Operating Hours Per Year (hours)

EF_{POL}: Emission Factor for Pollutant (lb/hp-hr)

4. Personnel

4.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Snohomish

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Personnel 2026

- Activity Description:

500

- Activity Start Date

Start Month: 1

Start Year: 2026

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.706566
SO_x	0.007510
NO_x	0.505958
CO	10.074386
PM 10	0.015898

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.014059
Pb	0.000000
NH_3	0.073788
CO_2e	1010.4

4.2 Personnel Assumptions

- Number of Personnel

Active Duty Personnel: 500
Civilian Personnel: 0
Support Contractor Personnel: 0
Air National Guard (ANG) Personnel: 0
Reserve Personnel: 0

- Default Settings Used: Yes

- Average Personnel Round Trip Commute (mile): 20 (default)

- Personnel Work Schedule

Active Duty Personnel: 5 Days Per Week (default)
Civilian Personnel: 5 Days Per Week (default)
Support Contractor Personnel: 5 Days Per Week (default)
Air National Guard (ANG) Personnel: 4 Days Per Week (default)
Reserve Personnel: 4 Days Per Month (default)

4.3 Personnel On Road Vehicle Mixture

- On Road Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	37.55	60.32	0	0.03	0.2	0	1.9
GOVs	54.49	37.73	4.67	0	0	3.11	0

4.4 Personnel Emission Factor(s)

- On Road Vehicle Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.201	000.002	000.113	003.107	000.004	000.004		000.024	00296.374
LDGT	000.211	000.003	000.199	003.490	000.006	000.005		000.026	00386.238
HDGV	000.798	000.006	000.859	013.035	000.024	000.021		000.051	00897.042
LDDV	000.081	000.001	000.080	002.872	000.003	000.002		000.008	00298.880
LDDT	000.084	000.001	000.120	001.978	000.003	000.003		000.009	00348.850

HDDV	000.115	000.004	002.431	001.505	000.041	000.038		000.032	01249.474
MC	002.292	000.003	000.725	012.519	000.022	000.020		000.054	00390.892

4.5 Personnel Formula(s)

- Personnel Vehicle Miles Travel for Work Days per Year

$VMT_P = NP * WD * AC$

VMT_P: Personnel Vehicle Miles Travel (miles/year)

NP: Number of Personnel

WD: Work Days per Year

AC: Average Commute (miles)

- Total Vehicle Miles Travel per Year

$VMT_{Total} = VMT_{AD} + VMT_C + VMT_{SC} + VMT_{ANG} + VMT_{AFRC}$

VMT_{Total}: Total Vehicle Miles Travel (miles)

VMT_{AD}: Active Duty Personnel Vehicle Miles Travel (miles)

VMT_C: Civilian Personnel Vehicle Miles Travel (miles)

VMT_{SC}: Support Contractor Personnel Vehicle Miles Travel (miles)

VMT_{ANG}: Air National Guard Personnel Vehicle Miles Travel (miles)

VMT_{AFRC}: Reserve Personnel Vehicle Miles Travel (miles)

- Vehicle Emissions per Year

$V_{POL} = (VMT_{Total} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)

VMT_{Total}: Total Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Personnel On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

5. Personnel

5.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Snohomish

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Personnel 2027

- Activity Description:

200

- Activity Start Date

Start Month: 1

Start Year: 2027

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.282627
SO_x	0.003004
NO_x	0.202383
CO	4.029754
PM 10	0.006359

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.005624
Pb	0.000000
NH_3	0.029515
CO_2e	404.2

5.2 Personnel Assumptions

- Number of Personnel

Active Duty Personnel: 200

Civilian Personnel: 0

Support Contractor Personnel: 0

Air National Guard (ANG) Personnel: 0

Reserve Personnel: 0

- Default Settings Used: Yes

- Average Personnel Round Trip Commute (mile): 20 (default)

- Personnel Work Schedule

Active Duty Personnel: 5 Days Per Week (default)

Civilian Personnel: 5 Days Per Week (default)

Support Contractor Personnel: 5 Days Per Week (default)

Air National Guard (ANG) Personnel: 4 Days Per Week (default)

Reserve Personnel: 4 Days Per Month (default)

5.3 Personnel On Road Vehicle Mixture

- On Road Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	37.55	60.32	0	0.03	0.2	0	1.9
GOVs	54.49	37.73	4.67	0	0	3.11	0

5.4 Personnel Emission Factor(s)

- On Road Vehicle Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.201	000.002	000.113	003.107	000.004	000.004		000.024	00296.374
LDGT	000.211	000.003	000.199	003.490	000.006	000.005		000.026	00386.238
HDGV	000.798	000.006	000.859	013.035	000.024	000.021		000.051	00897.042
LDDV	000.081	000.001	000.080	002.872	000.003	000.002		000.008	00298.880
LDDT	000.084	000.001	000.120	001.978	000.003	000.003		000.009	00348.850
HDDV	000.115	000.004	002.431	001.505	000.041	000.038		000.032	01249.474
MC	002.292	000.003	000.725	012.519	000.022	000.020		000.054	00390.892

5.5 Personnel Formula(s)

- Personnel Vehicle Miles Travel for Work Days per Year

$VMT_P = NP * WD * AC$

VMT_P: Personnel Vehicle Miles Travel (miles/year)

NP: Number of Personnel

WD: Work Days per Year

AC: Average Commute (miles)

- Total Vehicle Miles Travel per Year

$VMT_{Total} = VMT_{AD} + VMT_C + VMT_{SC} + VMT_{ANG} + VMT_{AFRC}$

VMT_{Total}: Total Vehicle Miles Travel (miles)

VMT_{AD}: Active Duty Personnel Vehicle Miles Travel (miles)

VMT_C: Civilian Personnel Vehicle Miles Travel (miles)

VMT_{SC}: Support Contractor Personnel Vehicle Miles Travel (miles)

VMT_{ANG}: Air National Guard Personnel Vehicle Miles Travel (miles)

VMT_{AFRC}: Reserve Personnel Vehicle Miles Travel (miles)

- Vehicle Emissions per Year

$V_{POL} = (VMT_{Total} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)

VMT_{Total}: Total Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Personnel On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

6. Personnel

6.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Snohomish

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Personnel 2028

- Activity Description:

200

- Activity Start Date

Start Month: 1

Start Year: 2028

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.282627
SO_x	0.003004
NO_x	0.202383
CO	4.029754
PM 10	0.006359

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.005624
Pb	0.000000
NH_3	0.029515
CO_2e	404.2

6.2 Personnel Assumptions

- Number of Personnel

Active Duty Personnel: 200

Civilian Personnel: 0

Support Contractor Personnel: 0

Air National Guard (ANG) Personnel: 0

Reserve Personnel: 0

- Default Settings Used: Yes

- Average Personnel Round Trip Commute (mile): 20 (default)

- Personnel Work Schedule

Active Duty Personnel: 5 Days Per Week (default)

Civilian Personnel: 5 Days Per Week (default)

Support Contractor Personnel: 5 Days Per Week (default)

Air National Guard (ANG) Personnel: 4 Days Per Week (default)

Reserve Personnel: 4 Days Per Month (default)

6.3 Personnel On Road Vehicle Mixture

- On Road Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	37.55	60.32	0	0.03	0.2	0	1.9
GOVs	54.49	37.73	4.67	0	0	3.11	0

6.4 Personnel Emission Factor(s)

- On Road Vehicle Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.201	000.002	000.113	003.107	000.004	000.004		000.024	00296.374
LDGT	000.211	000.003	000.199	003.490	000.006	000.005		000.026	00386.238
HDGV	000.798	000.006	000.859	013.035	000.024	000.021		000.051	00897.042
LDDV	000.081	000.001	000.080	002.872	000.003	000.002		000.008	00298.880
LDDT	000.084	000.001	000.120	001.978	000.003	000.003		000.009	00348.850
HDDV	000.115	000.004	002.431	001.505	000.041	000.038		000.032	01249.474
MC	002.292	000.003	000.725	012.519	000.022	000.020		000.054	00390.892

6.5 Personnel Formula(s)

- Personnel Vehicle Miles Travel for Work Days per Year

$VMT_P = NP * WD * AC$

VMT_P: Personnel Vehicle Miles Travel (miles/year)

NP: Number of Personnel

WD: Work Days per Year

AC: Average Commute (miles)

- Total Vehicle Miles Travel per Year

$VMT_{Total} = VMT_{AD} + VMT_{C} + VMT_{SC} + VMT_{ANG} + VMT_{AFRC}$

VMT_{Total}: Total Vehicle Miles Travel (miles)

VMT_{AD}: Active Duty Personnel Vehicle Miles Travel (miles)

VMT_{C}: Civilian Personnel Vehicle Miles Travel (miles)

VMT_{SC}: Support Contractor Personnel Vehicle Miles Travel (miles)

VMT_{ANG}: Air National Guard Personnel Vehicle Miles Travel (miles)

VMT_{AFRC}: Reserve Personnel Vehicle Miles Travel (miles)

- Vehicle Emissions per Year

$V_{POL} = (VMT_{Total} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)

VMT_{Total}: Total Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Personnel On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

7. Personnel

7.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Snohomish

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Personnel 2029

- Activity Description:

400

- Activity Start Date

Start Month: 1

Start Year: 2029

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.565253
SO_x	0.006008
NO_x	0.404767
CO	8.059509
PM 10	0.012718

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.011247
Pb	0.000000
NH_3	0.059031
CO_2e	808.3

7.2 Personnel Assumptions

- Number of Personnel

Active Duty Personnel: 400

Civilian Personnel: 0

Support Contractor Personnel: 0

Air National Guard (ANG) Personnel: 0

Reserve Personnel: 0

- Default Settings Used: Yes

- Average Personnel Round Trip Commute (mile): 20 (default)

- Personnel Work Schedule

Active Duty Personnel: 5 Days Per Week (default)

Civilian Personnel: 5 Days Per Week (default)

Support Contractor Personnel: 5 Days Per Week (default)

Air National Guard (ANG) Personnel: 4 Days Per Week (default)

Reserve Personnel: 4 Days Per Month (default)

7.3 Personnel On Road Vehicle Mixture

- On Road Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	37.55	60.32	0	0.03	0.2	0	1.9
GOVs	54.49	37.73	4.67	0	0	3.11	0

7.4 Personnel Emission Factor(s)

- On Road Vehicle Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.201	000.002	000.113	003.107	000.004	000.004		000.024	00296.374
LDGT	000.211	000.003	000.199	003.490	000.006	000.005		000.026	00386.238
HDGV	000.798	000.006	000.859	013.035	000.024	000.021		000.051	00897.042
LDDV	000.081	000.001	000.080	002.872	000.003	000.002		000.008	00298.880
LDDT	000.084	000.001	000.120	001.978	000.003	000.003		000.009	00348.850
HDDV	000.115	000.004	002.431	001.505	000.041	000.038		000.032	01249.474
MC	002.292	000.003	000.725	012.519	000.022	000.020		000.054	00390.892

7.5 Personnel Formula(s)

- Personnel Vehicle Miles Travel for Work Days per Year

$VMT_P = NP * WD * AC$

VMT_P: Personnel Vehicle Miles Travel (miles/year)

NP: Number of Personnel

WD: Work Days per Year

AC: Average Commute (miles)

- Total Vehicle Miles Travel per Year

$VMT_{Total} = VMT_{AD} + VMT_C + VMT_{SC} + VMT_{ANG} + VMT_{AFRC}$

VMT_{Total}: Total Vehicle Miles Travel (miles)

VMT_{AD}: Active Duty Personnel Vehicle Miles Travel (miles)

VMT_{C}: Civilian Personnel Vehicle Miles Travel (miles)

VMT_{SC}: Support Contractor Personnel Vehicle Miles Travel (miles)

VMT_{ANG}: Air National Guard Personnel Vehicle Miles Travel (miles)

VMT_{AFRC}: Reserve Personnel Vehicle Miles Travel (miles)

- Vehicle Emissions per Year

$V_{POL} = (VMT_{Total} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)

VMT_{Total}: Total Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Personnel On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

8. Personnel

8.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Snohomish

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Personnel 2030

- Activity Description:

400

- Activity Start Date

Start Month: 1

Start Year: 2030

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.565253
SO_x	0.006008
NO_x	0.404767
CO	8.059509
PM 10	0.012718

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.011247
Pb	0.000000
NH_3	0.059031
CO_2e	808.3

8.2 Personnel Assumptions

- Number of Personnel

Active Duty Personnel: 400

Civilian Personnel: 0

Support Contractor Personnel: 0

Air National Guard (ANG) Personnel: 0

Reserve Personnel: 0

- Default Settings Used: Yes

- Average Personnel Round Trip Commute (mile): 20 (default)

- Personnel Work Schedule

Active Duty Personnel: 5 Days Per Week (default)

Civilian Personnel: 5 Days Per Week (default)

Support Contractor Personnel: 5 Days Per Week (default)

Air National Guard (ANG) Personnel: 4 Days Per Week (default)

Reserve Personnel: 4 Days Per Month (default)

8.3 Personnel On Road Vehicle Mixture

- On Road Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	37.55	60.32	0	0.03	0.2	0	1.9
GOVs	54.49	37.73	4.67	0	0	3.11	0

8.4 Personnel Emission Factor(s)

- On Road Vehicle Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.201	000.002	000.113	003.107	000.004	000.004		000.024	00296.374
LDGT	000.211	000.003	000.199	003.490	000.006	000.005		000.026	00386.238
HDGV	000.798	000.006	000.859	013.035	000.024	000.021		000.051	00897.042
LDDV	000.081	000.001	000.080	002.872	000.003	000.002		000.008	00298.880
LDDT	000.084	000.001	000.120	001.978	000.003	000.003		000.009	00348.850
HDDV	000.115	000.004	002.431	001.505	000.041	000.038		000.032	01249.474
MC	002.292	000.003	000.725	012.519	000.022	000.020		000.054	00390.892

8.5 Personnel Formula(s)

- Personnel Vehicle Miles Travel for Work Days per Year

$VMT_P = NP * WD * AC$

VMT_P: Personnel Vehicle Miles Travel (miles/year)

NP: Number of Personnel

WD: Work Days per Year

AC: Average Commute (miles)

- Total Vehicle Miles Travel per Year

$VMT_{Total} = VMT_{AD} + VMT_C + VMT_{SC} + VMT_{ANG} + VMT_{AFRC}$

VMT_{Total}: Total Vehicle Miles Travel (miles)

VMT_{AD}: Active Duty Personnel Vehicle Miles Travel (miles)

VMT_C: Civilian Personnel Vehicle Miles Travel (miles)

VMT_{SC}: Support Contractor Personnel Vehicle Miles Travel (miles)

VMT_{ANG}: Air National Guard Personnel Vehicle Miles Travel (miles)

VMT_{AFRC}: Reserve Personnel Vehicle Miles Travel (miles)

- Vehicle Emissions per Year

$V_{POL} = (VMT_{Total} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)

VMT_{Total}: Total Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Personnel On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

9. Personnel

9.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Snohomish

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Personnel 2031

- Activity Description:

400

- Activity Start Date

Start Month: 1

Start Year: 2031

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.565253
SO_x	0.006008
NO_x	0.404767
CO	8.059509
PM 10	0.012718

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.011247
Pb	0.000000
NH_3	0.059031
CO_2e	808.3

9.2 Personnel Assumptions

- Number of Personnel

Active Duty Personnel: 400
Civilian Personnel: 0
Support Contractor Personnel: 0
Air National Guard (ANG) Personnel: 0
Reserve Personnel: 0

- Default Settings Used: Yes

- Average Personnel Round Trip Commute (mile): 20 (default)

- Personnel Work Schedule

Active Duty Personnel: 5 Days Per Week (default)
Civilian Personnel: 5 Days Per Week (default)
Support Contractor Personnel: 5 Days Per Week (default)
Air National Guard (ANG) Personnel: 4 Days Per Week (default)
Reserve Personnel: 4 Days Per Month (default)

9.3 Personnel On Road Vehicle Mixture

- On Road Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	37.55	60.32	0	0.03	0.2	0	1.9
GOVs	54.49	37.73	4.67	0	0	3.11	0

9.4 Personnel Emission Factor(s)

- On Road Vehicle Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.201	000.002	000.113	003.107	000.004	000.004		000.024	00296.374
LDGT	000.211	000.003	000.199	003.490	000.006	000.005		000.026	00386.238
HDGV	000.798	000.006	000.859	013.035	000.024	000.021		000.051	00897.042
LDDV	000.081	000.001	000.080	002.872	000.003	000.002		000.008	00298.880
LDDT	000.084	000.001	000.120	001.978	000.003	000.003		000.009	00348.850
HDDV	000.115	000.004	002.431	001.505	000.041	000.038		000.032	01249.474
MC	002.292	000.003	000.725	012.519	000.022	000.020		000.054	00390.892

9.5 Personnel Formula(s)

- Personnel Vehicle Miles Travel for Work Days per Year

$VMT_P = NP * WD * AC$

VMT_P: Personnel Vehicle Miles Travel (miles/year)

NP: Number of Personnel

WD: Work Days per Year

AC: Average Commute (miles)

- Total Vehicle Miles Travel per Year

$VMT_{Total} = VMT_{AD} + VMT_C + VMT_{SC} + VMT_{ANG} + VMT_{AFRC}$

VMT_{Total}: Total Vehicle Miles Travel (miles)

VMT_{AD}: Active Duty Personnel Vehicle Miles Travel (miles)

VMT_C: Civilian Personnel Vehicle Miles Travel (miles)

VMT_{SC}: Support Contractor Personnel Vehicle Miles Travel (miles)

VMT_{ANG}: Air National Guard Personnel Vehicle Miles Travel (miles)

VMT_{AFRC}: Reserve Personnel Vehicle Miles Travel (miles)

- Vehicle Emissions per Year

$V_{POL} = (VMT_{Total} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)

VMT_{Total}: Total Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Personnel On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

10. Personnel

10.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Snohomish

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Personnel 2032

- Activity Description:

400

- Activity Start Date

Start Month: 1

Start Year: 2032

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.565253
SO_x	0.006008
NO_x	0.404767
CO	8.059509
PM 10	0.012718

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.011247
Pb	0.000000
NH_3	0.059031
CO_2e	808.3

10.2 Personnel Assumptions

- Number of Personnel

Active Duty Personnel:	400
Civilian Personnel:	0
Support Contractor Personnel:	0
Air National Guard (ANG) Personnel:	0
Reserve Personnel:	0

- Default Settings Used: Yes

- Average Personnel Round Trip Commute (mile): 20 (default)

- Personnel Work Schedule

Active Duty Personnel:	5 Days Per Week (default)
Civilian Personnel:	5 Days Per Week (default)
Support Contractor Personnel:	5 Days Per Week (default)
Air National Guard (ANG) Personnel:	4 Days Per Week (default)
Reserve Personnel:	4 Days Per Month (default)

10.3 Personnel On Road Vehicle Mixture

- On Road Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	37.55	60.32	0	0.03	0.2	0	1.9
GOVs	54.49	37.73	4.67	0	0	3.11	0

10.4 Personnel Emission Factor(s)

- On Road Vehicle Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.201	000.002	000.113	003.107	000.004	000.004		000.024	00296.374
LDGT	000.211	000.003	000.199	003.490	000.006	000.005		000.026	00386.238
HDGV	000.798	000.006	000.859	013.035	000.024	000.021		000.051	00897.042
LDDV	000.081	000.001	000.080	002.872	000.003	000.002		000.008	00298.880

LDDT	000.084	000.001	000.120	001.978	000.003	000.003		000.009	00348.850
HDDV	000.115	000.004	002.431	001.505	000.041	000.038		000.032	01249.474
MC	002.292	000.003	000.725	012.519	000.022	000.020		000.054	00390.892

10.5 Personnel Formula(s)

- Personnel Vehicle Miles Travel for Work Days per Year

$VMT_P = NP * WD * AC$

VMT_P: Personnel Vehicle Miles Travel (miles/year)

NP: Number of Personnel

WD: Work Days per Year

AC: Average Commute (miles)

- Total Vehicle Miles Travel per Year

$VMT_{Total} = VMT_{AD} + VMT_C + VMT_{SC} + VMT_{ANG} + VMT_{AFRC}$

VMT_{Total}: Total Vehicle Miles Travel (miles)

VMT_{AD}: Active Duty Personnel Vehicle Miles Travel (miles)

VMT_C: Civilian Personnel Vehicle Miles Travel (miles)

VMT_{SC}: Support Contractor Personnel Vehicle Miles Travel (miles)

VMT_{ANG}: Air National Guard Personnel Vehicle Miles Travel (miles)

VMT_{AFRC}: Reserve Personnel Vehicle Miles Travel (miles)

- Vehicle Emissions per Year

$V_{POL} = (VMT_{Total} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)

VMT_{Total}: Total Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Personnel On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

11. Personnel

11.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Snohomish

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Personnel 2036

- Activity Description:

200

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.282627
SO_x	0.003004
NO_x	0.202383
CO	4.029754
PM 10	0.006359

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.005624
Pb	0.000000
NH_3	0.029515
CO_2e	404.2

11.2 Personnel Assumptions

- Number of Personnel

Active Duty Personnel: 200

Civilian Personnel: 0

Support Contractor Personnel: 0

Air National Guard (ANG) Personnel: 0

Reserve Personnel: 0

- Default Settings Used: Yes

- Average Personnel Round Trip Commute (mile): 20 (default)

- Personnel Work Schedule

Active Duty Personnel: 5 Days Per Week (default)

Civilian Personnel: 5 Days Per Week (default)

Support Contractor Personnel: 5 Days Per Week (default)

Air National Guard (ANG) Personnel: 4 Days Per Week (default)

Reserve Personnel: 4 Days Per Month (default)

11.3 Personnel On Road Vehicle Mixture

- On Road Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	37.55	60.32	0	0.03	0.2	0	1.9
GOVs	54.49	37.73	4.67	0	0	3.11	0

11.4 Personnel Emission Factor(s)

- On Road Vehicle Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.201	000.002	000.113	003.107	000.004	000.004		000.024	00296.374
LDGT	000.211	000.003	000.199	003.490	000.006	000.005		000.026	00386.238
HDGV	000.798	000.006	000.859	013.035	000.024	000.021		000.051	00897.042
LDDV	000.081	000.001	000.080	002.872	000.003	000.002		000.008	00298.880
LDDT	000.084	000.001	000.120	001.978	000.003	000.003		000.009	00348.850
HDDV	000.115	000.004	002.431	001.505	000.041	000.038		000.032	01249.474
MC	002.292	000.003	000.725	012.519	000.022	000.020		000.054	00390.892

11.5 Personnel Formula(s)

- Personnel Vehicle Miles Travel for Work Days per Year

$VMT_P = NP * WD * AC$

VMT_P: Personnel Vehicle Miles Travel (miles/year)

NP: Number of Personnel

WD: Work Days per Year

AC: Average Commute (miles)

- Total Vehicle Miles Travel per Year

$VMT_{Total} = VMT_{AD} + VMT_C + VMT_{SC} + VMT_{ANG} + VMT_{AFRC}$

VMT_{Total}: Total Vehicle Miles Travel (miles)

VMT_{AD}: Active Duty Personnel Vehicle Miles Travel (miles)

VMT_C: Civilian Personnel Vehicle Miles Travel (miles)

VMT_{SC}: Support Contractor Personnel Vehicle Miles Travel (miles)

VMT_{ANG}: Air National Guard Personnel Vehicle Miles Travel (miles)

VMT_{AFRC}: Reserve Personnel Vehicle Miles Travel (miles)

- Vehicle Emissions per Year

$V_{POL} = (VMT_{Total} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)

VMT_{Total}: Total Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Personnel On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

12. Personnel

12.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Snohomish

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Personnel 2037

- Activity Description:

200

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.282627
SO_x	0.003004
NO_x	0.202383
CO	4.029754
PM 10	0.006359

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.005624
Pb	0.000000
NH_3	0.029515
CO_2e	404.2

12.2 Personnel Assumptions

- Number of Personnel

Active Duty Personnel: 200

Civilian Personnel: 0

Support Contractor Personnel: 0

Air National Guard (ANG) Personnel: 0

Reserve Personnel: 0

- Default Settings Used: Yes

- Average Personnel Round Trip Commute (mile): 20 (default)

- Personnel Work Schedule

Active Duty Personnel: 5 Days Per Week (default)

Civilian Personnel: 5 Days Per Week (default)

Support Contractor Personnel: 5 Days Per Week (default)

Air National Guard (ANG) Personnel: 4 Days Per Week (default)

Reserve Personnel: 4 Days Per Month (default)

12.3 Personnel On Road Vehicle Mixture

- On Road Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	37.55	60.32	0	0.03	0.2	0	1.9
GOVs	54.49	37.73	4.67	0	0	3.11	0

12.4 Personnel Emission Factor(s)

- On Road Vehicle Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.201	000.002	000.113	003.107	000.004	000.004		000.024	00296.374
LDGT	000.211	000.003	000.199	003.490	000.006	000.005		000.026	00386.238
HDGV	000.798	000.006	000.859	013.035	000.024	000.021		000.051	00897.042
LDDV	000.081	000.001	000.080	002.872	000.003	000.002		000.008	00298.880
LDDT	000.084	000.001	000.120	001.978	000.003	000.003		000.009	00348.850
HDDV	000.115	000.004	002.431	001.505	000.041	000.038		000.032	01249.474
MC	002.292	000.003	000.725	012.519	000.022	000.020		000.054	00390.892

12.5 Personnel Formula(s)

- Personnel Vehicle Miles Travel for Work Days per Year

$VMT_P = NP * WD * AC$

VMT_P: Personnel Vehicle Miles Travel (miles/year)

NP: Number of Personnel

WD: Work Days per Year

AC: Average Commute (miles)

- Total Vehicle Miles Travel per Year

$VMT_{Total} = VMT_{AD} + VMT_{C} + VMT_{SC} + VMT_{ANG} + VMT_{AFRC}$

VMT_{Total}: Total Vehicle Miles Travel (miles)

VMT_{AD}: Active Duty Personnel Vehicle Miles Travel (miles)

VMT_{C}: Civilian Personnel Vehicle Miles Travel (miles)

VMT_{SC}: Support Contractor Personnel Vehicle Miles Travel (miles)

VMT_{ANG}: Air National Guard Personnel Vehicle Miles Travel (miles)

VMT_{AFRC}: Reserve Personnel Vehicle Miles Travel (miles)

- Vehicle Emissions per Year

$V_{POL} = (VMT_{Total} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)

VMT_{Total}: Total Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Personnel On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

13. Personnel

13.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County: Snohomish

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Existing Navy and USCGC Personnel

- Activity Description:

2440

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	-3.448044
SO_x	-0.036649
NO_x	-2.469076
CO	-49.163005
PM 10	-0.077582

Pollutant	Emissions Per Year (TONs)
PM 2.5	-0.068608
Pb	0.000000
NH_3	-0.360087
CO_2e	-4930.7

13.2 Personnel Assumptions

- Number of Personnel

Active Duty Personnel: 2440

Civilian Personnel: 0

Support Contractor Personnel: 0

Air National Guard (ANG) Personnel: 0

Reserve Personnel: 0

- Default Settings Used: Yes

- Average Personnel Round Trip Commute (mile): 20 (default)

- Personnel Work Schedule

Active Duty Personnel: 5 Days Per Week (default)

Civilian Personnel: 5 Days Per Week (default)

Support Contractor Personnel: 5 Days Per Week (default)

Air National Guard (ANG) Personnel: 4 Days Per Week (default)

Reserve Personnel: 4 Days Per Month (default)

13.3 Personnel On Road Vehicle Mixture

- On Road Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	37.55	60.32	0	0.03	0.2	0	1.9
GOVs	54.49	37.73	4.67	0	0	3.11	0

13.4 Personnel Emission Factor(s)

- On Road Vehicle Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.201	000.002	000.113	003.107	000.004	000.004		000.024	00296.374
LDGT	000.211	000.003	000.199	003.490	000.006	000.005		000.026	00386.238
HDGV	000.798	000.006	000.859	013.035	000.024	000.021		000.051	00897.042
LDDV	000.081	000.001	000.080	002.872	000.003	000.002		000.008	00298.880
LDDT	000.084	000.001	000.120	001.978	000.003	000.003		000.009	00348.850
HDDV	000.115	000.004	002.431	001.505	000.041	000.038		000.032	01249.474
MC	002.292	000.003	000.725	012.519	000.022	000.020		000.054	00390.892

13.5 Personnel Formula(s)

- Personnel Vehicle Miles Travel for Work Days per Year

$VMT_P = NP * WD * AC$

VMT_P: Personnel Vehicle Miles Travel (miles/year)

NP: Number of Personnel

WD: Work Days per Year

AC: Average Commute (miles)

- Total Vehicle Miles Travel per Year

$VMT_{Total} = VMT_{AD} + VMT_C + VMT_{SC} + VMT_{ANG} + VMT_{AFRC}$

VMT_{Total}: Total Vehicle Miles Travel (miles)

VMT_{AD}: Active Duty Personnel Vehicle Miles Travel (miles)

VMT_{C}: Civilian Personnel Vehicle Miles Travel (miles)

VMT_{SC}: Support Contractor Personnel Vehicle Miles Travel (miles)

VMT_{ANG}: Air National Guard Personnel Vehicle Miles Travel (miles)

VMT_{AFRC}: Reserve Personnel Vehicle Miles Travel (miles)

- Vehicle Emissions per Year

$V_{POL} = (VMT_{Total} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)

VMT_{Total}: Total Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Personnel On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

C.2 ALTERNATIVE 2 DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location

Base: NAVSTA EVERETT

State: Washington

County(s): Snohomish

Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: Homeporting of Constellation-Class Frigates at Naval Station Everett, Washington

- Project Number/s (if applicable):

- Projected Action Start Date: 1 / 2026

- Action Purpose and Need:

The purpose of the Proposed Action is to support homeporting of up to 12 Constellation-class guided-missile frigates (FFGs) on the West Coast of the United States to provide the Pacific Fleet with the next generation of multi-mission small surface combatants with the ability to operate independently or as part of a strike group.

The need for the Proposed Action is to provide capabilities for manning, training, and equipping combat-capable naval forces ready to deploy worldwide. In this regard, the Proposed Action furthers the Navy's execution of its congressionally mandated roles and responsibilities under 10 U.S. Code (U.S.C.) Section 8062.

- Action Description:

Under Alternative 2, the Navy would homeport up to 12 FFGs; construct training and support facilities for ships, commands, and crews; and station approximately 2,900 personnel, plus their family members. The homeporting of ships and personnel would be phased in over a period of approximately 10 years. Based on the production and testing timeline, the first ship is expected to arrive at NAVSTA Everett beginning no earlier than fiscal year 2028. Personnel will be stationed at NAVSTA Everett in a phased-in approach over approximately 10 years beginning no earlier than approximately fiscal year 2026.

Between fiscal years 2023 and 2031, the 10 existing homeported Navy ships berthed at NAVSTA Everett would gradually be reduced to zero through changes in homeport or changes in mission. Over time, approximately 3,100 personnel associated with the departing vessels would also depart NAVSTA Everett.

New stand-alone facilities construction:

• None.

Building additions:

• Administrative Support Facility (up to 3 stories) – Approximately 20,000 square feet. Under Alternative 2, the Administrative Support Facility would be a combination of a new addition to an existing building and renovations of existing space (see renovations below). The facility would be located within the Administrative District of NAVSTA Everett.

• Two shelter additions along the pier (1 story) – 400 square feet

• Fleet Region Readiness Center multistory addition – 41,000 square feet. Provides classroom and training space.

Note: All building square footages listed above are approximate at this early stage in planning.

Renovations:

• Interior renovations of existing buildings on NAVSTA Everett to accommodate shifts in tenants and allow for FFG-related administrative support facility space allocation (estimated 30,000 sf of interior renovations).

Other supporting facilities and infrastructure:

• Stormwater management facilities

• Electrical and mechanical utilities

• Road and parking lot resurfacing

Potential locations for construction and additions under Alternative 2 are shown in Figure 2.3-1 of the EA.

- Point of Contact

Name: Brad Boykin
Title: CTR
Organization: Leidos
Email: boykinb@leidos.com
Phone Number: 571.521.8765

- Activity List:

Activity Type		Activity Title
2.	Construction / Demolition	Construction of New Facilities/Additions
3.	Emergency Generator	Emergency Generator
4.	Personnel	Personnel 2026
5.	Personnel	Personnel 2027
6.	Personnel	Personnel 2028
7.	Personnel	Personnel 2029
8.	Personnel	Personnel 2030
9.	Personnel	Personnel 2031

10.	Personnel	Personnel 2032
11.	Personnel	Personnel 2036
12.	Personnel	Personnel 2037
13.	Personnel	Existing Navy and USCGC Personnel

Emission factors and air emission estimating methods come from the United States Air Force's Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and Air Emissions Guide for Air Force Transitory Sources.

2. Construction / Demolition

2.1 General Information & Timeline Assumptions

- Activity Location

County: Snohomish

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construction of New Facilities/Additions

- Activity Description:

New:

None.

Additions:

Admin Support Fac - 20,000 sq ft

2 Shelter Additions - 400 sq ft each

Fleet Readiness Center - 65,000 sq ft

Paving:

Resurfacing up to 35 parking spaces - 5,600 sq ft

Utilities upgrades:

Excavating/trenching - up to 30,000 linear ft

- Activity Start Date

Start Month: 1

Start Month: 2026

- Activity End Date

Indefinite: False

End Month: 6

End Month: 2029

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	2.250400
SO_x	0.028793
NO_x	7.995805
CO	12.190904
PM 10	51.591673

Pollutant	Total Emissions (TONs)
PM 2.5	0.289772
Pb	0.000000
NH_3	0.008141
CO_2e	2785.1

2.1 Site Grading Phase

2.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 1

Start Quarter: 1

Start Year: 2026

- Phase Duration

Number of Month: 12

Number of Days: 0

2.1.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft^2): 69750

Amount of Material to be Hauled On-Site (yd^3): 70

Amount of Material to be Hauled Off-Site (yd^3): 70

- Site Grading Default Settings

Default Settings Used: Yes

Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60

Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.201	000.002	000.113	003.107	000.004	000.004		000.024	00296.374
LDGT	000.211	000.003	000.199	003.490	000.006	000.005		000.026	00386.238
HDGV	000.798	000.006	000.859	013.035	000.024	000.021		000.051	00897.042
LDDV	000.081	000.001	000.080	002.872	000.003	000.002		000.008	00298.880
LDDT	000.084	000.001	000.120	001.978	000.003	000.003		000.009	00348.850
HDDV	000.115	000.004	002.431	001.505	000.041	000.038		000.032	01249.474
MC	002.292	000.003	000.725	012.519	000.022	000.020		000.054	00390.892

2.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Work Days (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Work Days (days)

H: Hours Worked per Day (hours)

EF_{POL}: Emission Factor for Pollutant (lb/hour)

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)

$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)

HC: Average Hauling Truck Capacity (yd^3)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Work Days (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

2.2 Trenching/Excavating Phase

2.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date

Start Month: 7

Start Quarter: 1

Start Year: 2026

- Phase Duration

Number of Month: 24

Number of Days: 0

2.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information

Area of Site to be Trenched/Excavated (ft^2): 180000

Amount of Material to be Hauled On-Site (yd^3): 180

Amount of Material to be Hauled Off-Site (yd^3): 180

- Trenching Default Settings

Default Settings Used: Yes

Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.201	000.002	000.113	003.107	000.004	000.004		000.024	00296.374
LDGT	000.211	000.003	000.199	003.490	000.006	000.005		000.026	00386.238
HDGV	000.798	000.006	000.859	013.035	000.024	000.021		000.051	00897.042
LDDV	000.081	000.001	000.080	002.872	000.003	000.002		000.008	00298.880
LDDT	000.084	000.001	000.120	001.978	000.003	000.003		000.009	00348.850
HDDV	000.115	000.004	002.431	001.505	000.041	000.038		000.032	01249.474
MC	002.292	000.003	000.725	012.519	000.022	000.020		000.054	00390.892

2.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Work Days (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

2.3 Building Construction Phase

2.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 1

Start Quarter: 1

Start Year: 2026

- Phase Duration

Number of Month: 30

Number of Days: 0

2.3.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial

Area of Building (ft^2): 67000

Height of Building (ft): 30

Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: Yes

Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

2.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0680	0.0013	0.4222	0.3737	0.0143	0.0143	0.0061	128.77
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0236	0.0006	0.0859	0.2147	0.0025	0.0025	0.0021	54.449
Generator Sets Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0287	0.0006	0.2329	0.2666	0.0080	0.0080	0.0025	61.057
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0214	0.0003	0.1373	0.1745	0.0051	0.0051	0.0019	25.650

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.201	000.002	000.113	003.107	000.004	000.004		000.024	00296.374
LDGT	000.211	000.003	000.199	003.490	000.006	000.005		000.026	00386.238
HDGV	000.798	000.006	000.859	013.035	000.024	000.021		000.051	00897.042
LDDV	000.081	000.001	000.080	002.872	000.003	000.002		000.008	00298.880
LDDT	000.084	000.001	000.120	001.978	000.003	000.003		000.009	00348.850
HDDV	000.115	000.004	002.431	001.505	000.041	000.038		000.032	01249.474
MC	002.292	000.003	000.725	012.519	000.022	000.020		000.054	00390.892

2.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Work Days (days)

H: Hours Worked per Day (hours)

EF_{POL}: Emission Factor for Pollutant (lb/hour)

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft^2)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Work Days (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase

$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

2.4 Architectural Coatings Phase

2.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date

Start Month: 7
Start Quarter: 1
Start Year: 2028

- Phase Duration

Number of Month: 12

Number of Days: 0

2.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information

Building Category: Non-Residential

Total Square Footage (ft^2): 65400

Number of Units: N/A

- Architectural Coatings Default Settings

Default Settings Used: Yes

Average Day(s) worked per week: 5 (default)

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.201	000.002	000.113	003.107	000.004	000.004		000.024	00296.374
LDGT	000.211	000.003	000.199	003.490	000.006	000.005		000.026	00386.238
HDGV	000.798	000.006	000.859	013.035	000.024	000.021		000.051	00897.042
LDDV	000.081	000.001	000.080	002.872	000.003	000.002		000.008	00298.880
LDDT	000.084	000.001	000.120	001.978	000.003	000.003		000.009	00348.850
HDDV	000.115	000.004	002.431	001.505	000.041	000.038		000.032	01249.474
MC	002.292	000.003	000.725	012.519	000.022	000.020		000.054	00390.892

2.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

1: Conversion Factor man days to trips (1 trip / 1 man * day)

WT: Average Worker Round Trip Commute (mile)

PA: Paint Area (ft^2)

800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$VOC_{AC} = (BA * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)

BA: Area of Building (ft^2)

2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)

0.0116: Emission Factor (lb/ft^2)

2000: Conversion Factor pounds to tons

2.5 Paving Phase

2.5.1 Paving Phase Timeline Assumptions

- Phase Start Date

Start Month: 1

Start Quarter: 1

Start Year: 2027

- Phase Duration

Number of Month: 12

Number of Days: 0

2.5.2 Paving Phase Assumptions

- General Paving Information

Paving Area (ft^2): 5600

- Paving Default Settings

Default Settings Used: Yes

Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.201	000.002	000.113	003.107	000.004	000.004		000.024	00296.374
LDGT	000.211	000.003	000.199	003.490	000.006	000.005		000.026	00386.238
HDGV	000.798	000.006	000.859	013.035	000.024	000.021		000.051	00897.042
LDDV	000.081	000.001	000.080	002.872	000.003	000.002		000.008	00298.880
LDDT	000.084	000.001	000.120	001.978	000.003	000.003		000.009	00348.850
HDDV	000.115	000.004	002.431	001.505	000.041	000.038		000.032	01249.474
MC	002.292	000.003	000.725	012.519	000.022	000.020		000.054	00390.892

2.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Work Days (days)

H: Hours Worked per Day (hours)

EF_{POL}: Emission Factor for Pollutant (lb/hour)

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

PA: Paving Area (ft^2)

0.25: Thickness of Paving Area (ft)

(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)

HC: Average Hauling Truck Capacity (yd^3)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Work Days (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$VOC_P = ((2.62 * PA) / 43560)/2000$

VOC_P: Paving VOC Emissions (TONs)

2.62: Emission Factor (lb/acre)

PA: Paving Area (ft^2)

43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

2000: Conversion Factor pounds to tons

3. Emergency Generator

3.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Snohomish

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Emergency Generator

- Activity Description:

500 kW emergency generator

- Activity Start Date

Start Month: 1

Start Year: 2027

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.007196
SO_x	0.000126
NO_x	0.260295
CO	0.069144
PM 10	0.008130

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.008130
Pb	0.000000
NH_3	0.000000
CO_2e	13.4

3.2 Emergency Generator Assumptions

- Emergency Generator

Type of Fuel used in Emergency Generator: Diesel

Number of Emergency Generators: 1

- Default Settings Used: No

- Emergency Generators Consumption

Emergency Generator's Horsepower: 670

Average Operating Hours Per Year (hours): 30

3.3 Emergency Generator Emission Factor(s)

- Emergency Generators Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
0.000716	0.0000125	0.0259	0.00688	0.000809	0.000809			1.33

3.4 Emergency Generator Formula(s)

- Emergency Generator Emissions per Year

$AE_{POL} = (NGEN * HP * OT * EF_{POL}) / 2000$

AE_{POL}: Activity Emissions (TONs per Year)

NGEN: Number of Emergency Generators

HP: Emergency Generator's Horsepower (hp)

OT: Average Operating Hours Per Year (hours)

EF_{POL}: Emission Factor for Pollutant (lb/hp-hr)

4. Personnel

4.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Snohomish

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Personnel 2026

- Activity Description:

500

- Activity Start Date

Start Month: 1

Start Year: 2026

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.706566
SO_x	0.007510
NO_x	0.505958
CO	10.074386
PM 10	0.015898

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.014059
Pb	0.000000
NH_3	0.073788
CO_2e	1010.4

4.2 Personnel Assumptions

- Number of Personnel

Active Duty Personnel: 500

Civilian Personnel: 0

Support Contractor Personnel: 0

Air National Guard (ANG) Personnel: 0

Reserve Personnel: 0

- Default Settings Used: Yes

- Average Personnel Round Trip Commute (mile): 20 (default)

- Personnel Work Schedule

Active Duty Personnel: 5 Days Per Week (default)

Civilian Personnel: 5 Days Per Week (default)

Support Contractor Personnel: 5 Days Per Week (default)

Air National Guard (ANG) Personnel: 4 Days Per Week (default)

Reserve Personnel: 4 Days Per Month (default)

4.3 Personnel On Road Vehicle Mixture

- On Road Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	37.55	60.32	0	0.03	0.2	0	1.9
GOVs	54.49	37.73	4.67	0	0	3.11	0

4.4 Personnel Emission Factor(s)

- On Road Vehicle Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.201	000.002	000.113	003.107	000.004	000.004		000.024	00296.374
LDGT	000.211	000.003	000.199	003.490	000.006	000.005		000.026	00386.238
HDGV	000.798	000.006	000.859	013.035	000.024	000.021		000.051	00897.042
LDDV	000.081	000.001	000.080	002.872	000.003	000.002		000.008	00298.880
LDDT	000.084	000.001	000.120	001.978	000.003	000.003		000.009	00348.850
HDDV	000.115	000.004	002.431	001.505	000.041	000.038		000.032	01249.474
MC	002.292	000.003	000.725	012.519	000.022	000.020		000.054	00390.892

4.5 Personnel Formula(s)

- Personnel Vehicle Miles Travel for Work Days per Year

$VMT_P = NP * WD * AC$

VMT_P: Personnel Vehicle Miles Travel (miles/year)

NP: Number of Personnel

WD: Work Days per Year

AC: Average Commute (miles)

- Total Vehicle Miles Travel per Year

$VMT_{Total} = VMT_{AD} + VMT_C + VMT_{SC} + VMT_{ANG} + VMT_{AFRC}$

VMT_{Total}: Total Vehicle Miles Travel (miles)

VMT_{AD}: Active Duty Personnel Vehicle Miles Travel (miles)

VMT_C: Civilian Personnel Vehicle Miles Travel (miles)

VMT_{SC}: Support Contractor Personnel Vehicle Miles Travel (miles)

VMT_{ANG}: Air National Guard Personnel Vehicle Miles Travel (miles)

VMT_{AFRC}: Reserve Personnel Vehicle Miles Travel (miles)

- Vehicle Emissions per Year

$V_{POL} = (VMT_{Total} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)

VMT_{Total}: Total Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Personnel On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

5. Personnel

5.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Snohomish

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Personnel 2027

- Activity Description:

200

- Activity Start Date

Start Month: 1

Start Year: 2027

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.282627
SO_x	0.003004
NO_x	0.202383
CO	4.029754
PM 10	0.006359

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.005624
Pb	0.000000
NH_3	0.029515
CO_2e	404.2

5.2 Personnel Assumptions

- Number of Personnel

Active Duty Personnel: 200

Civilian Personnel: 0

Support Contractor Personnel: 0

Air National Guard (ANG) Personnel: 0

Reserve Personnel: 0

- Default Settings Used: Yes

- Average Personnel Round Trip Commute (mile): 20 (default)

- Personnel Work Schedule

Active Duty Personnel: 5 Days Per Week (default)
Civilian Personnel: 5 Days Per Week (default)
Support Contractor Personnel: 5 Days Per Week (default)
Air National Guard (ANG) Personnel: 4 Days Per Week (default)
Reserve Personnel: 4 Days Per Month (default)

5.3 Personnel On Road Vehicle Mixture

- On Road Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	37.55	60.32	0	0.03	0.2	0	1.9
GOVs	54.49	37.73	4.67	0	0	3.11	0

5.4 Personnel Emission Factor(s)

- On Road Vehicle Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.201	000.002	000.113	003.107	000.004	000.004		000.024	00296.374
LDGT	000.211	000.003	000.199	003.490	000.006	000.005		000.026	00386.238
HDGV	000.798	000.006	000.859	013.035	000.024	000.021		000.051	00897.042
LDDV	000.081	000.001	000.080	002.872	000.003	000.002		000.008	00298.880
LDDT	000.084	000.001	000.120	001.978	000.003	000.003		000.009	00348.850
HDDV	000.115	000.004	002.431	001.505	000.041	000.038		000.032	01249.474
MC	002.292	000.003	000.725	012.519	000.022	000.020		000.054	00390.892

5.5 Personnel Formula(s)

- Personnel Vehicle Miles Travel for Work Days per Year

$VMT_P = NP * WD * AC$

VMT_P: Personnel Vehicle Miles Travel (miles/year)

NP: Number of Personnel

WD: Work Days per Year

AC: Average Commute (miles)

- Total Vehicle Miles Travel per Year

$VMT_{Total} = VMT_{AD} + VMT_C + VMT_{SC} + VMT_{ANG} + VMT_{AFRC}$

VMT_{Total}: Total Vehicle Miles Travel (miles)

VMT_{AD}: Active Duty Personnel Vehicle Miles Travel (miles)

VMT_C: Civilian Personnel Vehicle Miles Travel (miles)

VMT_{SC}: Support Contractor Personnel Vehicle Miles Travel (miles)

VMT_{ANG}: Air National Guard Personnel Vehicle Miles Travel (miles)

VMT_{AFRC}: Reserve Personnel Vehicle Miles Travel (miles)

- Vehicle Emissions per Year

$V_{POL} = (VMT_{Total} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)

VMT_{Total}: Total Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Personnel On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

6. Personnel

6.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Snohomish

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Personnel 2028

- Activity Description:

200

- Activity Start Date

Start Month: 1

Start Year: 2028

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.282627
SO_x	0.003004
NO_x	0.202383
CO	4.029754
PM 10	0.006359

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.005624
Pb	0.000000
NH_3	0.029515
CO_2e	404.2

6.2 Personnel Assumptions

- Number of Personnel

Active Duty Personnel: 200

Civilian Personnel: 0

Support Contractor Personnel: 0

Air National Guard (ANG) Personnel: 0

Reserve Personnel: 0

- Default Settings Used: Yes

- Average Personnel Round Trip Commute (mile): 20 (default)

- Personnel Work Schedule

Active Duty Personnel: 5 Days Per Week (default)

Civilian Personnel: 5 Days Per Week (default)

Support Contractor Personnel: 5 Days Per Week (default)

Air National Guard (ANG) Personnel: 4 Days Per Week (default)

Reserve Personnel: 4 Days Per Month (default)

6.3 Personnel On Road Vehicle Mixture

- On Road Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	37.55	60.32	0	0.03	0.2	0	1.9
GOVs	54.49	37.73	4.67	0	0	3.11	0

6.4 Personnel Emission Factor(s)

- On Road Vehicle Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.201	000.002	000.113	003.107	000.004	000.004		000.024	00296.374
LDGT	000.211	000.003	000.199	003.490	000.006	000.005		000.026	00386.238
HDGV	000.798	000.006	000.859	013.035	000.024	000.021		000.051	00897.042
LDDV	000.081	000.001	000.080	002.872	000.003	000.002		000.008	00298.880
LDDT	000.084	000.001	000.120	001.978	000.003	000.003		000.009	00348.850
HDDV	000.115	000.004	002.431	001.505	000.041	000.038		000.032	01249.474
MC	002.292	000.003	000.725	012.519	000.022	000.020		000.054	00390.892

6.5 Personnel Formula(s)

- Personnel Vehicle Miles Travel for Work Days per Year

$VMT_P = NP * WD * AC$

VMT_P: Personnel Vehicle Miles Travel (miles/year)

NP: Number of Personnel

WD: Work Days per Year

AC: Average Commute (miles)

- Total Vehicle Miles Travel per Year

$VMT_{Total} = VMT_{AD} + VMT_{C} + VMT_{SC} + VMT_{ANG} + VMT_{AFRC}$

VMT_{Total}: Total Vehicle Miles Travel (miles)

VMT_{AD}: Active Duty Personnel Vehicle Miles Travel (miles)

VMT_{C}: Civilian Personnel Vehicle Miles Travel (miles)

VMT_{SC}: Support Contractor Personnel Vehicle Miles Travel (miles)

VMT_{ANG}: Air National Guard Personnel Vehicle Miles Travel (miles)

VMT_{AFRC}: Reserve Personnel Vehicle Miles Travel (miles)

- Vehicle Emissions per Year

$V_{POL} = (VMT_{Total} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)

VMT_{Total}: Total Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Personnel On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

7. Personnel

7.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Snohomish

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Personnel 2029

- Activity Description:

400

- Activity Start Date

Start Month: 1

Start Year: 2029

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.565253
SO_x	0.006008
NO_x	0.404767
CO	8.059509
PM 10	0.012718

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.011247
Pb	0.000000
NH_3	0.059031
CO_2e	808.3

7.2 Personnel Assumptions

- Number of Personnel

Active Duty Personnel: 400

Civilian Personnel: 0

Support Contractor Personnel: 0

Air National Guard (ANG) Personnel: 0

Reserve Personnel: 0

- Default Settings Used: Yes

- Average Personnel Round Trip Commute (mile): 20 (default)

- Personnel Work Schedule

Active Duty Personnel: 5 Days Per Week (default)

Civilian Personnel: 5 Days Per Week (default)

Support Contractor Personnel: 5 Days Per Week (default)

Air National Guard (ANG) Personnel: 4 Days Per Week (default)

Reserve Personnel: 4 Days Per Month (default)

7.3 Personnel On Road Vehicle Mixture

- On Road Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	37.55	60.32	0	0.03	0.2	0	1.9
GOVs	54.49	37.73	4.67	0	0	3.11	0

7.4 Personnel Emission Factor(s)

- On Road Vehicle Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.201	000.002	000.113	003.107	000.004	000.004		000.024	00296.374
LDGT	000.211	000.003	000.199	003.490	000.006	000.005		000.026	00386.238
HDGV	000.798	000.006	000.859	013.035	000.024	000.021		000.051	00897.042
LDDV	000.081	000.001	000.080	002.872	000.003	000.002		000.008	00298.880
LDDT	000.084	000.001	000.120	001.978	000.003	000.003		000.009	00348.850
HDDV	000.115	000.004	002.431	001.505	000.041	000.038		000.032	01249.474
MC	002.292	000.003	000.725	012.519	000.022	000.020		000.054	00390.892

7.5 Personnel Formula(s)

- Personnel Vehicle Miles Travel for Work Days per Year

$VMT_P = NP * WD * AC$

VMT_P: Personnel Vehicle Miles Travel (miles/year)

NP: Number of Personnel

WD: Work Days per Year

AC: Average Commute (miles)

- Total Vehicle Miles Travel per Year

$VMT_{Total} = VMT_{AD} + VMT_C + VMT_{SC} + VMT_{ANG} + VMT_{AFRC}$

VMT_{Total}: Total Vehicle Miles Travel (miles)

VMT_{AD}: Active Duty Personnel Vehicle Miles Travel (miles)

VMT_C: Civilian Personnel Vehicle Miles Travel (miles)

VMT_{SC}: Support Contractor Personnel Vehicle Miles Travel (miles)

VMT_{ANG}: Air National Guard Personnel Vehicle Miles Travel (miles)

VMT_{AFRC}: Reserve Personnel Vehicle Miles Travel (miles)

- Vehicle Emissions per Year

$V_{POL} = (VMT_{Total} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)

VMT_{Total}: Total Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Personnel On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

8. Personnel

8.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Snohomish

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Personnel 2030

- Activity Description:

400

- Activity Start Date

Start Month: 1

Start Year: 2030

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.565253
SO_x	0.006008
NO_x	0.404767
CO	8.059509
PM 10	0.012718

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.011247
Pb	0.000000
NH_3	0.059031
CO_2e	808.3

8.2 Personnel Assumptions

- Number of Personnel

Active Duty Personnel: 400
Civilian Personnel: 0
Support Contractor Personnel: 0
Air National Guard (ANG) Personnel: 0
Reserve Personnel: 0

- Default Settings Used: Yes

- Average Personnel Round Trip Commute (mile): 20 (default)

- Personnel Work Schedule

Active Duty Personnel: 5 Days Per Week (default)
Civilian Personnel: 5 Days Per Week (default)
Support Contractor Personnel: 5 Days Per Week (default)
Air National Guard (ANG) Personnel: 4 Days Per Week (default)
Reserve Personnel: 4 Days Per Month (default)

8.3 Personnel On Road Vehicle Mixture

- On Road Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	37.55	60.32	0	0.03	0.2	0	1.9
GOVs	54.49	37.73	4.67	0	0	3.11	0

8.4 Personnel Emission Factor(s)

- On Road Vehicle Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.201	000.002	000.113	003.107	000.004	000.004		000.024	00296.374
LDGT	000.211	000.003	000.199	003.490	000.006	000.005		000.026	00386.238
HDGV	000.798	000.006	000.859	013.035	000.024	000.021		000.051	00897.042
LDDV	000.081	000.001	000.080	002.872	000.003	000.002		000.008	00298.880
LDDT	000.084	000.001	000.120	001.978	000.003	000.003		000.009	00348.850
HDDV	000.115	000.004	002.431	001.505	000.041	000.038		000.032	01249.474
MC	002.292	000.003	000.725	012.519	000.022	000.020		000.054	00390.892

8.5 Personnel Formula(s)

- Personnel Vehicle Miles Travel for Work Days per Year

$VMT_P = NP * WD * AC$

VMT_P: Personnel Vehicle Miles Travel (miles/year)

NP: Number of Personnel

WD: Work Days per Year

AC: Average Commute (miles)

- Total Vehicle Miles Travel per Year

$VMT_{Total} = VMT_{AD} + VMT_C + VMT_{SC} + VMT_{ANG} + VMT_{AFRC}$

VMT_{Total}: Total Vehicle Miles Travel (miles)

VMT_{AD}: Active Duty Personnel Vehicle Miles Travel (miles)

VMT_C: Civilian Personnel Vehicle Miles Travel (miles)

VMT_{SC}: Support Contractor Personnel Vehicle Miles Travel (miles)

VMT_{ANG}: Air National Guard Personnel Vehicle Miles Travel (miles)

VMT_{AFRC}: Reserve Personnel Vehicle Miles Travel (miles)

- Vehicle Emissions per Year

$V_{POL} = (VMT_{Total} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)

VMT_{Total}: Total Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Personnel On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

9. Personnel

9.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Snohomish

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Personnel 2031

- Activity Description:

400

- Activity Start Date

Start Month: 1

Start Year: 2031

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.565253
SO_x	0.006008

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.011247
Pb	0.000000

NO_x	0.404767
CO	8.059509
PM 10	0.012718

NH_3	0.059031
CO_2e	808.3

9.2 Personnel Assumptions

- Number of Personnel

Active Duty Personnel: 400
Civilian Personnel: 0
Support Contractor Personnel: 0
Air National Guard (ANG) Personnel: 0
Reserve Personnel: 0

- Default Settings Used: Yes

- Average Personnel Round Trip Commute (mile): 20 (default)

- Personnel Work Schedule

Active Duty Personnel: 5 Days Per Week (default)
Civilian Personnel: 5 Days Per Week (default)
Support Contractor Personnel: 5 Days Per Week (default)
Air National Guard (ANG) Personnel: 4 Days Per Week (default)
Reserve Personnel: 4 Days Per Month (default)

9.3 Personnel On Road Vehicle Mixture

- On Road Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	37.55	60.32	0	0.03	0.2	0	1.9
GOVs	54.49	37.73	4.67	0	0	3.11	0

9.4 Personnel Emission Factor(s)

- On Road Vehicle Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.201	000.002	000.113	003.107	000.004	000.004		000.024	00296.374

LDGT	000.211	000.003	000.199	003.490	000.006	000.005		000.026	00386.238
HDGV	000.798	000.006	000.859	013.035	000.024	000.021		000.051	00897.042
LDDV	000.081	000.001	000.080	002.872	000.003	000.002		000.008	00298.880
LDDT	000.084	000.001	000.120	001.978	000.003	000.003		000.009	00348.850
HDDV	000.115	000.004	002.431	001.505	000.041	000.038		000.032	01249.474
MC	002.292	000.003	000.725	012.519	000.022	000.020		000.054	00390.892

9.5 Personnel Formula(s)

- Personnel Vehicle Miles Travel for Work Days per Year

$VMT_P = NP * WD * AC$

VMT_P: Personnel Vehicle Miles Travel (miles/year)

NP: Number of Personnel

WD: Work Days per Year

AC: Average Commute (miles)

- Total Vehicle Miles Travel per Year

$VMT_{Total} = VMT_{AD} + VMT_C + VMT_{SC} + VMT_{ANG} + VMT_{AFRC}$

VMT_{Total}: Total Vehicle Miles Travel (miles)

VMT_{AD}: Active Duty Personnel Vehicle Miles Travel (miles)

VMT_C: Civilian Personnel Vehicle Miles Travel (miles)

VMT_{SC}: Support Contractor Personnel Vehicle Miles Travel (miles)

VMT_{ANG}: Air National Guard Personnel Vehicle Miles Travel (miles)

VMT_{AFRC}: Reserve Personnel Vehicle Miles Travel (miles)

- Vehicle Emissions per Year

$V_{POL} = (VMT_{Total} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)

VMT_{Total}: Total Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Personnel On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

10. Personnel

10.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Snohomish

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Personnel 2032

- Activity Description:

400

- Activity Start Date

Start Month: 1

Start Year: 2032

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.565253
SO_x	0.006008
NO_x	0.404767
CO	8.059509
PM 10	0.012718

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.011247
Pb	0.000000
NH_3	0.059031
CO_2e	808.3

10.2 Personnel Assumptions

- Number of Personnel

Active Duty Personnel: 400

Civilian Personnel: 0

Support Contractor Personnel: 0

Air National Guard (ANG) Personnel: 0

Reserve Personnel: 0

- Default Settings Used: Yes

- Average Personnel Round Trip Commute (mile): 20 (default)

- Personnel Work Schedule

Active Duty Personnel: 5 Days Per Week (default)

Civilian Personnel: 5 Days Per Week (default)

Support Contractor Personnel: 5 Days Per Week (default)

Air National Guard (ANG) Personnel: 4 Days Per Week (default)

Reserve Personnel: 4 Days Per Month (default)

10.3 Personnel On Road Vehicle Mixture

- On Road Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	37.55	60.32	0	0.03	0.2	0	1.9
GOVs	54.49	37.73	4.67	0	0	3.11	0

10.4 Personnel Emission Factor(s)

- On Road Vehicle Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.201	000.002	000.113	003.107	000.004	000.004		000.024	00296.374
LDGT	000.211	000.003	000.199	003.490	000.006	000.005		000.026	00386.238
HDGV	000.798	000.006	000.859	013.035	000.024	000.021		000.051	00897.042
LDDV	000.081	000.001	000.080	002.872	000.003	000.002		000.008	00298.880
LDDT	000.084	000.001	000.120	001.978	000.003	000.003		000.009	00348.850
HDDV	000.115	000.004	002.431	001.505	000.041	000.038		000.032	01249.474
MC	002.292	000.003	000.725	012.519	000.022	000.020		000.054	00390.892

10.5 Personnel Formula(s)

- Personnel Vehicle Miles Travel for Work Days per Year

$VMT_P = NP * WD * AC$

VMT_P: Personnel Vehicle Miles Travel (miles/year)

NP: Number of Personnel

WD: Work Days per Year

AC: Average Commute (miles)

- Total Vehicle Miles Travel per Year

$VMT_{Total} = VMT_{AD} + VMT_C + VMT_{SC} + VMT_{ANG} + VMT_{AFRC}$

VMT_{Total}: Total Vehicle Miles Travel (miles)

VMT_{AD}: Active Duty Personnel Vehicle Miles Travel (miles)

VMT_C: Civilian Personnel Vehicle Miles Travel (miles)

VMT_{SC}: Support Contractor Personnel Vehicle Miles Travel (miles)

VMT_{ANG}: Air National Guard Personnel Vehicle Miles Travel (miles)

VMT_{AFRC}: Reserve Personnel Vehicle Miles Travel (miles)

- Vehicle Emissions per Year

$V_{POL} = (VMT_{Total} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)

VMT_{Total}: Total Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Personnel On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

11. Personnel

11.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Snohomish

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Personnel 2036

- Activity Description:

200

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.282627
SO_x	0.003004
NO_x	0.202383
CO	4.029754
PM 10	0.006359

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.005624
Pb	0.000000
NH_3	0.029515
CO_2e	404.2

11.2 Personnel Assumptions

- Number of Personnel

Active Duty Personnel: 200

Civilian Personnel: 0

Support Contractor Personnel: 0

Air National Guard (ANG) Personnel: 0

Reserve Personnel: 0

- Default Settings Used: Yes

- Average Personnel Round Trip Commute (mile): 20 (default)

- Personnel Work Schedule

Active Duty Personnel: 5 Days Per Week (default)
Civilian Personnel: 5 Days Per Week (default)
Support Contractor Personnel: 5 Days Per Week (default)
Air National Guard (ANG) Personnel: 4 Days Per Week (default)
Reserve Personnel: 4 Days Per Month (default)

11.3 Personnel On Road Vehicle Mixture

- On Road Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	37.55	60.32	0	0.03	0.2	0	1.9
GOVs	54.49	37.73	4.67	0	0	3.11	0

11.4 Personnel Emission Factor(s)

- On Road Vehicle Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.201	000.002	000.113	003.107	000.004	000.004		000.024	00296.374
LDGT	000.211	000.003	000.199	003.490	000.006	000.005		000.026	00386.238
HDGV	000.798	000.006	000.859	013.035	000.024	000.021		000.051	00897.042
LDDV	000.081	000.001	000.080	002.872	000.003	000.002		000.008	00298.880
LDDT	000.084	000.001	000.120	001.978	000.003	000.003		000.009	00348.850
HDDV	000.115	000.004	002.431	001.505	000.041	000.038		000.032	01249.474
MC	002.292	000.003	000.725	012.519	000.022	000.020		000.054	00390.892

11.5 Personnel Formula(s)

- Personnel Vehicle Miles Travel for Work Days per Year

$VMT_P = NP * WD * AC$

VMT_P: Personnel Vehicle Miles Travel (miles/year)

NP: Number of Personnel

WD: Work Days per Year

AC: Average Commute (miles)

- Total Vehicle Miles Travel per Year

$VMT_{Total} = VMT_{AD} + VMT_C + VMT_{SC} + VMT_{ANG} + VMT_{AFRC}$

VMT_{Total}: Total Vehicle Miles Travel (miles)

VMT_{AD}: Active Duty Personnel Vehicle Miles Travel (miles)

VMT_C: Civilian Personnel Vehicle Miles Travel (miles)

VMT_{SC}: Support Contractor Personnel Vehicle Miles Travel (miles)

VMT_{ANG}: Air National Guard Personnel Vehicle Miles Travel (miles)

VMT_{AFRC}: Reserve Personnel Vehicle Miles Travel (miles)

- Vehicle Emissions per Year

$V_{POL} = (VMT_{Total} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)

VMT_{Total}: Total Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Personnel On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

12. Personnel

12.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Snohomish

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Personnel 2037

- Activity Description:

200

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.282627
SO_x	0.003004
NO_x	0.202383
CO	4.029754
PM 10	0.006359

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.005624
Pb	0.000000
NH_3	0.029515
CO_2e	404.2

12.2 Personnel Assumptions

- Number of Personnel

Active Duty Personnel: 200

Civilian Personnel: 0

Support Contractor Personnel: 0

Air National Guard (ANG) Personnel: 0

Reserve Personnel: 0

- Default Settings Used: Yes

- Average Personnel Round Trip Commute (mile): 20 (default)

- Personnel Work Schedule

Active Duty Personnel: 5 Days Per Week (default)

Civilian Personnel: 5 Days Per Week (default)

Support Contractor Personnel: 5 Days Per Week (default)

Air National Guard (ANG) Personnel: 4 Days Per Week (default)

Reserve Personnel: 4 Days Per Month (default)

12.3 Personnel On Road Vehicle Mixture

- On Road Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	37.55	60.32	0	0.03	0.2	0	1.9
GOVs	54.49	37.73	4.67	0	0	3.11	0

12.4 Personnel Emission Factor(s)

- On Road Vehicle Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.201	000.002	000.113	003.107	000.004	000.004		000.024	00296.374
LDGT	000.211	000.003	000.199	003.490	000.006	000.005		000.026	00386.238
HDGV	000.798	000.006	000.859	013.035	000.024	000.021		000.051	00897.042
LDDV	000.081	000.001	000.080	002.872	000.003	000.002		000.008	00298.880
LDDT	000.084	000.001	000.120	001.978	000.003	000.003		000.009	00348.850
HDDV	000.115	000.004	002.431	001.505	000.041	000.038		000.032	01249.474
MC	002.292	000.003	000.725	012.519	000.022	000.020		000.054	00390.892

12.5 Personnel Formula(s)

- Personnel Vehicle Miles Travel for Work Days per Year

$VMT_P = NP * WD * AC$

VMT_P: Personnel Vehicle Miles Travel (miles/year)

NP: Number of Personnel

WD: Work Days per Year

AC: Average Commute (miles)

- Total Vehicle Miles Travel per Year

$VMT_{Total} = VMT_{AD} + VMT_{C} + VMT_{SC} + VMT_{ANG} + VMT_{AFRC}$

VMT_{Total}: Total Vehicle Miles Travel (miles)

VMT_{AD}: Active Duty Personnel Vehicle Miles Travel (miles)

VMT_{C}: Civilian Personnel Vehicle Miles Travel (miles)

VMT_{SC}: Support Contractor Personnel Vehicle Miles Travel (miles)

VMT_{ANG}: Air National Guard Personnel Vehicle Miles Travel (miles)

VMT_{AFRC}: Reserve Personnel Vehicle Miles Travel (miles)

- Vehicle Emissions per Year

$V_{POL} = (VMT_{Total} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)

VMT_{Total}: Total Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Personnel On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

13. Personnel

13.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County: Snohomish

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Existing Navy and USCGC Personnel

- Activity Description:

2440

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	-3.448044
SO_x	-0.036649
NO_x	-2.469076
CO	-49.163005
PM 10	-0.077582

Pollutant	Emissions Per Year (TONs)
PM 2.5	-0.068608
Pb	0.000000
NH_3	-0.360087
CO_2e	-4930.7

13.2 Personnel Assumptions

- Number of Personnel

Active Duty Personnel: 2440

Civilian Personnel: 0

Support Contractor Personnel: 0

Air National Guard (ANG) Personnel: 0

Reserve Personnel: 0

- Default Settings Used: Yes

- Average Personnel Round Trip Commute (mile): 20 (default)

- Personnel Work Schedule

Active Duty Personnel: 5 Days Per Week (default)

Civilian Personnel: 5 Days Per Week (default)

Support Contractor Personnel: 5 Days Per Week (default)

Air National Guard (ANG) Personnel: 4 Days Per Week (default)

Reserve Personnel: 4 Days Per Month (default)

13.3 Personnel On Road Vehicle Mixture

- On Road Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	37.55	60.32	0	0.03	0.2	0	1.9
GOVs	54.49	37.73	4.67	0	0	3.11	0

13.4 Personnel Emission Factor(s)

- On Road Vehicle Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.201	000.002	000.113	003.107	000.004	000.004		000.024	00296.374
LDGT	000.211	000.003	000.199	003.490	000.006	000.005		000.026	00386.238
HDGV	000.798	000.006	000.859	013.035	000.024	000.021		000.051	00897.042
LDDV	000.081	000.001	000.080	002.872	000.003	000.002		000.008	00298.880
LDDT	000.084	000.001	000.120	001.978	000.003	000.003		000.009	00348.850
HDDV	000.115	000.004	002.431	001.505	000.041	000.038		000.032	01249.474
MC	002.292	000.003	000.725	012.519	000.022	000.020		000.054	00390.892

13.5 Personnel Formula(s)

- Personnel Vehicle Miles Travel for Work Days per Year

$VMT_P = NP * WD * AC$

VMT_P: Personnel Vehicle Miles Travel (miles/year)

NP: Number of Personnel

WD: Work Days per Year

AC: Average Commute (miles)

- Total Vehicle Miles Travel per Year

$VMT_{Total} = VMT_{AD} + VMT_C + VMT_{SC} + VMT_{ANG} + VMT_{AFRC}$

VMT_{Total}: Total Vehicle Miles Travel (miles)

VMT_{AD}: Active Duty Personnel Vehicle Miles Travel (miles)

VMT_C: Civilian Personnel Vehicle Miles Travel (miles)

VMT_{SC}: Support Contractor Personnel Vehicle Miles Travel (miles)

VMT_{ANG}: Air National Guard Personnel Vehicle Miles Travel (miles)

VMT_{AFRC}: Reserve Personnel Vehicle Miles Travel (miles)

- Vehicle Emissions per Year

$V_{POL} = (VMT_{Total} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)

VMT_{Total}: Total Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Personnel On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

Appendix D
Endangered Species Act Documentation

To be included in the Final EA.

Appendix E
National Historic Preservation Act Section 106 Documentation

To be included in the Final EA.

Appendix F
Tribal Government-to-Government Documentation

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Navy to Tribal Governments March 29, 2022

DEPARTMENT OF THE NAVY
NAVAL STATION EVERETT
2000 WEST MARINE VIEW DRIVE
EVERETT, WA 98207-5001

IN REPLY REFER TO:
5090
N4
29 Mar 22

The Honorable Steve Edwards
Swinomish Indian Tribal Community
11404 Moorage Way
La Conner, WA 98257

Dear Chairman Edwards,

SUBJECT: INVITATION TO INITIATE GOVERNMENT-TO-GOVERNMENT CONSULTATION FOR THE U.S. NAVY HOMEPORTING OF CONSTELLATION (FFG 62) CLASS FRIGATES AT NAVAL STATION EVERETT WASHINGTON

In recognition of the Department of the Navy's consultation responsibilities, I would like to inform you that the U.S. Navy is proposing to establish facilities and functions at Naval Station (NAVSTA) Everett (Enclosure 1) to support West Coast homeporting of 12 Constellation (FFG 62) Class Frigates. The proposed action is needed to provide capabilities for training and equipping combat-capable naval forces ready to deploy worldwide.

The Navy is in the early stages of preparing an Environmental Assessment (EA) for the proposed action, which includes construction of multi-story training and support facilities for squadrons and crews; construction of personal vehicle parking and stationing of approximately 5,100 military and civilian personnel, plus their family members. The EA is expected to take approximately one year to complete, with a Draft EA anticipated to be available for public review in the fall of 2022 and a final decision document expected in early 2023. The homeporting of ships and personnel would be phased over a period of nine years beginning with the arrival of initial personnel in fiscal year 2024. The Navy is currently developing alternatives for the placement of new facilities within existing NAVSTA Everett property or on adjacent property.

FFG-62 ships would be berthed at NAVSTA Everett's existing piers (Enclosure 2) and there are no requirements under the proposed action to modify existing piers or to conduct in-water work. With a phased approach, the first FFG-62 ship is expected to arrive in fiscal year 2026. The proposed action will address any changes to the frequency of Port Security Barrier operations that may result from homeporting activities.

Pursuant to the Navy's policies for government-to-government consultations with American Indian tribes, I would like to invite you to review the information provided in this letter and offer the opportunity to brief you or your staff on the proposed action. If you determine there may be a potential to significantly affect tribal treaty rights, protected tribal resources or Indian lands

SUBJECT: INVITATION TO INITIATE GOVERNMENT-TO-GOVERNMENT CONSULTATION FOR THE U.S. NAVY HOMEPORTING OF CONSTELLATION (FFG 62) CLASS FRIGATES AT NAVAL STATION EVERETT WASHINGTON

from the implementation of the proposed action and would like to initiate government-to-government consultation, we will continue consultation beyond the initial briefing. Please provide your response to this letter within 60 days.

I look forward to working with you to address any concerns you may have regarding this proposed action onboard NAVSTA Everett. If you have any questions or concerns, please contact me directly at (425) 304-3325 or at joshua.m.menzel.mil@us.navy.mil. Please feel free to have your staff contact Tom Dildine, NAVSTA Everett Installation Environmental Program Director, at (425) 304-3463 or thomas.e.dildine.civ@us.navy.mil.

Sincerely,

J. M. MENZEL
Captain, U.S. Navy
Commanding Officer, Naval Station Everett

Enclosures:
1. NAVSTA Everett General Location Map
2. NAVSTA Everett Detail Map

2

DEPARTMENT OF THE NAVY
NAVAL STATION EVERETT
2000 WEST MARINE VIEW DRIVE
EVERETT, WA 98207-5001

IN REPLY REFER TO
5090
N4
29 Mar 22

The Honorable Leonard Forsman
The Suquamish Tribe
PO Box 498
Suquamish, WA 98392

Dear Chairman Forsman,

SUBJECT: INVITATION TO INITIATE GOVERNMENT-TO-GOVERNMENT CONSULTATION FOR THE U.S. NAVY HOMEPORTING OF CONSTELLATION (FFG 62) CLASS FRIGATES AT NAVAL STATION EVERETT WASHINGTON

In recognition of the Department of the Navy's consultation responsibilities, I would like to inform you that the U.S. Navy is proposing to establish facilities and functions at Naval Station (NAVSTA) Everett (Enclosure 1) to support West Coast homeporting of 12 Constellation (FFG 62) Class Frigates. The proposed action is needed to provide capabilities for training and equipping combat-capable naval forces ready to deploy worldwide.

The Navy is in the early stages of preparing an Environmental Assessment (EA) for the proposed action, which includes construction of multi-story training and support facilities for squadrons and crews; construction of personal vehicle parking and stationing of approximately 5,100 military and civilian personnel, plus their family members. The EA is expected to take approximately one year to complete, with a Draft EA anticipated to be available for public review in the fall of 2022 and a final decision document expected in early 2023. The homeporting of ships and personnel would be phased over a period of nine years beginning with the arrival of initial personnel in fiscal year 2024. The Navy is currently developing alternatives for the placement of new facilities within existing NAVSTA Everett property or on adjacent property.

FFG 62 ships would be berthed at NAVSTA Everett's existing piers (Enclosure 2) and there are no requirements under the proposed action to modify existing piers or to conduct in-water work. With a phased approach, the first FFG-62 ship is expected to arrive in fiscal year 2026. The proposed action will address any changes to the frequency of Port Security Barrier operations that may result from homeporting activities.

Pursuant to the Navy's policies for government-to-government consultations with American Indian tribes, I would like to invite you to review the information provided in this letter and offer the opportunity to brief you or your staff on the proposed action. If you determine there may be a potential to significantly affect tribal treaty rights, protected tribal resources or Indian lands

SUBJECT: INVITATION TO INITIATE GOVERNMENT-TO-GOVERNMENT CONSULTATION FOR THE U.S. NAVY HOMEPORTING OF CONSTELLATION (FFG 62) CLASS FRIGATES AT NAVAL STATION EVERETT WASHINGTON

from the implementation of the proposed action and would like to initiate government-to-government consultation, we will continue consultation beyond the initial briefing. Please provide your response to this letter within 60 days.

I look forward to working with you to address any concerns you may have regarding this proposed action onboard NAVSTA Everett. If you have any questions or concerns, please contact me directly at (425) 304-3325 or at joshua.m.menzel.mil@us.navy.mil. Please feel free to have your staff contact Tom Dildine, NAVSTA Everett Installation Environmental Program Director, at (425) 304-3463 or thomas.e.dildine.civ@us.navy.mil.

Sincerely,

J. M. MENZEL
Captain, U.S. Navy
Commanding Officer, Naval Station Everett

Enclosures:
1. NAVSTA Everett General Location Map
2. NAVSTA Everett Detail Map

2

DEPARTMENT OF THE NAVY
NAVAL STATION EVERETT
2000 WEST MARINE VIEW DRIVE
EVERETT, WA 98207-5001

IN REPLY REFER TO:
5090
N4
29 Mar 22

The Honorable Teri Gobin
Tulalip Tribes
6406 Marine Drive
Tulalip, WA 98271

Dear Chairwoman Gobin,

SUBJECT: INVITATION TO INITIATE GOVERNMENT-TO-GOVERNMENT CONSULTATION FOR THE U.S. NAVY HOMEPORTING OF CONSTELLATION (FFG 62) CLASS FRIGATES AT NAVAL STATION EVERETT WASHINGTON

In recognition of the Department of the Navy's consultation responsibilities, I would like to inform you that the U.S. Navy is proposing to establish facilities and functions at Naval Station (NAVSTA) Everett (Enclosure 1) to support West Coast homeporting of 12 Constellation (FFG 62) Class Frigates. The proposed action is needed to provide capabilities for training and equipping combat-capable naval forces ready to deploy worldwide.

The Navy is in the early stages of preparing an Environmental Assessment (EA) for the proposed action, which includes construction of multi-story training and support facilities for squadrons and crews; construction of personal vehicle parking and stationing of approximately 5,100 military and civilian personnel, plus their family members. The EA is expected to take approximately one year to complete, with a Draft EA anticipated to be available for public review in the fall of 2022 and a final decision document expected in early 2023. The homeporting of ships and personnel would be phased over a period of nine years beginning with the arrival of initial personnel in fiscal year 2024. The Navy is currently developing alternatives for the placement of new facilities within existing NAVSTA Everett property or on adjacent property.

FFG 62 ships would be berthed at NAVSTA Everett's existing piers (Enclosure 2) and there are no requirements under the proposed action to modify existing piers or to conduct in-water work. With a phased approach, the first FFG-62 ship is expected to arrive in fiscal year 2026. The proposed action will address any changes to the frequency of Port Security Barrier operations that may result from homeporting activities.

Pursuant to the Navy's policies for government-to-government consultations with American Indian tribes, I would like to invite you to review the information provided in this letter and offer the opportunity to brief you or your staff on the proposed action. If you determine there may be a potential to significantly affect tribal treaty rights, protected tribal resources or Indian lands

SUBJECT: INVITATION TO INITIATE GOVERNMENT-TO-GOVERNMENT CONSULTATION FOR THE U.S. NAVY HOMEPORTING OF CONSTELLATION (FFG 62) CLASS FRIGATES AT NAVAL STATION EVERETT WASHINGTON

from the implementation of the proposed action and would like to initiate government-to-government consultation, we will continue consultation beyond the initial briefing. Please provide your response to this letter within 60 days.

I look forward to working with you to address any concerns you may have regarding this proposed action onboard NAVSTA Everett. If you have any questions or concerns, please contact me directly at (425) 304-3325 or at joshua.m.menzel.mil@us.navy.mil. Please feel free to have your staff contact Tom Dildine, NAVSTA Everett Installation Environmental Program Director, at (425) 304-3463 or thomas.e.dildine.civ@us.navy.mil.

Sincerely,

J. M. MENZEL
Captain, U.S. Navy
Commanding Officer, Naval Station Everett

Enclosures:
1. NAVSTA Everett General Location Map
2. NAVSTA Everett Detail Map

2

DEPARTMENT OF THE NAVY
NAVAL STATION EVERETT
2000 WEST MARINE VIEW DRIVE
EVERETT, WA 98207-5001

IN REPLY REFER TO
5090
N4
29 Mar 22

The Honorable Eric White
Stillaguamish Tribe of Indians
PO Box 277
Arlington, WA 98223

Dear Chairman White,

SUBJECT: INVITATION TO INITIATE GOVERNMENT-TO-GOVERNMENT CONSULTATION FOR THE U.S. NAVY HOMEPORTING OF CONSTELLATION (FFG 62) CLASS FRIGATES AT NAVAL STATION EVERETT WASHINGTON

In recognition of the Department of the Navy's consultation responsibilities, I would like to inform you that the U.S. Navy is proposing to establish facilities and functions at Naval Station (NAVSTA) Everett (Enclosure 1) to support West Coast homeporting of 12 Constellation (FFG 62) Class Frigates. The proposed action is needed to provide capabilities for training and equipping combat-capable naval forces ready to deploy worldwide.

The Navy is in the early stages of preparing an Environmental Assessment (EA) for the proposed action, which includes construction of multi-story training and support facilities for squadrons and crews; construction of personal vehicle parking and stationing of approximately 5,100 military and civilian personnel, plus their family members. The EA is expected to take approximately one year to complete, with a Draft EA anticipated to be available for public review in the fall of 2022 and a final decision document expected in early 2023. The homeporting of ships and personnel would be phased over a period of nine years beginning with the arrival of initial personnel in fiscal year 2024. The Navy is currently developing alternatives for the placement of new facilities within existing NAVSTA Everett property or on adjacent property.

FFG-62 ships would be berthed at NAVSTA Everett's existing piers (Enclosure 2) and there are no requirements under the proposed action to modify existing piers or to conduct in-water work. With a phased approach, the first FFG-62 ship is expected to arrive in fiscal year 2026. The proposed action will address any changes to the frequency of Port Security Barrier operations that may result from homeporting activities.

Pursuant to the Navy's policies for government-to-government consultations with American Indian tribes, I would like to invite you to review the information provided in this letter and offer the opportunity to brief you or your staff on the proposed action. If you determine there may be a potential to significantly affect tribal treaty rights, protected tribal resources or Indian lands

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I look forward to working with you to address any concerns you may have regarding this proposed action onboard NAVSTA Everett. If you have any questions or concerns, please contact me directly at (425) 304-3325 or at joshua.m.menzel.mil@us.navy.mil. Please feel free to have your staff contact Tom Dildine, NAVSTA Everett Installation Environmental Program Director, at (425) 304-3463 or thomas.e.dildine.civ@us.navy.mil.

Sincerely,

J. M. MENZEL
Captain, U.S. Navy
Commanding Officer, Naval Station Everett

Enclosures:
1. NAVSTA Everett General Location Map
2. NAVSTA Everett Detail Map

2

Navy to Tribal Governments October 10, 2023

DEPARTMENT OF THE NAVY
NAVAL STATION EVERETT
2000 WEST MARINE VIEW DRIVE
EVERETT, WA 98207-5001

IN REPLY REFER TO:
5090
N4
10 Oct 23

The Honorable Steve Edwards
Swinomish Indian Tribal Community
11404 Moorage Way
La Conner, WA 98257

Dear Chairman Edwards,

SUBJECT: INVITATION TO INITIATE GOVERNMENT-TO-GOVERNMENT CONSULTATION FOR THE U.S. NAVY HOMEPORTING OF CONSTELLATION (FFG-62) CLASS FRIGATES AT NAVAL STATION EVERETT, WASHINGTON

In recognition of the Department of the Navy's consultation responsibilities, I would like to inform you that the U.S. Navy is proposing to establish facilities and functions onboard Naval Station (NAVSTA) Everett (enclosure (1)) in Everett, Washington, to support West Coast homeporting of 12 Constellation (FFG-62) Class Frigates. The proposed action is needed to provide capabilities for training and equipping combat-capable naval forces ready to deploy worldwide.

On March 29, 2022, you were notified of the Navy's proposal to homeport the FFG-62 ships onboard NAVSTA Everett and our intent to initiate an Environmental Assessment (EA) for the proposed action. Since that time, the FFG-62 program has undergone some changes in manning and infrastructure requirements. This letter is to notify you of our intent to restart the EA process and to provide some updated information on the proposed action.

The Navy is in the early stages of preparing a new EA for the proposed action, which includes construction of training and support facilities for squadrons and crews and stationing of approximately 2,900 personnel, plus their family members. The Navy is currently developing alternatives for the placement of new facilities within existing NAVSTA Everett property.

FFG-62 ships would be berthed at NAVSTA Everett's existing piers (enclosure (2))), and there are no requirements under the proposed action to modify existing piers or to conduct in-water work. The homeporting of ships and personnel would be phased in over a period of approximately 10 years beginning in fiscal year 2026. The timing of construction and delivery of ships to NAVSTA Everett may fluctuate. The proposed action will address any changes to the frequency of Port Security Barrier operations that may result from homeporting activities.

Pursuant to the Navy's policies for government-to-government consultations with American Indian tribes, I would like to invite you to review the information provided in this letter and offer

SUBJECT: INVITATION TO INITIATE GOVERNMENT-TO-GOVERNMENT CONSULTATION FOR THE U.S. NAVY HOMEPORTING OF CONSTELLATION (FFG-62) CLASS FRIGATES AT NAVAL STATION EVERETT, WASHINGTON

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Sincerely,

Captain, USN
Commanding Officer, Naval Station Everett

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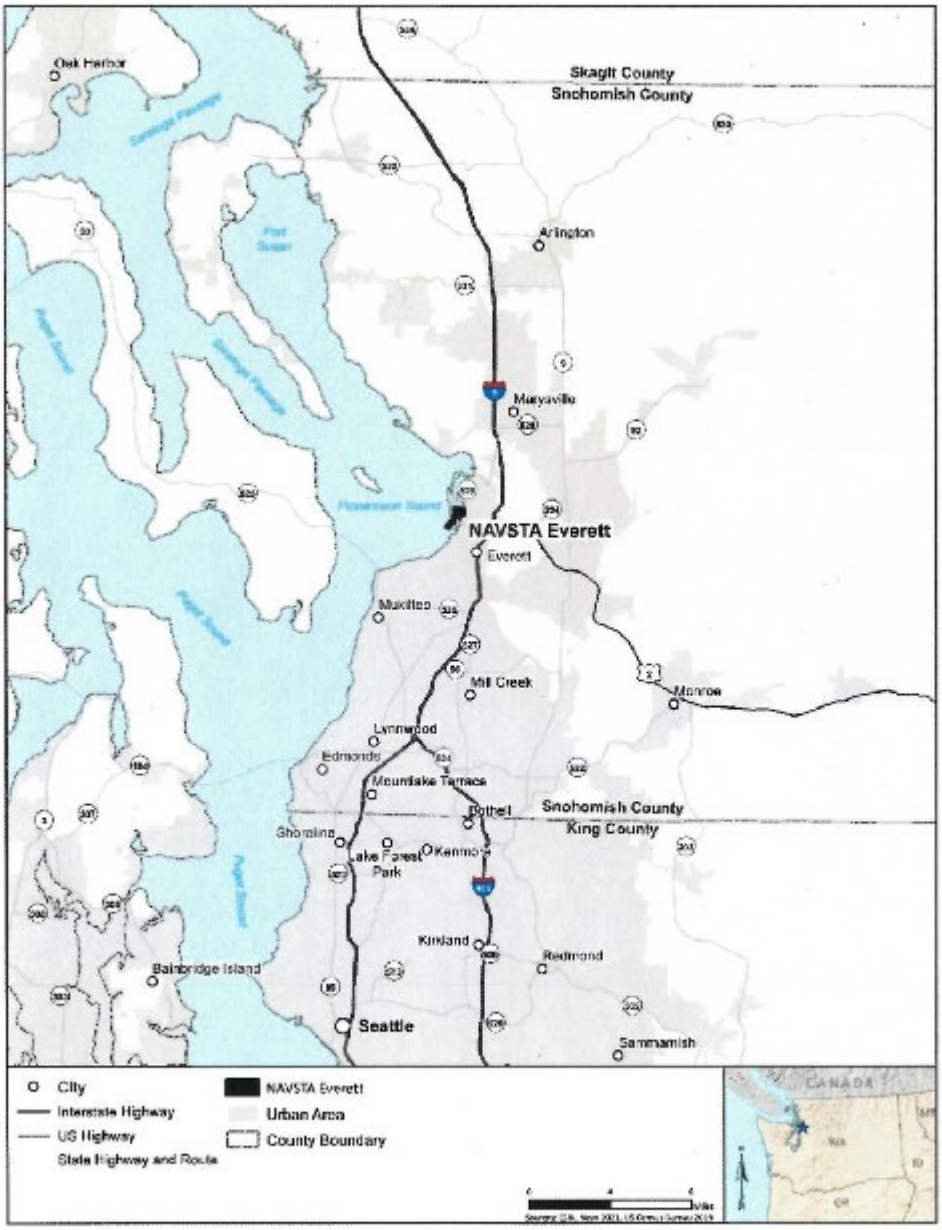
1. NAVSTA Everett General Location Map
2. NAVSTA Everett Detail Map

2

NAVSTA Everett General Location Map



Enclosure (1)

NAVSTA Everett Detail Map

Enclosure (2)

DEPARTMENT OF THE NAVY
NAVAL STATION EVERETT
2000 WEST MARINE VIEW DRIVE
EVERETT, WA 98207-5001

IN REPLY REFER TO:
5090
N4
10 Oct 23

The Honorable Eric White
Stillaguamish Tribe of Indians
PO Box 277
Arlington, WA 98223

Dear Chairman White,

SUBJECT: INVITATION TO INITIATE GOVERNMENT-TO-GOVERNMENT CONSULTATION FOR THE U.S. NAVY HOMEPORTING OF CONSTELLATION (FFG-62) CLASS FRIGATES AT NAVAL STATION EVERETT, WASHINGTON

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On March 29, 2022, you were notified of the Navy's proposal to homeport the FFG-62 ships onboard NAVSTA Everett and our intent to initiate an Environmental Assessment (EA) for the proposed action. Since that time, the FFG-62 program has undergone some changes in manning and infrastructure requirements. This letter is to notify you of our intent to restart the EA process and to provide some updated information on the proposed action.

The Navy is in the early stages of preparing a new EA for the proposed action, which includes construction of training and support facilities for squadrons and crews and stationing of approximately 2,900 personnel, plus their family members. The Navy is currently developing alternatives for the placement of new facilities within existing NAVSTA Everett property.

FFG-62 ships would be berthed at NAVSTA Everett's existing piers (enclosure (2)), and there are no requirements under the proposed action to modify existing piers or to conduct in-water work. The homeporting of ships and personnel would be phased in over a period of approximately 10 years beginning in fiscal year 2026. The timing of construction and delivery of ships to NAVSTA Everett may fluctuate. The proposed action will address any changes to the frequency of Port Security Barrier operations that may result from homeporting activities.

Pursuant to the Navy's policies for government-to-government consultations with American Indian tribes, I would like to invite you to review the information provided in this letter and offer

SUBJECT: INVITATION TO INITIATE GOVERNMENT-TO-GOVERNMENT CONSULTATION FOR THE U.S. NAVY HOMEPORTING OF CONSTELLATION (FFG-62) CLASS FRIGATES AT NAVAL STATION EVERETT, WASHINGTON

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I look forward to working with you to address any concerns you may have regarding this proposed action onboard NAVSTA Everett. If you have any questions or concerns, please contact me directly at (425) 304-3325 or at joshua.m.menzel3@navy.mil. Please feel free to have your staff contact Kevin McKeag, NAVSTA Everett Installation Environmental Program Director, at (425) 304-3396 or kevin.j.mckeag.civ@us.navy.mil.

Sincerely,

J. M. MENZEL
Captain, USN
Commanding Officer, Naval Station Everett

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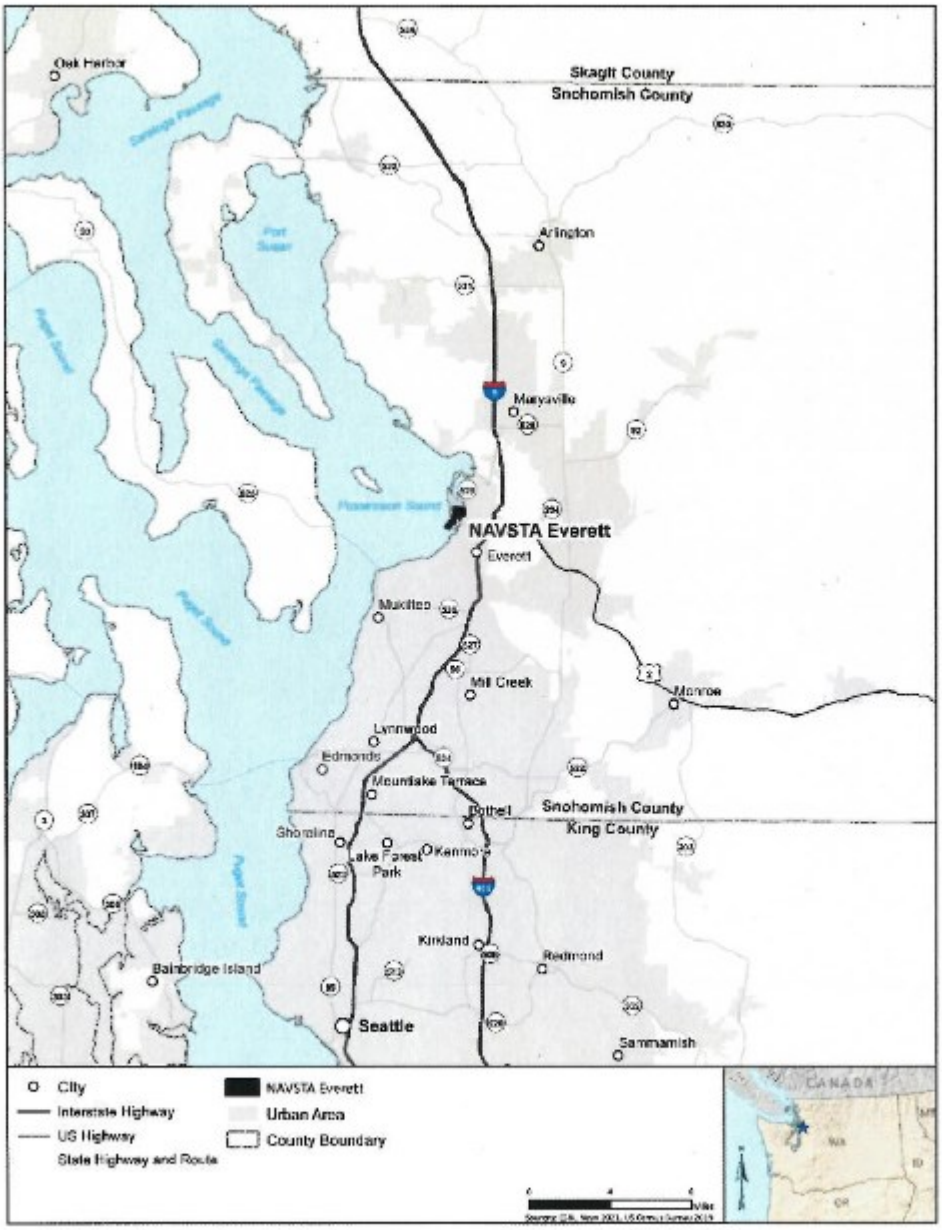
2. NAVSTA Everett Detail Map

2

NAVSTA Everett General Location Map



Enclosure (1)

NAVSTA Everett Detail Map

Enclosure (2)

DEPARTMENT OF THE NAVY
NAVAL STATION EVERETT
2000 WEST MARINE VIEW DRIVE
EVERETT, WA 98207-5001

IN REPLY REFER TO:
5090
N4
10 Oct 23

The Honorable Leonard Forsman
The Suquamish Tribe
PO Box 498
Suquamish, WA 98392

Dear Chairman Forsman,

SUBJECT: INVITATION TO INITIATE GOVERNMENT-TO-GOVERNMENT CONSULTATION FOR THE U.S. NAVY HOMEPORTING OF CONSTELLATION (FFG-62) CLASS FRIGATES AT NAVAL STATION EVERETT, WASHINGTON

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FFG-62 ships would be berthed at NAVSTA Everett's existing piers (enclosure (2)), and there are no requirements under the proposed action to modify existing piers or to conduct in-water work. The homeporting of ships and personnel would be phased in over a period of approximately 10 years beginning in fiscal year 2026. The timing of construction and delivery of ships to NAVSTA Everett may fluctuate. The proposed action will address any changes to the frequency of Port Security Barrier operations that may result from homeporting activities.

Pursuant to the Navy's policies for government-to-government consultations with American Indian tribes, I would like to invite you to review the information provided in this letter and offer the opportunity to brief you or your staff on the proposed action. If you determine there may be a potential to significantly affect tribal treaty rights, protected tribal resources, or Indian lands

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Sincerely,

J. M. MENZEL
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Commanding Officer, Naval Station Everett

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2. NAVSTA Everett Detail Map

2

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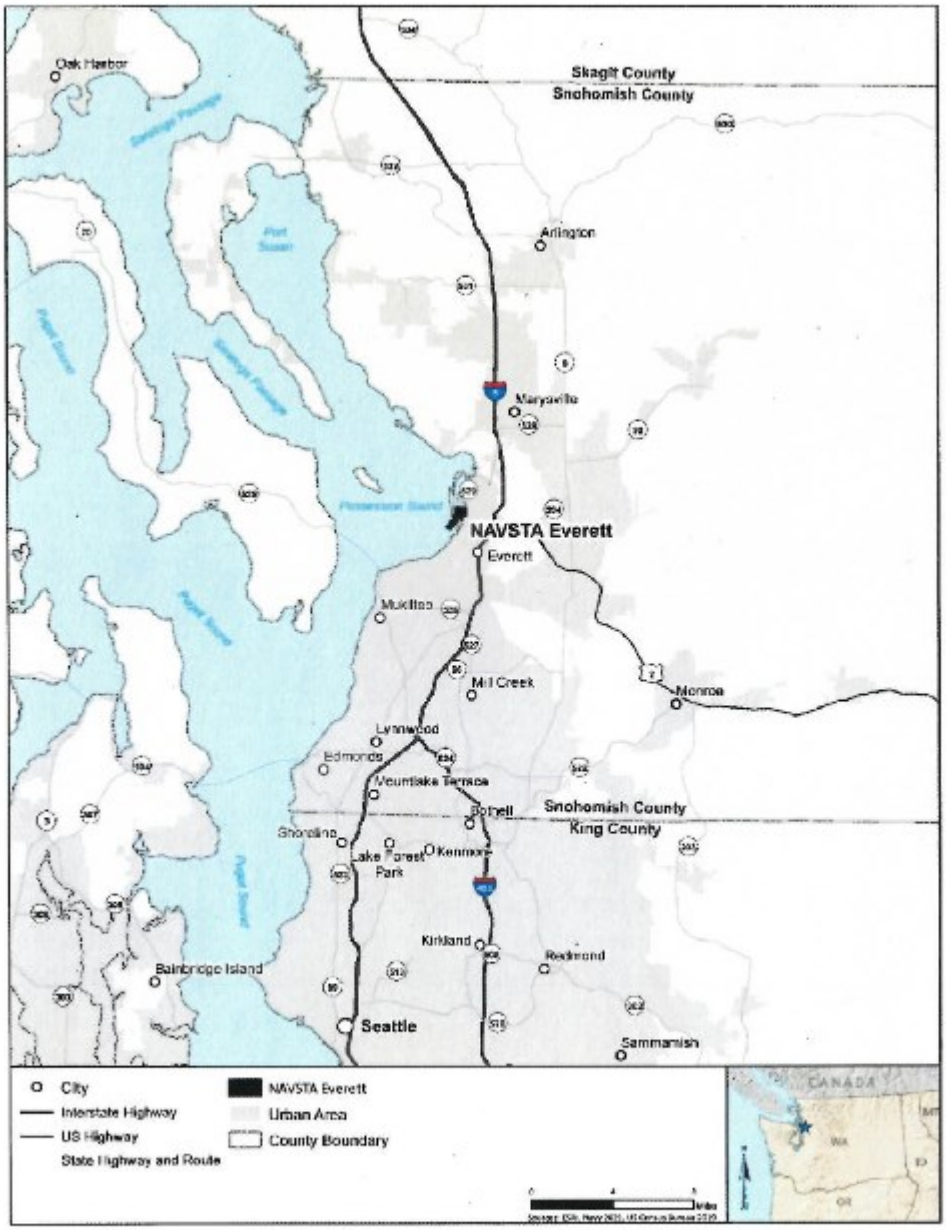

Enclosure (1)

NAVSTA Everett Detail Map

Enclosure (2)

DEPARTMENT OF THE NAVY
NAVAL STATION EVERETT
2000 WEST MARINE VIEW DRIVE
EVERETT, WA 98207-5001

IN REPLY REFER TO:
5090
N4
10 Oct 23

The Honorable Teri Gobin
Tulalip Tribe
6406 Marine Drive
Tulalip, WA 98271

Dear Chairman Gobin,

SUBJECT: INVITATION TO INITIATE GOVERNMENT-TO-GOVERNMENT CONSULTATION FOR THE U.S. NAVY HOMEPORTING OF CONSTELLATION (FFG-62) CLASS FRIGATES AT NAVAL STATION EVERETT, WASHINGTON

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Sincerely,

J. M. MENZEL
Captain, USN
Commanding Officer, Naval Station Everett

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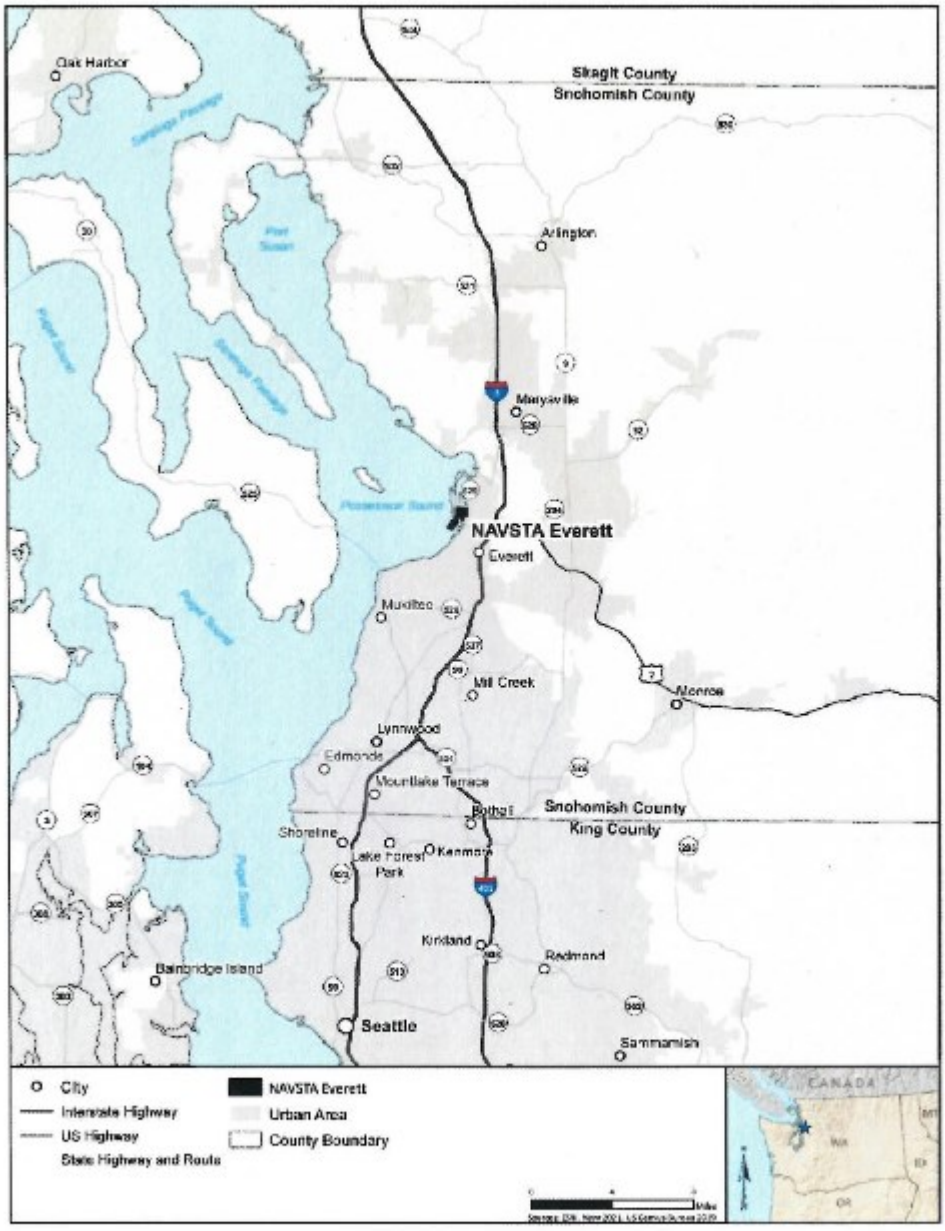
2

NAVSTA Everett General Location Map



Enclosure (1)

NAVSTA Everett Detail Map

Enclosure (2)

Appendix G
Noise Metrics and Methodology

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Noise Metrics and Methodology

Sound is a physical phenomenon consisting of minute vibrations that travel through a medium, such as air or water, and are sensed by the human ear. Sound is all around us. The perception and evaluation of sound involves three basic physical characteristics:

Intensity – the acoustic energy, which is expressed in terms of sound pressure, in decibels (dB)

Frequency – the number of cycles per second the air vibrates, in Hertz (Hz)

Duration – the length of time the sound can be detected

Noise is defined as unwanted or annoying sound that interferes with or disrupts normal human activities. Although continuous and extended exposure to high noise levels (e.g., through occupational exposure) can cause hearing loss, the principal human response to noise is annoyance. The response of different individuals to similar noise events is diverse and is influenced by the type of noise; perceived importance of the noise; its appropriateness in the setting, time of day, and type of activity during which the noise occurs; and sensitivity of the individual.

G.1 Basics of Sound and A-Weighted Sound Level

The loudest sounds that can be detected comfortably by the human ear have intensities that are a trillion times higher than those of sounds that can barely be detected. This vast range means that using a linear scale to represent sound intensity is not feasible. The dB is a logarithmic unit used to represent the intensity of a sound, also referred to as the sound level. Table G-1 provides a comparison of how the human ear perceives changes in loudness on the logarithmic scale.

Table G-1 Subjective Responses to Changes in A-Weighted Decibels

Change	*Change in Perceived Loudness*
3 dB	Barely perceptible
5 dB	Quite noticeable
10 dB	Dramatic – twice or half as loud
20 dB	Striking – fourfold change

Key: dB = decibels.

All sounds have a spectral content, which means their magnitude or level changes with frequency, where frequency is measured in cycles per second or Hz. To mimic the human ear's non-linear sensitivity and perception of different frequencies of sound, the spectral content is weighted. For example, environmental noise measurements are usually on an "A-weighted" scale that filters out very low and very high frequencies to replicate human sensitivity. It is common to add the "A" to the measurement unit to identify that the measurement has been made with this filtering process (dBA).

Figure G-1 (Cowan, 1994) provides a chart of A-weighted sound levels from typical noise sources. Some noise sources (e.g., air conditioner, vacuum cleaner) are continuous sounds that maintain a constant sound level for some period of time. Other sources (e.g., automobile, heavy truck) are the maximum sound produced during an event like a vehicle pass-by. Other sounds (e.g., urban daytime, urban nighttime) are averages taken over extended periods of time. A variety of noise metrics have been developed to describe noise over different time periods, as discussed below.

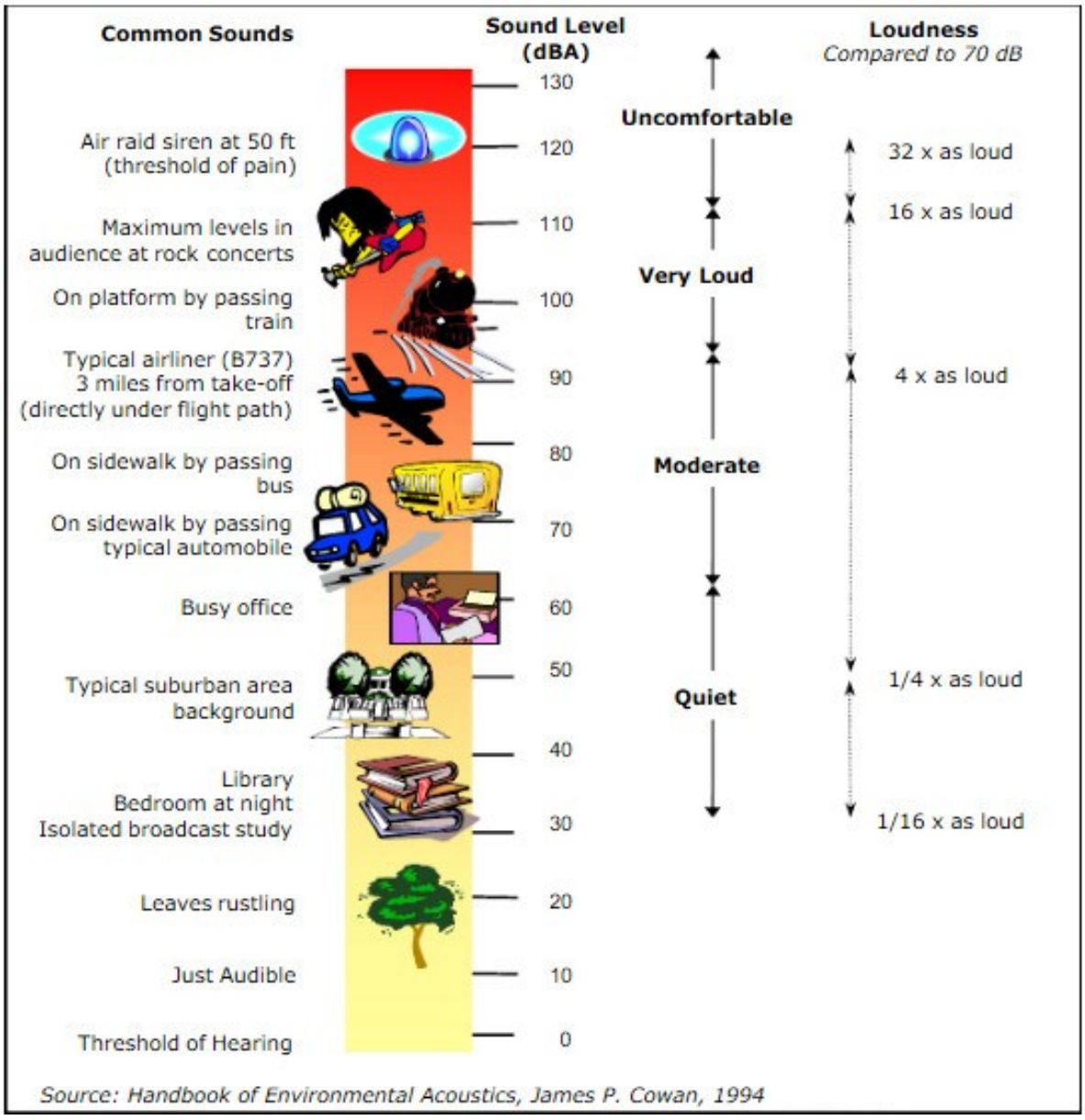

Figure G-1 A-Weighted Sound Levels from Typical Sources

G.2 Noise Metrics

A metric is a system for measuring or quantifying a particular characteristic of a subject. Since noise is a complex physical phenomenon, different noise metrics help to quantify the noise environment. This EA uses the metrics maximum noise level (L_{max}), Day-Night Average Noise Level (DNL), and equivalent noise level (L_{eq}).

Maximum Noise Level. The highest noise level measured during a single event where the noise level changes value with time is called the maximum noise level or L_{max}. The noise of a passing truck, for example, starts at the ambient or background noise level, rises to the maximum level as the truck comes closest to the observer, and returns to the background level as the truck recedes into the distance. L_{max}

defines the maximum noise level occurring for a fraction (typically 1/8th) of a second (American National Standards Institute, 1988).

Day-Night Average Noise Level. The DNL metric is the energy-averaged noise level measured over a 24-hour period, with a 10-dB penalty assigned to noise events occurring between 10 p.m. and 7 a.m. (known as "acoustic night"). DNL is the primary noise metric used by the U.S. Department of Housing and Urban Development, Federal Aviation Administration, U.S. Environmental Protection Agency, and Department of Defense to assess community reactions to noise. Research has indicated that about 87 percent of the population is not highly annoyed by outdoor noise levels below 65 dBA DNL (Federal Interagency Committee on Urban Noise, 1980). However, studies on the relationship between DNL and prevalence of annoyance have focused on the noise sources that persist for long periods of time (e.g., years). Community reactions to noise sources of short duration, such as construction noise, are not necessarily predicted with the same degree of accuracy using the DNL metric. Land use compatibility guidelines associated with particular DNL values are intended primarily for application to noise sources that last for long periods of time.

Equivalent Noise Level. The L_{eq} is the continuous noise level that would be present if all of the variations in noise level occurring over a specified time period were smoothed out as to contain the same total noise energy. The L_{eq} measured over a 24-hour period (denoted L_{eq24hr}) is equivalent to DNL except that it does not incorporate decibel penalties for late night noise events. Other common time periods described using L_{eq} are 5 minutes ($L_{eq\text{-}5min}$), 1 hour ($L_{eq\text{-}1hr}$), and 8 hours ($L_{eq\text{-}8hr}$).

G.3 Noise Effects

Several categories of potential noise effects are summarized below.

G.3.1 Annoyance

As previously noted, the primary effect of noise on exposed communities is annoyance. Annoyance is often triggered by interference of a noise with an activity such as conversation or sleep.

G.3.2 Speech Interference

Speech interference can cause disruption of routine activities, such as enjoyment of radio or television programs, telephone use, or family conversation, giving rise to frustration or irritation. Some degree of speech interference is possible whenever background noise levels exceed 50 dBA. However, people often choose to raise their voices to be heard over moderately loud background noise. People indoors experience lower noise levels as a result of outdoor noise sources. Typical residential construction provides approximately 25 dBA outdoor-to-indoor noise level reduction while windows are closed, and speech interference indoors is unlikely when outdoor noise levels are below 75 dBA.

G.3.3 Sleep Disturbance

Sleep disturbance is often of concern in situations where noise levels would be elevated late at night when most people are asleep. Noise generated during daytime hours is less likely to result in sleep disturbance.

G.4 Noise Modeling

Construction noise levels were estimated using methods prescribed by Washington State Department of Transportation (WSDOT) (WSDOT, 2023). All construction equipment noise levels used in modeling except those associated with impact pile driving were also based on WSDOT recommendations. Noise

levels associated with impact driving of 24-inch piles were based on measurements conducted by the U.S. Navy at Naval Base Kitsap – Bangor, Washington (Navy, 2015). The Navy-measured pile driving noise levels are slightly higher than values reported by WSDOT and were selected to ensure that impacts would not be underrepresented. The formula used to determine construction noise levels at a specific distance assumed that there is no intervening topography or structures and assumes that noise propagation is over hard surfaces (e.g., concrete) with minimal impedance.

G.5 References

Author	*Date*	*Title*
American National Standards Institute	1988	American National Standard Quantities and Procedures for Description and Measurement of Environmental Sound, ANSI S12-9-1988. New York: Acoustical Society of America.
Cowan, J.P.	1994	Handbook of Environmental Acoustics. New York: John Wiley & Sons.
Federal Interagency Committee on Urban Noise	1980	Guidelines for Considering Noise in Land Use Planning and Control. Washington, D.C.
Navy	2015	Proxy Source Sound Levels and Potential Bubble Curtain Attenuation for Acoustic Modeling of Nearshore Marine Pile Driving at Navy Installations in Puget Sound. Silverdale, WA: Naval Facilities Engineering Command.
Washington State Department of Transportation (WSDOT)	2023	Biological Assessment Preparation Manual. Chapter 7 Construction Noise Impact Assessment. June.