3.5 Air Quality

Air quality refers to the cleanliness of the atmosphere. Clean air is vital to human health and is a resource protected by federal, state, and local regulations. Pollutants in the air not only can negatively affect humans but can also affect plants, animals, and manmade structures. Ambient (outdoor) air quality is affected by climate, topography, meteorological conditions, and airborne pollutants produced by natural or artificial sources. NEPA and SEPA regulations require that the effects of a proposed project on air quality are evaluated in an EIS.

What is the Air Quality Technical Memorandum?

This section was derived from Appendix G, Air Quality Technical Memorandum, which details the following information:

- Air quality regulations
- Study area air quality
- Proposed project potential effects on air quality

Has any new information has been developed since the Draft EIS?

No new issues related to air quality were introduced, but WSDOT updated the analysis in this section for project construction and operation emissions. These changes reflect the revised truck trip estimates since vehicle emissions contribute to these emissions calculations.

What laws and regulations protect air quality?

Both the federal Clean Air Act (Title 42 USC Section 7401 et seq. 1970) and its amendments and the Washington State Clean Air Act (RCW 70.94) regulate air quality. The EPA, Ecology, the Olympic Region Clean Air Agency, and the Puget Sound Clean Air Agency enforce regulations developed to protect air quality in the proposed pontoon construction areas.

Transportation conformity is an analytical process required for all federally funded transportation projects located in nonattainment or maintenance areas (see sidebar). Under the 1990 federal Clean Air Act Amendments, the U.S. Department of Transportation cannot fund, authorize, or approve federal actions to support programs or projects that do not conform to the State Implementation Plan—the state's plan for meeting and maintaining compliance with the National Ambient Air Quality Standards (NAAQS)—for achieving the goals of the Clean Air Act. Conformity with the Clean Air Act takes place on two levels: first at the regional level and second at the project level; the proposed project must conform at both levels to be approved.

What is attainment?

An area considered to have air quality as good as or better than the NAAQS for criteria pollutants designated in the Clean Air Act is said to be in attainment. An area can be in attainment for one pollutant but still be in nonattainment for another.

What is a maintenance area?

This designation indicates that the area was previously classified as nonattainment but was reclassified due to improvements in air quality and measured concentrations below the standards.

What are the National Ambient Air Quality Standards?

The federal Clean Air Act established two types of national air quality standards: primary and secondary. **Primary standards** set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. **Secondary standards** set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings.

What is the air quality in the study area?

To identify current air quality in the project vicinity, WSDOT coordinated with Puget Sound Regional Council, Olympic Region Clean Air Agency, Ecology, FHWA, and EPA to obtain current

regional air quality information. Air quality is a resource without boundaries, so WSDOT did not define a distinct study area. In general, actions that affect air quality do so on a regional basis because pollutants released to the air are subject to dilution and mixing throughout the entire airshed.

To talk about air quality, it is first important to understand how air quality is regulated and how it is measured. Several regulations, standards, requirements, and criteria apply to air quality in Washington. The EPA NAAQS sets limits on criteria pollutant concentrations, which are the six pollutants (listed in Exhibit 3.5-1) for which the EPA has identified and set standards to protect human health under the federal Clean Air Act. Concentrations of the criteria pollutants must not exceed the NAAQS.

EXHIBIT 3.5-1
Summary of Ambient Air Quality Standards in the Study Area

Pollutant	Standard	Averaging Period
Nitrogen dioxide	0.053 ppm	Annual
Carbon monoxide	9 ppm	8 hours
	35 ppm	1 hour
Ozone	0.075 ppm	8 hours
Lead	1.5 µg/m³	Quarterly
Sulfur dioxide	0.02 ppm	Annual
	0.10 ppm	24 hours
	0.05 ppm	3 hours
	0.40 ppm	1 hour
Particulate matter (PM_{10})	150 µg/m³	24 hours
Particulate matter ($PM_{2.5}$) [a]	15 µg/m³	Annual
	35 µg/m³	24 hours

Source: EPA (2009a), WAC 173-474-100, and Washington State Standards (RCW 70.94).
[a] The 24-hour $PM_{2.5}$ standard was reduced to 35 µg/m³ from 65 µg/m³ (effective December 17, 2006).

$\mu g/m^3$ microgram(s) per cubic meter
PM_{10} particulate matter less than or equal to 10 microns in diameter
$PM_{2.5}$ particulate matter less than or equal to 2.5 microns in diameter
ppm part(s) per million

The EPA, Ecology, Olympic Region Air Agency, and the Puget Sound Clean Air Agency operate air quality monitors to assess the levels of regulated pollutants and verify continued compliance with the NAAQS. These agencies have adopted state and local ambient air quality standards that are equivalent to, or more stringent than, EPA's NAAQS.

Exhibit 3.5-1 summarizes the ambient air quality standards applicable in the region. Currently, there are no established standards for toxic air pollutants defined by the Clean Air Act (of which Mobile Source Air Toxics [MSATs] from moving vehicles are a subset). The air quality in the study area region is currently in attainment with the NAAQS. WSDOT collected monitoring data for 2004 through 2008 from pollutant monitoring stations in the project vicinity of both Grays Harbor and Tacoma.

CTC Facility

Air quality in the Tacoma area has changed since the area began growing in the nineteenth century through today. The presence of industrial activities in the area, such as shipping docks and vessels, lumber mills, paper mills, and a smelter (The American Smelting And Refining Company), during the nineteenth and twentieth centuries affected air quality in the area because air quality was unregulated during much of this time. The condition of air quality in the vicinity of the CTC facility has changed in the last 40 years with the introduction of air quality standards and regulations for industry and transportation.

In 1978, EPA classified the central Puget Sound region as a nonattainment area for carbon monoxide and ground-level ozone. In 1987, EPA also classified the Tacoma tideflats industrial area, where the site is located, as a nonattainment area for particulate matter less than 10 microns in diameter (PM_{10}). Carbon dioxide and ozone levels improved over time and, in 1996, having met the federal standards for several years, EPA redesignated the region as a maintenance area for carbon monoxide and ozone. Pierce County is currently designated a maintenance area for carbon monoxide. In June 2005, EPA established a new standard for ozone and designated the region as unclassifiable/attainment for the new standard, which still indicates improvement for this area.

The PM_{10} levels have also improved over time, and EPA has designated Pierce County a maintenance area for this pollutant since May 2001. EPA also recognizes particulate matter of smaller size as a potential health risk and has set a standard for $PM_{2.5}$ (particulate matter less than 2.5 microns in size). EPA has most recently designated the region as meeting air quality standards (attainment) for $PM_{2.5}$, but at area monitoring stations in Tacoma, the maximum 24-hour $PM_{2.5}$ concentration has exceeded the NAAQS. If the trends of $PM_{2.5}$ concentrations exceeding the NAAQS continue, EPA could redesignate Pierce County as nonattainment for $PM_{2.5}$, thereby forcing more stringent constraints on transportation projects and economic growth.

Because of the maintenance classification for some criteria pollutants in the project vicinity, project effects at the CTC site would need to comply with transportation conformity requirements for carbon monoxide and PM_{10}. Pierce County is in attainment for all other criteria pollutants. The closest monitoring sites for criteria pollutants other than PM_{10} and $PM_{2.5}$ are located in Seattle and have not measured an exceedance for any NAAQS in the past 5 years.

Grays Harbor Build Alternatives

Grays Harbor County is in attainment for all criteria pollutants because it does not have a history of exceeding the NAAQS. This is a result of the area having low population density (as compared with the Puget Sound region) and, therefore, less motor vehicle emissions and industrial source emissions. Also, the prevailing wind from the Pacific Ocean helps to disperse local emissions. Outdoor burning is of particular concern in the Olympic Region because it creates smoke that includes fine particulate matter and contributes to ozone pollution. The Olympic Region Clean Air Agency operates monitoring equipment to measure PM_{10}, $PM_{2.5}$, and ozone. The Olympic Region Clean Air Agency might declare a burn ban when weather and atmospheric conditions warrant the ban to help protect air quality (ORCAA 2009).

The closest monitoring station to the proposed Grays Harbor build alternative sites is in Aberdeen; this station measures $PM_{2.5}$ concentrations. Monitored $PM_{2.5}$ concentrations were below the NAAQS for the last 5 years. Monitoring data for PM_{10} were obtained from a station located at 1900 College Street SE in Lacey, about 50 miles east of both sites. No stations near the two build alternative sites monitor carbon monoxide, ozone, nitrogen dioxide, and sulfur dioxide concentrations. The closest monitoring stations for these pollutants are located in Seattle. Concentration data from all monitoring sites reviewed were below the NAAQS for the last 5 years.

How did WSDOT evaluate direct effects on air quality?

WSDOT quantified construction emissions for each construction year from 2011 through 2012 for both build alternatives. Analyses were based on conceptual construction details (activities, areas, sequencing, and schedule). Emissions investigated were fugitive dust, vehicle and equipment exhaust, and emissions from asphalt paving. Exhaust from construction equipment was estimated using EPA's NONROAD Model methodology. WSDOT estimated fugitive dust emissions from the proposed onsite concrete batch plant using methodology suggested by the Bay Area Air Quality Management District's Permit Handbook (2008). Particulate emissions from the batch plant operation and storage

What is fugitive dust?

Fugitive dust is a type of nonpoint source air pollution—small airborne particles that do not originate from a specific point, such as a smoke stack. Common sources of fugitive dust are unpaved roads and construction sites.

piles were based on project concrete volume estimates. During site operation, exhaust emission factors of haul trucks and worker commute vehicles were estimated by calculating the number of truck trips and workers and the estimated round trip distances for the vehicles. Paving the parking area would result in VOCs emissions. The default emission factor of 2.62 pounds per acre in URBEMIS2007 (Air Resources Board 2007) was used to calculate VOC emissions for a 5-acre parking area.

Pontoon towing-related emissions were calculated for each site, assuming the maximum number of pontoons that would be produced at that site. To estimate criteria pollutant emissions during pontoon transport, WSDOT applied these assumptions (also used for the calculations in Section 3.6, Energy and Climate Change):

- The average towing speed for transporting pontoons would be 3 miles per hour.
- One tugboat would tow each pontoon from its casting basin to the moorage location.
- The distances from the casting basins to the temporary moorage locations would be the following:
  - CTC site: 25 miles (to an existing marine berth in Puget Sound)
  - Anderson & Middleton site: 5 miles (to a Grays Harbor open-water location)
  - Aberdeen Log Yard site: 8 miles (to Grays Harbor open-water location)

Tug emission factors were determined from the EPA document *Analysis of Commercial Marine Vessels Emissions and Fuel Consumption Data* (EPA 2000).

What air pollutants would the project generate?

The major airborne pollutants of interest for transportation-related projects are carbon monoxide, particulate matter, and oxides of nitrogen—some of the criteria pollutants discussed above. VOCs, also of interest for transportation-related projects, are regulated as precursors to ozone under the ozone ambient air quality standard. Lead and sulfur dioxide are not pollutants of concern for transportation-related projects and therefore, are not addressed in this analysis.

Local and national studies address MSATs in vehicle exhaust, particularly generated from diesel-fueled vehicles. MSATs are known or suspected to cause cancer or other serious health effects. Another substance generated by fuel combustion in motor vehicles is carbon dioxide, one of several pollutants classified as a greenhouse gas. More

detailed discussions of greenhouse gas are presented in Section 3.6, Energy and Climate Change, and Appendix H, Energy Technical Memorandum.

How would construction of the casting basin directly affect air quality?

Construction emissions would come from equipment used during site preparation and casting basin construction; these activities would involve using diesel- and gasoline-powered equipment. Emissions and air quality effects associated with each alternative are presented in the following sections.

During casting basin construction, heavy-duty construction equipment would generate exhaust emissions containing pollutants. Earth-moving activities would generate fugitive dust, and employee and supply truck vehicle trips to and from the site would generate exhaust emissions. Asphalt paving also would be a source of VOC emissions. Excavating fill material to construct the facility at either site would release particulates into the air at borrow sites distant from the casting basin construction zone.

Trucks hauling casting basin construction materials and wastes to and from the casting basin facility would release exhaust emissions along haul routes. The air quality effects of the two Grays Harbor build alternatives would vary only by the number of truck trips to and from each site during construction. Air emissions resulting from construction at the Aberdeen Log Yard site would be slightly higher than at the Anderson & Middleton site because more truck trips would be required for casting basin construction (due to a higher volume of dredged sediments). If a concrete batch plant is constructed onsite or nearby, then an air permit from the Olympic Region Clean Air Agency would be required.

An adverse effect to air quality is a violation of the NAAQS. Current project design indicates that the build alternatives would not cause substantial regional effects on air quality and, therefore, would meet regional conformity requirements; that is, the project is in compliance with the NAAQS. Any local effects on air quality during casting basin facility construction would be temporary. Based on conceptual construction details and estimated construction emissions, construction activities are not expected to violate or exceed any NAAQS for any criteria pollutants.

MSAT emissions would increase proportionally due to truck traffic hauling materials to and from the casting basin facility site. This increase would be temporary, and MSAT emissions associated with

project construction and operation would not be expected to substantially affect air quality. Emissions from truck trips are a small percentage of the total emissions estimate, which is dominated by construction equipment exhaust. The increase in traffic at the highest volume intersection in the study area (SR 12 and Tyler Street) would be approximately 8 percent during construction in 2011 and approximately 3 percent during operations in 2011-2014.Although the increase in MSAT emission would vary by intersection, this intersection demonstrates that the temporary increase in MSAT emissions would be on the order of 5 percent in the study area for each alternative. According to current FHWA guidance (FHWA 2006), an increase of 5 percent would not be expected to cause an appreciable difference in the overall MSAT emissions. Exhibit 3.5-2 summarizes the estimated annual emissions of criteria pollutants at the Aberdeen Log Yard site, and Exhibit 3.5-3 summarizes the estimated annual emissions of criteria pollutants at the Anderson & Middleton site.

EXHIBIT 3.5-2
Aberdeen Log Yard Alternative (Preferred Alternative) Site Construction and Operation Emissions[a]

Year	Nitrogen Dioxide (tons per year)	Carbon Monoxide (tons per year)	Sulfur Dioxide (tons per year)	Volatile Organic Compound (tons per year)	Particulate Matter (PM_{10}) (tons per year)	Particulate Matter ($PM_{2.5}$) (tons per year)
2011 Construction	764	315	157	55	79	69
2012 Construction	578	415	102	77	93	77
2012 Operation	2.7	1.8	0.4	0.2	0.2	0.2
2012 Total[b]	**581**	**417**	**102**	**77**	**93**	**77**
2013 Operation	105	48	12	8.1	7.3	6.7
2013 Total[b]	**105**	**48**	**12**	**8**	**7**	**7**
2014 Operation	32	14	3.4	2.4	2.4	2.2
Project Total[b]	**1,483**	**795**	**274**	**142**	**183**	**155**

[a]Results should not be compared to the NAAQS. Emission rates are not directly comparable to NAAQS concentrations.

[b]Totals are rounded to the nearest whole number.

EXHIBIT 3.5-3
Anderson & Middleton Alternative Site Construction and Operation Emissions[a]

Year	Nitrogen Dioxide (tons per year)	Carbon Monoxide (tons per year)	Sulfur Dioxide (tons per year)	Volatile Organic Compound (tons per year)	Particulate Matter (PM_{10}) (tons per year)	Particulate Matter ($PM_{2.5}$) (tons per year)
2011 Construction	768	315	157	55	79	69
2012 Construction	581	416	102	77	93	77
2012 Operation	2.7	1.8	0.4	0.2	0.2	0.2
2012 Total[b]	**584**	**418**	**102**	**77**	**93**	**77**
2013 Operation	107	49	12	8.2	7.4	6.7
2013 Total[b]	**107**	**49**	**12**	**8**	**7**	**7**
2014 Operation	32	14	3.4	2.5	2.4	2.2
Project Total[b]	**1492**	**797**	**274**	**143**	**183**	**155**

[a]Results should not be compared to the NAAQS. Emission rates are not directly comparable to NAAQS concentrations.

[b]Totals are rounded to the nearest whole number.

How would pontoon-building operations directly affect air quality?

Emission sources during operation would be similar to those during the project construction phase, but would also include concrete batch plant operation. Truck traffic during pontoon construction at the CTC facility and the Grays Harbor facility would have a direct effect on air quality. Trucks hauling pontoon construction materials and wastes to and from the casting basin facilities would release exhaust emissions along haul routes.

CTC Facility

Using the CTC facility would not increase existing traffic in the project vicinity. Currently, the number of truck trips to and from the CTC facility site is about 12 per day. For the proposed SR 520 Pontoon Construction Project there would be an estimated 9 trips per day, which is less than existing levels. Because the project would not be expected substantially change the current vehicle mix and traffic volumes in the project vicinity, WSDOT assumed that the increase in all pollutants from project-related vehicle trips would be negligible compared to existing conditions.

Pontoon construction at the CTC facility would result in carbon monoxide and PM_{10} emissions from vehicles, off-road equipment, and fugitive dust. Activities during pontoon-building operations would not violate or exceed any NAAQS for any criteria pollutants. Exhibit 3.5-4 summarizes the estimated annual emissions of criteria pollutants at the CTC site.

EXHIBIT 3.5-4
CTC Facility Site Operation Emissions[a]

Year	Nitrogen Dioxide (tons per year)	Carbon Monoxide (tons per year)	Sulfur Dioxide (tons per year)	Volatile Organic Compound (tons per year)	Particulate Matter (PM_{10}) (tons per year)	Particulate Matter ($PM_{2.5}$) (tons per year)
2011 Operation	31	15	4.0	2.6	2.1	1.9
2012 Operation	22	12	2.6	1.7	1.5	1.4

[a]Results should not be compared to the NAAQS. Emission rates are not directly comparable to NAAQS concentrations.

Grays Harbor Build Alternatives

WSDOT calculated the effects of pontoon-building operations at both Grays Harbor build alternative sites based on assumptions regarding pontoon building activities and schedule. The slightly higher vehicle emissions from the Aberdeen Log Yard Alternative would not result in a substantial difference between the two alternatives in terms of effects on air quality. Activities during pontoon-building operations are not expected to violate or exceed any NAAQS for any criteria pollutants. An onsite concrete batch plant is included as a support facility in preliminary design for this project. Assuming it is built, its operations would require an air permit from the Olympic Region Clean Air Agency. Exhibits 3.5-2 and 3.5-3 summarize estimated annual emissions for criteria pollutants during operation of the Aberdeen Log Yard and Anderson & Middleton alternatives, respectively.

Would the project meet conformity requirements?

In Washington, projects located in air quality maintenance and nonattainment areas must meet federal Clean Air Act conformity requirements implemented by EPA regulations (40 CFR Parts 51 and 93) and by the Washington Clean Air Act (WAC 173-420). Because the proposed SR 520 Pontoon Construction Project would be federally funded, and because the CTC facility is located in a maintenance area for carbon monoxide and PM_{10}, the project must demonstrate

conformity with the applicable State Implementation Plan for meeting and maintaining compliance with the NAAQS.

General conformity applies to all federal actions unless they are otherwise exempt. The proposed SR 520 Pontoon Construction Project would be exempt from meeting general conformity requirements because it is a federal action covered by transportation conformity rules, as stated in 40 CFR 93.153(a). For this reason, the project would be subject to transportation conformity requirements. The project meets transportation conformity requirements because it satisfies the three criteria stipulated in the Clean Air Act:

- The project would not cause or contribute to any new violation of any NAAQS in any area.
- The project would not increase the frequency or severity of any existing violation of any NAAQS in any area.
- The project would not delay timely attainment of any NAAQS or any required interim emissions reductions or other milestones in any area.

As previously noted, pontoon construction at the CTC facility would take place in an air quality maintenance area and would have to meet transportation conformity requirements. The air quality analysis conducted for this project and documented in Appendix G, Air Quality Technical Memorandum, concludes that the transportation conformity requirements would be met. The Grays Harbor sites would not be subject to any conformity rules because they are not located in a maintenance or nonattainment area. The Puget Sound Regional Council has confirmed that the project need not be included in its Transportation Improvement Program because it would not result in a noticeable effect on the transportation network (pers. comm., Kimberly Scribner, Puget Sound Regional Council, July 13, 2009).

How would pontoon moorage directly affect air quality?

When the pontoons are towed from the proposed Grays Harbor or existing CTC casting basin to the moorage location, there would be air pollutant emissions from tugboat exhaust. Exhibit 3.5-5 presents the estimated total emissions for pontoon transport at each site. Once the pontoons are towed to their moorage location, no emissions would be produced.

EXHIBIT 3.5-5
Pontoon Transport Emissions

Site	Nitrogen Dioxide (tons per year)	Carbon Monoxide (tons per year)	Sulfur Dioxide (tons per year)	Volatile Organic Compound (tons per year)	Particulate matter (PM_{10}) (tons per year)	Particulate matter ($PM_{2.5}$) (tons per year)
Aberdeen Log Yard	0.44	0.15	0.0005	0.024	0.020	0.020
Anderson & Middleton	0.27	0.09	0.0003	0.015	0.013	0.012
CTC	0.54	0.18	0.0006	0.029	0.025	0.024

How would the Grays Harbor build alternatives compare in their direct effects on air quality?

Exhibit 3.5-6 summarizes and compares the potential project air quality effects of the Grays Harbor build alternatives.

EXHIBIT 3.5-6
Air Quality Summary of Direct Effects

	Aberdeen Log Yard Alternative (Preferred Alternative)	Anderson & Middleton Alternative
Casting basin construction	This project is exempt from conformity requirements; there would be no adverse effects[a].	Effects would be the same.
Pontoon-building operation	This project is exempt from conformity requirements; there would be no adverse effects[a].	Effects would be the same.
Pontoon moorage	None	None

[a]An adverse effect to air quality is a violation of the NAAQS. Project-related emissions are not expected to violate NAAQS.

What indirect effects would the project have on air quality?

CTC Facility

WSDOT does not anticipate indirect effects on air quality associated with pontoon construction or moorage. There are no other actions related to project activities at the CTC facility that would result in indirect effects related to air quality.

Grays Harbor Build Alternatives

Project-related truck traffic could lead some drivers along the haul routes to use alternate routes to avoid potential delays. Using alternate routes would lead to indirect effects on air quality in two ways: alternate routes could be longer and using them would result in increased emissions, and using alternate routes would cause additional emissions in areas outside of the proposed haul routes. There are no other actions related to project activities at either build alternative site that would result in indirect effects related to air quality.

How would air quality be affected if the project were not built?

Under the No Build Alternative, no project construction activities would occur at any of the sites, and there would be no effects on air quality.

What would the cumulative effect on air quality likely be?

WSDOT assumed the following for the air quality cumulative effects analysis:

- Ambient air quality is itself a cumulative effect because ambient air quality is determined by the individual contributions of many individual emission sources.
- If a region is designated as a maintenance area (a nonattainment area where maintenance regulations are in effect), then its ambient air quality reflects the adverse cumulative effect of pollutant emissions from many sources.
- All present and reasonably foreseeable future actions, including transportation and land development projects, are and will be subject to regulatory limits on their pollutant emissions.

CTC Facility

The Puget Sound Regional Council has confirmed that the proposed SR 520 Pontoon Construction Project will not be included in the Regional Transportation Plan or the Transportation Improvement Plan. Operations at the CTC facility would not affect local traffic volumes and, therefore, would not cause or contribute to a violation of the NAAQS, increase the severity of an existing NAAQS violation, or delay timely NAAQS attainment. Therefore, this project would not contribute to a cumulative effect in the region.

Grays Harbor Build Alternatives

Project construction and operation, including use of the batch plant, at either Grays Harbor build alternative site would contribute to a cumulative effect on air quality by emitting exhaust gases and particulates into the atmosphere. Emissions from project construction activities would combine with other emissions sources in the region, such as other planned projects (Exhibits 3-1 and 3-3). The cumulative effect would not likely cause a change from the baseline condition or a violation of NAAQS. Vehicle exhaust gases released during project operation would result in a contribution to the cumulative effect on air quality over the long term. These emissions would include greenhouse gases, which are considered to contribute to global climate change. Section 3.6, Energy and Climate Change, discuss greenhouse gas emissions expected to result from the project.

How would the project affect greenhouse gases?

For a discussion on how the proposed project would affect greenhouse gases, see Section 3.6, Energy and Climate Change.