## 3.16. AIR QUALITY

### 3.16.1. Affected Environment

Air quality in a given location is defined by the concentration of various pollutants in the atmosphere, generally expressed in units of parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$). The air quality of the area is measured in comparison to national and/or state ambient air quality standards (AAQS). The USEPA has established National Ambient Air Quality Standards (NAAQS) for six criteria pollutants: ozone ($O_3$), nitrogen dioxide ($NO_2$), carbon monoxide (CO), respirable particulate matter (PM) less than or equal to 10 microns in diameter ($PM_{10}$), particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), sulfur dioxide ($SO_2$), and lead. The NAAQS represent the maximum allowable atmospheric concentrations that may occur and still protect public health and welfare with a reasonable margin of safety. The standards identify the maximum acceptable ground-level concentrations that may not be exceeded more than once per year and mean annual concentrations that may never be exceeded. WDOE has also established state standards with concentrations that are at least as restrictive as the NAAQS. The national and Washington State AAQS are shown in Table 3.16–1. Emissions from sources associated with the Proposed Action would not be allowed to contribute to a violation of an AAQS. In addition to the NAAQS, green houses gases (GHGs), gases that trap heat in the atmosphere, are reportable to the USEPA or WDOE when stationary source emissions from a facility exceed 25,000 metric tons carbon dioxide equivalent ($CO_2e$) or 10,000 metric tons $CO_2e$, respectively.

#### 3.16.1.1. EXISTING CONDITIONS

For the majority of the year, air quality in the vicinity of the LWI and SPE project sites, the upland project area, and the greater area of NAVBASE Kitsap Bangor, all of which are located in Kitsap County, is generally rated as good, which is the highest air quality rating. Kitsap County is presently in attainment for all NAAQS. The Puget Sound Clean Air Agency (PSCAA) addresses air quality issues in Kitsap County and has created regulations requiring that a Notice of Construction (NOC) application be obtained for stationary emission sources that may have an impact on air quality. Typically these NOC approvals are applied for before operation of an emission source and require stringent operation and maintenance standards. PSCAA also implements regulations to minimize smoke emissions from stationary point sources and emissions of fugitive dust and smoke during construction projects. In addition, NAVBASE Kitsap Bangor is required by PSCAA to determine a twelve-month rolling average of criteria pollutant emissions and report these emissions to PSCAA per the terms of the NAVBASE Kitsap Bangor synthetic minor permit (NAVFAC Environmental 2012). Table 3.16–2 shows the most recent (2011) emissions on NAVBASE Kitsap Bangor.

**Table 3.16–1. National and Washington State Ambient Air Quality Standards**

| Air Pollutant | Averaging Time | Washington/PSCAA AAQS[a] | NAAQS[a] | |
|---|---|---|---|---|
| | | | Primary[b] | Secondary[c] |
| CO | 8-Hour[d]<br>1-Hour[d] | 9 ppm<br>35 ppm | 9 ppm<br>35 ppm | None<br>None |
| Lead | Rolling 3-month[e] | 0.15 µg/$m^3$ | 0.15 µg/$m^3$ | 0.15 µg/$m^3$ |
| $NO_2$ | Annual<br>1-Hour[g] | 0.053 ppm<br>0.10 ppm | 0.053 ppm[f]<br>0.10 ppm | 0.053 ppm<br>None |
| $PM_{10}$ | 24-Hour[h] | 150 µg/$m^3$ | 150 µg/$m^3$ | 150 µg/$m^3$ |
| $PM_{2.5}$ | Annual[i]<br>24-Hour[j] | 15 µg/$m^3$<br>35 µg/$m^3$ | 12 µg/$m^3$<br>35 µg/$m^3$ | 15 µg/$m^3$<br>35 µg/$m^3$ |
| $O_3$ | 8-Hour[k] | 0.075 ppm | 0.075 ppm | 0.075 ppm |
| $SO_2$ | 3-Hour[d]<br>1-Hour | 0.5 ppm<br>0.75 ppm[d] | None<br>0.075 ppm | 0.5 ppm<br>None |

Sources: PSCAA 2012; USEPA 2014a; WAC 173-470; WAC 173-474; WAC 173-475

AAQS = Ambient Air Quality Standards; ºC = degrees Celsius; CO = carbon monoxide; µg/$m^3$ = micrograms per cubic meter; NAAQS = National Ambient Air Quality Standards; $NO_2$ = nitrogen dioxide; $O_3$ = ozone; PSCAA = Puget Sound Clean Air Agency; $PM_{10}$ = particulate matter less than 10 microns in diameter; $PM_{2.5}$ = particulate matter less than 2.5 microns in diameter; ppb = parts per billion; ppm = parts per million; SIP = State Implementation Plan; $SO_2$ = sulfur dioxide; USEPA = U.S. Environmental Protection Agency

a. The NAAQS and Washington State standards are based on standard temperature and pressure of 25ºC and 760 millimeters of mercury, respectively. Units of measurement are ppm and µg/$m^3$.

b. National Primary Standards: The levels of air quality necessary to protect the public health with an adequate margin of safety. Each state must attain the primary standards no later than three years after the SIP is approved by the USEPA.

c. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant. Each state must attain the secondary standards within a reasonable time after the SIP is approved by the USEPA.

d. Not to be exceeded more than once per year.

e. Final rule signed October 15, 2008. The 1978 lead standard (1.5 µg/$m^3$ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

f. The official level of the annual $NO_2$ standard is 0.053 ppm, equal to 53 ppb, which is shown here to allow clearer comparison to the 1-hour standard.

g. To attain this standard, the three-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 100 ppb (effective January 22, 2010).

h. Not to be exceeded more than once per year on average over three years.

i. To attain this standard, the three-year average of the weighted annual mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed 12.0 µg/$m^3$.

j. To attain this standard, the three-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/$m^3$ (effective December 17, 2006).

k. To attain this standard, the three-year average of the fourth-highest daily maximum 8-hour average $O_3$ concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm (effective May 27, 2008).

**Table 3.16–2. Existing Air Emissions for NAVBASE Kitsap Bangor (2011)**

| Total Air Pollutant Emissions (tons) | | | | | |
|---|---|---|---|---|---|
| VOC | CO | $NO_x$ | $SO_x$ | $PM_{10}$ | $PM_{2.5}$ |
| 34.30 | 19.34 | 27.57 | 0.33 | 10.74 | 1.86 |

Source: NAVFAC Environmental 2012

CO = carbon monoxide; $NO_x$ = nitrogen oxides; $PM_{10}$ = particulate matter less than 10 microns in diameter; $PM_{2.5}$ = particulate matter less than 2.5 microns in diameter; $SO_x$ = sulfur oxides; VOC = volatile organic compound. $NO_x$ and VOC emissions are tracked since they are precursors to ozone.

#### 3.16.1.1.1. ATTAINMENT, AIR EMISSIONS, AND AIR QUALITY INDEX

The USEPA designates all areas of the U.S. as having air quality either better than (attainment) or worse than (nonattainment) the NAAQS. Areas which cannot be designated as either attainment or nonattainment due to lack of available information to the NAAQS are considered unclassifiable. A nonattainment designation means that a primary NAAQS has been exceeded in a given area. Areas that were previously designated nonattainment, but are now in attainment, are designated as maintenance areas. Kitsap County is presently in attainment for the six criteria pollutants of all NAAQS and has always attained these standards due to its rural nature and lack of substantial emission sources. All ambient pollutant levels in Kitsap County are also lower than the state AAQS shown in Table 3.16–1. The USEPA has developed a nationwide reporting index for the five major criteria pollutants (CO, $NO_2$, $SO_2$, $O_3$, and particulate matter), known as the Air Quality Index (AQI). The AQI is based on a 500-point scale. Ambient concentrations for the five major pollutants are converted into a separate AQI value for each pollutant, using standard formulas developed by the USEPA. The highest of these AQI values is reported as the AQI value for that day. For example, if an AQI is 132 for CO and 101 for particle pollution, the AQI value for that day would be 132 for CO. The index is scaled as follows: (1) 0–50 good, (2) 51–100 moderate, (3) 101–150 unhealthy for sensitive groups, (4) 151–200 unhealthy, (5) 201–300 very unhealthy, and (6) 301–500 hazardous (PSCAA 2013a).

For the Bangor waterfront, including the LWI and SPE project sites and upland project area, as well as Kitsap County, the AQI indicated that air quality was good for most (94.5 percent) of 2012 and moderate for the rest of the year (5.5 percent) (PSCAA 2013a). The highest AQI for Kitsap County in 2012 was 68; there were no occurrences of the AQI within the range of unhealthy for sensitive groups in 2012.

### 3.16.1.2. CURRENT REQUIREMENTS AND PRACTICES

The Clean Air Act (CAA) (Title 42, Chapter 85 of the U.S. Code) and its subsequent amendments form the basis for the national air pollution control effort. The USEPA is responsible for implementing most aspects of the CAA. The USEPA delegates the enforcement of the federal standards to most states. In Washington, WDOE administers the CAA in the state and its implementing regulations (RCW Chapter 70.94 and WAC 173-400). WDOE has, in turn, delegated to local air agencies the responsibility of regulating stationary emission sources. As indicated above, in Kitsap County PSCAA has this responsibility. In areas that exceed the NAAQS, the CAA requires preparation of a State Implementation Plan (SIP), detailing how the state will attain the standards within mandated time frames. Both the federal and state CAA identify emission reduction goals and compliance dates based on the air quality designation of

the area. PSCAA has developed rules to regulate stationary sources of air pollution in Kitsap County (PSCAA 2013b).

CAA Section 176(c), General Conformity, established certain statutory requirements for federal agencies with proposed federal activities to demonstrate conformity of the proposed activities with each state's SIP for attainment of the NAAQS. In 1993, USEPA issued the final rules for determining air quality conformity. Federal activities must not:

(a) Cause or contribute to any new violation;
(b) Increase the frequency or severity of any existing violation; or
(c) Delay timely attainment of any standard, interim emission reductions, or milestones in conformity to a SIP's purpose of eliminating or reducing the severity and number of NAAQS violations or achieving attainment of NAAQS.

The General Conformity Rule applies only to nonattainment and maintenance areas. The proposed project is located in an attainment area; therefore, the General Conformity Rule does not apply. Hazardous air pollutants (HAPs) include air pollutants that can produce serious illnesses or increased mortality, even in low concentrations. HAPs are compounds that have no established federal ambient standards, but have thresholds established by some states. The USEPA currently regulates 187 HAPs identified in the CAA, while WDOE and PSCAA list about 400 chemicals, including the 187 from the CAA. HAPs are released by sources such as chemical plants, dry cleaners, printing plants, and motor vehicles.

The most common GHGs emitted from natural processes and human activities include carbon dioxide ($CO_2$), methane ($CH_4$), and nitrous oxide ($N_2O$). Each GHG is assigned a global warming potential (GWP). The GWP is the ability of a gas or aerosol to trap heat in the atmosphere. The GWP rating system is standardized to $CO_2$, which has a value of one. For example, $CH_4$ has a GWP of 21, which means that it has a global warming effect 21 times greater than $CO_2$ on an equal-mass basis, and $N_2O$ has a GWP of 310. Total GHG emissions from a source are often reported as a $CO_2e$, which is calculated by multiplying the emission of each GHG by its GWP and adding the results together to produce a single, combined emission total representing all GHGs.

EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management Executive Order,* was signed by President Bush on January 24, 2007. The EO instructs federal agencies to conduct their environmental, transportation, and energy-related activities in an environmentally, economically, and fiscally sound; integrated; continuously improving; efficient; and sustainable manner. The EO requires federal agencies to meet specific goals to improve energy efficiency and reduce GHG emissions by annual energy usage reductions of 3 percent through the end of fiscal year (FY) 2015 or by 30 percent by the end of FY 2015, relative to the baseline energy use of the agency in FY 2003. On October 5, 2009, President Obama signed EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*, to establish an integrated strategy toward sustainability in the federal government and to make reduction of GHGs a priority for federal agencies. On November 1, 2013, President Obama signed EO 13653, *Preparing the United States for the Impacts of Climate Change*, with the goal of preparing the United States for the impacts of climate change by undertaking actions to enhance climate preparedness and resilience. EO 13653 established the Council on Climate Preparedness

and Resilience and the State, Local, and Tribal Leaders Task Force on Climate Preparedness and Resilience. Project considerations related to sea level rise effects from climate change are addressed in Section 3.1

Currently, there are no formally adopted or published NEPA thresholds of significance for GHG emissions. However, on December 18, 2014, the Council on Environmental Quality (CEQ) issued for public comment revised draft guidance for greenhouse gas emissions and climate change impacts. This document provides direction to federal agencies on when and how to consider the effects of GHG emissions and climate change in their evaluation of all proposed federal actions in accordance with NEPA (CEQ 2014). Specifically, if a proposed action emits 25,000 metric tons or more of $CO_2e$ on an annual basis, agencies should consider this as an indicator that a quantitative and qualitative assessment may be meaningful to decision makers and the public. CEQ notes that the 25,000-metric ton reference point may provide a useful, presumptive, threshold for discussion and disclosure of GHG emissions because it has been used in USEPA CAA rulemakings.

The Proposed Actions for the two projects would not require any notice of construction permits. To minimize impacts, however, the project construction contractor would use standard BMPs to control fugitive dust during construction, according to PSCAA Regulations and Section 9.15 and 70.94 RCW of the Washington CAA. These BMPs would include measures such as the following:

- Minimizing the amount of land disturbance at a given time,
- Using water sprays on disturbed earth areas,
- Installing gravel at construction area access points to prevent tracking of soil onto paved roads, and
- Revegetating disturbed areas as soon as practicable.

### 3.16.2. Environmental Consequences

The evaluation of impacts on air quality considers whether conditions resulting from construction and operation of the projects would violate federal, state, or local air pollution standards and regulations. Applicable air pollution standards and regulations that are the basis for determinations of environmental consequences are discussed in Section 3.16.1.2.

PSCAA has not established criteria for assessing the significance of air quality impacts for environmental impact purposes. However, WAC 173-401-200 defines a stationary source as "major" if annual emissions exceed (1) 100 tons per year of a regulated air pollutant (VOCs, CO, nitrogen oxides [$NO_x$], $SO_2$, and $PM_{10}$), (2) 10 tons per year of a single HAP, or (3) 25 tons per year of combined HAPs. There are currently no PSCAA thresholds for $PM_{2.5}$ emissions. Emissions from a project alternative would be considered substantial if they exceed one of these PSCAA thresholds.

From the description of construction duration and activities in Section 2.0, equipment usage per construction activity was formulated using construction schedules of similar projects (see Appendix E) to calculate construction emissions. Construction activities would produce minimal

fugitive dust ($PM_{10}$ and $PM_{2.5}$) emissions and would not produce substantial air quality impacts with regard to levels of HAPs or the other criteria pollutants. Future operations would produce a nominal increase in emissions that would not exceed the PSCAA annual emissions thresholds.

#### 3.16.2.1. APPROACH TO ANALYSIS

Impacts on air quality from construction would occur from combustive emissions due to the use of fossil fuel-powered construction equipment, support vessels for the delivery of piles, worker commuters, and excavation. Emission factors from USEPA NONROAD 2008 (USEPA 2009b) were used to quantify combustive emissions. Emissions from excavation of upland areas would produce minimal fugitive dust. The project alternative emissions would be substantial if they exceed one of the PSCAA thresholds identified in the preceding sections. Although these thresholds are designed to assess the potential for stationary sources to impact a localized area, almost all of the project emissions would occur from mobile sources that would operate and spread impacts over a large portion of NAVBASE Kitsap Bangor.

Reasonable precautions would be implemented to minimize fugitive dust, in accordance with PSCAA Regulations I, Section 9.15 Fugitive Dust Control Measures, and combustive emissions from pile driving or barge deliveries, and no temporary construction permit would be required to be obtained from PSCAA. In addition, none of these proposed alternatives would require an NOC approval application, GHG reporting to the USEPA, or modification of the NAVBASE Kitsap Bangor synthetic minor permit. Visible emission limits and work practices would be observed and implemented during the operation of all stationary point sources, cranes, pile hammers, or barge deliveries.

#### 3.16.2.2. LWI PROJECT ALTERNATIVES

##### 3.16.2.2.1. LWI ALTERNATIVE 1: NO ACTION

Under the No Action Alternative, none of the proposed construction activities would occur at the project site and overall operations would not change from current levels. Therefore, the No Action Alternative would not produce any impacts on air quality.

##### 3.16.2.2.2. LWI ALTERNATIVE 2: PILE-SUPPORTED PIER

CONSTRUCTION

Table 3.16–3 summarizes the total emissions (combustion, fugitive dust emissions, and construction worker commuting emissions) of criteria pollutants that would occur from construction of LWI Alternative 2 within the project region. The data represent the total construction emissions for the entire project including Phase 1 construction of the Pile Supported Pier and Phase 2 mesh/grate installation. Emissions from these combined activities would be substantially lower (e.g., at least by 10 times) than any PSCAA threshold as discussed in Section 3.16.2.1 above. Therefore, construction of LWI Alternative 2 would not violate federal, state, or local air pollution standards and regulations.

LWI Alternative 2 would emit HAPs, as subsets of VOC and $PM_{10}$ emissions, which could potentially affect public health. However, Alternative 2 would generate a combined total of

4.22 tons of VOC and $PM_{10}$ emissions, representing a worst-case surrogate for HAPs emissions, which is lower than the 10 tons per year for a single HAP that PSCAA uses as a nominal threshold for major emissions (Table 3.16–3). As a result, HAPs emissions from construction of LWI Alternative 2 would be below those expected to affect public health.

**Table 3.16–3. Total Air Emissions from Construction of LWI Alternative 2**

| Phase/Activity | Total Air Pollutant Emissions (tons) | | | | | |
|---|---|---|---|---|---|---|
| | VOC | CO | $NO_x$ | $SO_x$ | $PM_{10}$ | $PM_{2.5}$ |
| *Phase 1* | | | | | | |
| Construction Activities | 0.77 | 5.55 | 5.91 | 0.27 | 0.48 | 0.42 |
| Construction Commuters | 1.96 | 16.73 | 10.08 | 0.01 | 0.52 | 0.01 |
| *Phase 2* | 0.16 | 0.56 | 2.50 | 0.40 | 0.33 | 0.31 |
| **Total Emissions** | **2.89** | **22.84** | **18.49** | **0.68** | **1.33** | **0.75** |
| **PSCAA Thresholds** | **100** | **100** | **100** | **100** | **100** | **N/A** |

Note: See Appendix E for a detailed presentation of emissions calculations.

CO = carbon monoxide; $NO_x$ = nitrogen oxides; $PM_{10}$ = particulate matter less than 10 microns in diameter; $PM_{2.5}$ = particulate matter less than 2.5 microns in diameter; PSCAA = Puget Sound Clean Air Agency; $SO_x$ = sulfur oxides; VOC = volatile organic compound

LWI Alternative 2 construction activities would produce short-term emissions of GHGs. The GHGs emitted would include $CO_2$, $CH_4$, and $N_2O$. Table 3.16–4 shows the total GHG emissions that would occur from proposed LWI Alternative 2 construction activities. As indicated in the Regulatory Overview discussion above, CEQ recently issued revised draft guidance explaining how federal agencies should analyze the environmental impacts of GHG emissions and climate change when they describe the environmental impacts of a proposed action under NEPA. CEQ proposes a GHG emissions level of 25,000 metric tons per year as a useful indicator that a project may meet the foregoing "meaningful" standard for public disclosure. The revised draft guidance clarifies that the emissions level of 25,000 metric tons per year is neither an absolute standard nor an indicator of a level of emissions that may "significantly" affect the quality of the human environment, as that term is defined in CEQ's NEPA regulations.

In the absence of an adopted or science-based NEPA significance threshold or conformity *de minimis* levels for GHGs, this EIS compares GHG emissions that would occur from construction activity to the currently available U.S. GHG emissions inventory for 2012 to determine the relative contribution due to GHG emissions from proposed project alternatives. These data show that the ratio of annual $CO_2e$ emissions from construction of LWI Alternative 2 to the $CO_2e$ emissions associated with the net U.S. sources in 2012 is approximately 1,978 metric tons/6,526 million metric tons (USEPA 2014b), or about 0.00003 percent of the U.S. $CO_2e$ emissions inventory. Since GHG emissions from LWI Alternative 2 would equate to minimal amounts of the U.S. inventory, they would not substantially contribute to global climate change.

**Table 3.16–4. Total GHG Emissions from Construction of LWI Alternative 2**

| Phase/Activity | Total GHG Emissions (metric tons) | | | |
|---|---|---|---|---|
| | $N_2O$ | $CH_4$ | $CO_2$ | $CO_2e$ |
| *Phase 1* | | | | |
| Construction Activities | 0.03 | 0.03 | 406.1 | 417.6 |
| Construction Commuters | 0.02 | 0.08 | 1,284.3 | 1,291.5 |
| *Phase 2* | 0.05 | 0.01 | 253.7 | 268.5 |
| **Total Emissions** | **0.10** | **0.11** | **1,944.2** | **1,977.5** |
| ***U.S. 2012 Annual GHG Emissions (million metric tons)*** | | | | **6,526** |
| ***Proposed Emissions as a percent of U.S. GHG Emissions*** | | | | **0.00003** |

Note: See Appendix E for a detailed presentation of emissions calculations.
$CH_4$ = methane; $CO_2$ = carbon dioxide; $CO_2e$ = carbon dioxide equivalent; GHG = greenhouse gas; $N_2O$ = nitrous oxide

OPERATION/LONG-TERM IMPACTS

Operation of LWI Alternative 2 would not produce any substantial changes to existing operational emissions at NAVBASE Kitsap Bangor. Therefore, operation of LWI Alternative 2 would not violate federal, state, or local air pollution standards and regulations.

3.16.2.2.3. LWI ALTERNATIVE 3: PSB MODIFICATIONS (PREFERRED)

Impacts on air quality from construction of LWI Alternative 3 would be lower than those for Alternative 2 and would entail installation of far fewer piles than Alternative 2. Installation of the PSB units and their anchors would result in lower emissions than pile driving and other aspects of Alternative 2 pier construction. The shoreline abutment and other upland components of Alternative 3 would be the same as for Alternative 2.

Table 3.16–5 summarizes the total emissions of criteria pollutants that would occur from construction of Alternative 3 within the project region. As shown in Table 3.16–5, these combined activities would not exceed any PSCAA threshold.

**Table 3.16–5. Total Air Emissions from Construction of LWI Alternative 3**

| Activity | Total Air Pollutant Emissions (tons) | | | | | |
|---|---|---|---|---|---|---|
| | VOC | CO | $NO_x$ | $SO_x$ | $PM_{10}$ | $PM_{2.5}$ |
| Construction Activities | 0.66 | 5.24 | 3.82 | 0.04 | 0.29 | 0.24 |
| Construction Commuters | 1.96 | 16.73 | 10.08 | 0.01 | 0.52 | 0.01 |
| **Total Emissions** | **2.63** | **21.97** | **13.90** | **0.06** | **0.81** | **0.26** |
| **PSCAA Thresholds** | **100** | **100** | **100** | **100** | **100** | **N/A** |

Note: See Appendix E for a detailed presentation of emissions calculations.
CO = carbon monoxide; $NO_x$ = nitrogen oxides; $PM_{10}$ = particulate matter less than 10 microns in diameter; $PM_{2.5}$ = particulate matter less than 2.5 microns in diameter; PSCAA = Puget Sound Clean Air Agency; $SO_x$ = sulfur oxides; VOC = volatile organic compound

LWI Alternative 3 would emit HAPs that could potentially impact public health. However, Alternative 3 would generate a combined total of 3.44 tons of VOC and $PM_{10}$ emissions, which

is lower than the 10 tons per year for a single HAP (Table 3.16–5). As a result, HAPs emissions from construction of LWI Alternative 3 would be below those expected to affect public health.

Similar to LWI Alternative 2, Alternative 3 would produce short-term emissions of GHGs, as shown in Table 3.16–6. Because GHG emissions from Alternative 3 would equate to minimal amounts of the U.S. inventory (0.00003 percent), they would not substantially contribute to global climate change.

**Table 3.16–6. Total GHG Emissions from Construction of LWI Alternative 3**

| Activity | Total GHG Emissions (metric tons) | | | |
|---|---|---|---|---|
| | $N_2O$ | $CH_4$ | $CO_2$ | $CO_2e$ |
| Construction Activities | 0.02 | 0.02 | 414.8 | 420.7 |
| Construction Commuters | 0.02 | 0.08 | 1,284.3 | 1,291.5 |
| **Total GHG Emissions** | **0.04** | **0.10** | **1,699.1** | **1,712.2** |
| ***U.S. 2012 Annual GHG Emissions (million metric tons)*** | | | | **6,526** |
| ***Proposed Emissions as a percent of U.S. GHG Emissions*** | | | | **0.00003** |

Note: See Appendix E for a detailed presentation of emissions calculations.
$CH_4$ = methane; $CO_2$ = carbon dioxide; $CO_2e$ = carbon dioxide equivalent; GHG = greenhouse gas; $N_2O$ = nitrous oxide

OPERATION/LONG-TERM IMPACTS

Similar to LWI Alternative 2 above, operation of Alternative 3 would not produce any substantial changes to existing operational emissions at NAVBASE Kitsap Bangor.

3.16.2.2.4. SUMMARY OF LWI IMPACTS

Impacts on air quality associated with the construction and operation phases of the LWI project alternatives, along with mitigation and consultation and permit status, are summarized in Table 3.16–7.

**Table 3.16–7. Summary of LWI Impacts on Air Quality**

| Alternative | Environmental Impacts on Air Quality |
|---|---|
| LWI Alternative 1: No Action | No impact. |
| LWI Alternative 2: Pile-Supported Pier | *Construction:* Emissions would not exceed the thresholds for PSCAA.<br>*Operation/Long-term Impacts:* None. |
| LWI Alternative 3: PSB Modifications (Preferred) | *Construction:* Emissions would not exceed the thresholds for PSCAA. Compared to LWI Alternative 2, there would be slightly lower emissions.<br>*Operation/Long-term Impacts:* None. |
| **Mitigation:** No mitigation measures are necessary beyond the proposed BMPs. | |
| **Consultation and Permit Status:** No consultations or permits are required. | |

BMP = best management practices; PSCAA = Puget Sound Clean Air Agency

### 3.16.2.3. SPE PROJECT ALTERNATIVES

#### 3.16.2.3.1. SPE ALTERNATIVE 1: NO ACTION

Under the SPE No Action Alternative, none of the proposed construction activities would occur at the project site and overall operations would not change from current levels. Therefore, the SPE No Action Alternative would not produce any impacts on air quality.

#### 3.16.2.3.2. SPE ALTERNATIVE 2: SHORT PIER (PREFERRED)

CONSTRUCTION

The total emissions (combustion, fugitive dust emissions, and construction worker commuting emissions) of criteria pollutants that would occur from construction of SPE Alternative 2 within the project region are summarized in Table 3.16–8. These data represent the total construction emissions for the entire project including construction of the Pier Services and Compressor Building and the Waterfront Ship Support Building. The data in Table 3.16–8 show that the combined SPE Alternative 2 activities would be substantially less (at least 8 times lower) than any PSCAA threshold.

SPE Alternative 2 would emit HAPs, as subsets of VOC and $PM_{10}$ emissions, which could potentially affect public health. However, the data in Table 3.16–8 show that SPE Alternative 2 would generate a combined total of 4.4 tons of VOC and $PM_{10}$ emissions, representing a worst-case surrogate for HAPs, which is lower than the 10 tons per year for a single HAP. As a result, HAPs emissions from construction of SPE Alternative 2 would be below those expected to affect public health, following the approach in Section 3.16.2.1 above.

**Table 3.16–8. Total Air Emissions from Construction of SPE Alternative 2**

| Activity | Total Air Pollutant Emissions (tons) | | | | | |
|---|---|---|---|---|---|---|
| | VOC | CO | $NO_x$ | $SO_x$ | $PM_{10}$ | $PM_{2.5}$ |
| Overwater Construction | 0.61 | 1.5 | 13.64 | 1.09 | 0.94 | 0.89 |
| Pier Services and Compressor Bldg. | 0.00 | 0.01 | 0.02 | 0.00 | 0.00 | 0.00 |
| Waterfront Ship Support Building | 0.05 | 0.30 | 0.47 | 0.10 | 0.10 | 0.09 |
| Parking Lot | 0.01 | 0.03 | 0.09 | 0.02 | 0.02 | 0.02 |
| Construction Truck and Vehicle Trips | 1.08 | 8.84 | 5.87 | 0.02 | 0.30 | 0.29 |
| Construction Commuters | 1.02 | 8.68 | 5.23 | 0.01 | 0.27 | 0.01 |
| **Total Emissions** | **2.77** | **19.36** | **25.31** | **1.24** | **1.63** | **1.31** |
| **PSCAA Thresholds** | **100** | **100** | **100** | **100** | **100** | **N/A** |

Note: See Appendix E for a detailed presentation of emissions calculations.

CO = carbon monoxide; $NO_x$ = nitrogen oxides; $PM_{10}$ = particulate matter less than 10 microns in diameter; $PM_{2.5}$ = particulate matter less than 2.5 microns in diameter; PSCAA = Puget Sound Clean Air Agency; $SO_x$ = sulfur oxides; VOC = volatile organic compound

SPE Alternative 2 would produce short-term emissions of GHGs, as shown in Table 3.16–9. Because GHG emissions from SPE Alternative 2 relative to the U.S. inventory (USEPA 2014b) would be minimal (0.00003 percent), they would not contribute substantially to global climate change.

**Table 3.16–9. Total GHG Emissions from Construction of SPE Alternative 2**

| Activity | Total GHG Emissions (metric tons) | | | |
|---|---|---|---|---|
| | $N_2O$ | $CH_4$ | $CO_2$ | $CO_2e$ |
| Overwater Construction | 0.11 | 0.05 | 377.5 | 412.0 |
| Pier Services and Compressor Bldg. | 0.00 | 0.00 | 2.9 | 3.1 |
| Waterfront Ship Support Building | 0.01 | 0.00 | 73.1 | 76.7 |
| Parking Lot | 0.00 | 0.00 | 15.6 | 16.4 |
| Construction Truck and Vehicle Trips | 0.01 | 0.04 | 743.02 | 747.4 |
| Construction Commuters | 0.01 | 0.04 | 666.0 | 669.7 |
| **Total GHG Emissions** | 0.14 | 0.14 | 1,878.13 | 1,925.31 |
| ***U.S. 2012 Annual GHG Emissions (million metric tons)*** | | | | **6,526** |
| ***Proposed Emissions as a percent of U.S. GHG Emissions*** | | | | **0.00003** |

Note: See Appendix E for a detailed presentation of emissions calculations.
$CH_4$ = methane; $CO_2$ = carbon dioxide; $CO_2e$ = carbon dioxide equivalent; GHG = greenhouse gas; $N_2O$ = nitrous oxide

OPERATION/LONG-TERM IMPACTS

Two new facilities totaling 52,100 square feet (4,840 square meters) would be added to NAVBASE Kitsap Bangor as part of the operational changes for SPE Alternative 2. This alternative would produce an increase of less than 1 ton of combined criteria pollutants from the new facilities due to the use of small heating and cooling equipment, generators, or electricity usage (Appendix E). Maintenance of the SPE would include routine inspections, repair, and replacement of facility components as required. These activities would not result in substantial emissions or air quality impacts.

#### 3.16.2.3.3. SPE ALTERNATIVE 3: LONG PIER

CONSTRUCTION

Impacts on air quality from construction of SPE Alternative 3 would be slightly greater than those for SPE Alternative 2 since this alternative would include the construction of a pier that is twice as long.

Table 3.16–10 summarizes the total emissions of criteria pollutants that would occur from construction of SPE Alternative 3 within the project region. These data show that the emissions from these combined activities would be substantially less than any PSCAA threshold.

SPE Alternative 3 would emit HAPs that could potentially affect public health. However, the data in Table 3.16–10 show that SPE Alternative 3 would generate a combined total of 5.46 tons of VOC and $PM_{10}$ emissions, which is lower than the 10 tons per year for a single HAP. As a

result, HAPs emissions from construction of SPE Alternative 3 would be below those expected to affect public health.

**Table 3.16–10. Total Air Emissions from Construction of SPE Alternative 3**

| Activity | Total Air Pollutant Emissions (tons) | | | | | |
|---|---|---|---|---|---|---|
| | VOC | CO | $NO_x$ | $SO_x$ | $PM_{10}$ | $PM_{2.5}$ |
| Overwater Construction | 1.01 | 2.39 | 23.16 | 1.74 | 1.52 | 1.43 |
| Pier Services and Compressor Bldg. | 0.04 | 0.16 | 0.41 | 0.08 | 0.07 | 0.07 |
| Waterfront Ship Support Building | 0.05 | 0.30 | 0.47 | 0.10 | 0.09 | 0.10 |
| Parking Lot | 0.01 | 0.03 | 0.09 | 0.02 | 0.02 | 0.02 |
| Construction Truck and Vehicle Trips | 1.08 | 8.84 | 5.87 | 0.02 | 0.30 | 0.29 |
| Construction Commuters | 1.02 | 8.68 | 5.23 | 0.01 | 0.27 | 0.01 |
| **Total Emissions** | **3.20** | **20.40** | **35.22** | **1.97** | **2.26** | **1.92** |
| **PSCAA Thresholds** | **100** | **100** | **100** | **100** | **100** | **N/A** |

Note: See Appendix E for a detailed presentation of emissions calculations.

CO = carbon monoxide; $NO_x$ = nitrogen oxides; $PM_{10}$ = particulate matter less than 10 microns in diameter; $PM_{2.5}$ = particulate matter less than 2.5 microns in diameter; PSCAA = Puget Sound Clean Air Agency; $SO_x$ = sulfur oxides; VOC = volatile organic compound

SPE Alternative 3 would produce slightly higher short-term emissions of GHGs than SPE Alternative 2, as shown in Table 3.16–11. However, because GHG emissions from SPE Alternative 3 relative to the U.S. 2012 inventory would be minimal (0.00003 percent), they would not contribute substantially to global climate change.

**Table 3.16–11. Total GHG Emissions from Construction of SPE Alternative 3**

| Activity | Total GHG Emissions (metric tons) | | | |
|---|---|---|---|---|
| | $N_2O$ | $CH_4$ | $CO_2$ | $CO_2e$ |
| Overwater Construction | 0.17 | 0.09 | 539.2 | 593.6 |
| Pier Services and Compressor Bldg. | 0.06 | 0.01 | 0.0 | 18.5 |
| Waterfront Ship Support Building | 0.08 | 0.01 | 0.0 | 26.5 |
| Parking Lot | 0.02 | 0.00 | 0.0 | 5.1 |
| Construction Truck and Vehicle Trips | 0.01 | 0.04 | 743.02 | 747.4 |
| Construction Commuters | 0.01 | 0.04 | 666.0 | 669.7 |
| **Total GHG Emissions** | **0.35** | **0.19** | **1948.14** | **2,060.85** |
| ***U.S. 2012 Annual GHG Emissions (million metric tons)*** | | | | **6,526** |
| ***Proposed Emissions as a percent of U.S. GHG Emissions*** | | | | **0.00003** |

Note: See Appendix E for a detailed presentation of emissions calculations.

$CH_4$ = methane; $CO_2$ = carbon dioxide; $CO_2e$ = carbon dioxide equivalent; GHG = greenhouse gas; $N_2O$ = nitrous oxide

OPERATION/LONG-TERM IMPACTS

Similar to SPE Alternative 2 above, operation of SPE Alternative 3 would result in only a nominal increase in criteria pollutants (Appendix E) that would not violate federal, state, or local air pollution standards and regulations.

3.16.2.3.4. SUMMARY OF SPE IMPACTS

Impacts on air quality associated with the construction and operation phases of the SPE project alternatives, along with mitigation and consultation and permit status, are summarized in Table 3.16–12.

**Table 3.16–12. Summary of SPE Impacts on Air Quality**

| Alternative | Environmental Impacts on Air Quality |
|---|---|
| SPE Alternative 1: No Action | No impact. |
| SPE Alternative 2: Short Pier (Preferred) | *Construction:* Emissions would not exceed the thresholds for PSCAA.<br>*Operation/Long-term Impacts:* Less than significant. |
| SPE Alternative 3: Long Pier | *Construction:* Emissions would not exceed the thresholds for PSCAA. Compared to SPE Alternative 2, there would be somewhat higher, but still minimal changes in equipment and mobile exhaust emissions from construction.<br>*Operation/Long-term Impacts:* Less than significant. |
| **Mitigation:** No mitigation measures are necessary beyond the proposed BMPs. | |
| **Consultation and Permit Status:** No consultations or permits are required. | |

BMP = best management practices; PSCAA = Puget Sound Clean Air Agency

3.16.2.4. COMBINED IMPACTS OF LWI AND SPE PROJECTS

Table 3.16-3 presents the combined emissions of the LWI and SPE projects, based on the LWI and SPE alternatives with the greatest emissions. The construction periods for the two projects are not expected to overlap. Therefore, annual emissions are expected to be lower than shown in the table, which represents a worst-case scenario. In any case, emissions from these combined projects would be lower than any PSCAA threshold.

**Table 3.16–13. Combined Air Emissions of LWI and SPE (Worst-Case Alternatives)**

| Project Alternative | Total Air Polluant Emissions (tons) | | | | | |
|---|---|---|---|---|---|---|
| | VOC | CO | $NO_x$ | $SO_x$ | $PM_{10}$ | $PM_{2.5}$ |
| LWI (Alternative 2) | 2.89 | 22.84 | 18.49 | 0.68 | 1.33 | 0.75 |
| SPE (Alternative 3) | 3.20 | 20.40 | 35.22 | 1.97 | 2.26 | 1.92 |
| **Total Emissions** | **6.09** | **43.24** | **53.71** | **2.65** | **3.59** | **2.67** |
| **PSCAA Thresholds** | **100** | **100** | **100** | **100** | **100** | **N/A** |

Note: See Appendix E for a detailed presentation of emissions calculations.

CO = carbon monoxide; $NO_x$ = nitrogen oxides; $PM_{10}$ = particulate matter less than 10 microns in diameter; $PM_{2.5}$ = particulate matter less than 2.5 microns in diameter; PSCAA = Puget Sound Clean Air Agency; $SO_x$ = sulfur oxides; VOC = volatile organic compound

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