Chapter 4 Comparison of the Alternatives

While Chapter 3 explains the potential effects of the SR 520 Pontoon Construction Project on built and natural resources, this chapter highlights the primary differences between the build alternatives and compares the effects of each by resource.

What are the primary differences between the build alternatives?

Following are the primary differences between the build alternatives as they relate to the effects on the built and natural environments:

- **Wetlands:** The Anderson & Middleton Alternative would eliminate approximately 4.8 acres of palustrine wetland area and approximately 1.2 acres of an existing ditch that contains some wetlands. The Aberdeen Log Yard Alternative would eliminate approximately 1.04 acres of palustrine wetlands and 0.41 acre of estuarine wetland. For the Anderson & Middleton Alternative, dewatering could affect the hydrology of over 25 acres of protected wetlands adjacent to the property, whereas for the Aberdeen Log Yard property, there is only one small wetland (0.25 acre) that could be affected by dewatering.
- **Shoreline:** Constructing the launch channel at the Anderson & Middleton site would require disturbing approximately 1 acre of area within the rocky intertidal shore, mudflat, and subtidal habitat. Because the launch channel at the Aberdeen Log Yard site is farther from the navigation channel, excavating and building it would require disturbing approximately 5 acres of area within the rocky intertidal shore, mudflat, and subtidal habitat areas. At either site, the launch channel gate might be accessed by a trestle (built into what is now land), which when fully operational, would become a new overwater structure within the site's modified shoreline.
- **Hazardous Materials:** Contaminated sediments were found in the launch channel area at the Aberdeen Log Yard site. The contaminated sediments would have to be contained and disposed of at a special upland disposal site. The sediments in the Anderson & Middleton launch channel area appear to be clean enough for open

water disposal. There is localized soil and groundwater contamination on both sites. However, based on findings to date, encountering localized contamination would likely occur more frequently on the Aberdeen Log Yard site.

- **Cultural Resources:** Field investigations revealed one NHRP-eligible archaeological site on the Anderson & Middleton site—a precontact fish trap complex. Further study of the fish trap could potentially address important research questions about Native American resource procurement and subsistence in the region. Casting basin construction would disturb this site.

How would the alternatives differ in their effects on the environment?

Analyzing and comparing the project alternatives is considered the "heart" of the NEPA process because knowing and comparing the alternatives' potential effects are essential in making an informed decision. Chapter 3 presents the potential effects of the build alternatives on the various resources studied in this EIS. Exhibit 4-1 in this chapter compares the build alternatives' effects on each resource. For most resources, the potential effects of the build alternatives would be similar, with only minor variations to distinguish the two alternatives. The use of the CTC facility is not included in Exhibit 4-1 because the effects associated with using this facility would apply to both build alternatives. As a result, CTC-related project effects are a constant factor and not a point of comparison between the alternatives.

For the SR 520 Pontoon Construction Project, WSDOT considers that the No Build Alternative is effectively continued existing conditions in the study areas (refer to Chapter 2 for a full description of the No Build Alternative). As a result, the effects of each alternative presented in Exhibit 4-1 are inherently measured against the No Build Alternative because the effects analysis necessarily considers potential effects of the alternatives compared to existing conditions.

EXHIBIT 4-1
Build Alternative Comparison Table

	Summary of Potential Effects	Potential Avoidance, Minimization, and Compensatory Mitigation	Unavoidable Adverse Effects
Ecosystems			
Anderson & Middleton Alternative	Construction would eliminate 4.8 acres of palustrine wetlands and 1.2 acres of wetlands in an existing ditch. The launch channel would be approximately 1 acre of excavation within shoreline. A new overwater structure (a trestle) for gate operations may be built. Facility construction and operation would result in some effects to fish and wildlife. Pile-driving during construction would produce the most noise. Dewatering could affect wetlands adjacent to the property.	Locating casting basin and ancillary facilities in central portion of site would avoid 6.5 acres of palustrine and estuarine wetland on the western portion of site. The project would restore degraded habitat at a location yet to be determined as mitigation for project effects. Mitigation would meet all federal, tribal, state and local requirements. Mitigating pile-driving noise could include vibratory hammer rather than driving piles using an impact hammer or limiting the pile-driving activity time. Pile-driving effects on fish could be mitigated using bubble curtains, which could reduce the level of waterborne noise from pile-driving. Dewatering effects could be limited by installing cutoff walls.	The proposed project would eliminate approximately 6 acres of wetlands and 1 acre of nearshore intertidal zone.

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Build Alternative Comparison Table

	Summary of Potential Effects	Potential Avoidance, Minimization, and Compensatory Mitigation	Unavoidable Adverse Effects
Aberdeen Log Yard Alternative	Construction would eliminate 1.04 acres of palustrine wetlands and up to 0.41 acre of estuarine wetlands. The launch channel would excavate 5 acres within the shoreline, including mudflats and subtidal habitat. A new overwater structure (a trestle) for gate operations might be built. There would be some effects to fish and wildlife associated with facility construction and operation. Pile-driving during construction would produce the most noise.	Shoreline armoring would be avoided except within launch channel. The project would restore degraded habitat at a location yet to be determined as mitigation for project effects. Mitigation would meet all federal, state and local requirements. Mitigation for pile-driving noise could include using a vibratory hammer rather than an impact hammer to drive piles, or limiting the pile-driving activity time. Pile-driving effects on fish could be mitigated using bubble curtains, which could reduce the level of waterborne noise from pile-driving by placing a wall of bubbles between the pile and fish.	The proposed project would eliminate 1.45 acres of wetland and 5 acres of shoreline (mudflats and subtidal habitat).
Geology and Soils			
Anderson & Middleton Alternative	Approximately 840,000 cubic yards of material would be exported from the site. Approximately 450,000 cubic yards of material would be imported to the site. Approximately 23,000 cubic yards of material would be dredged. Certain construction activities could cause the ground to settle several inches.	During casting basin facility construction, WSDOT would implement best management practices, such as requiring silt fences downslope of all exposed soils, to avoid and minimize effects on geology and soils.	None. WSDOT could avoid any adverse effects.
Aberdeen Log Yard Alternative	Approximately 999,000 cubic yards of material would be exported from the site. Approximately 550,000 cubic yards of material would be imported to the site. Approximately 111,200 cubic yards of material would be dredged. Certain construction activities could cause the ground to settle to several inches.	Best management practices would be the same as for the Anderson & Middleton Alternative.	None. WSDOT could avoid any adverse effects.

EXHIBIT 4-1
Build Alternative Comparison Table

	Summary of Potential Effects	Potential Avoidance, Minimization, and Compensatory Mitigation	Unavoidable Adverse Effects
Hazardous Materials			
Anderson & Middleton Alternative	Dewatering water could contain contaminants unsuitable for discharge. Contaminated water would be treated before being discharged. Areas of localized upland soil contamination might be encountered. Contaminated sediments could be released into the water during launch channel dredging; however, data collected to date suggest that dredged materials would not be contaminated.	Best management practices would be used to avoid or minimize the effects of hazardous materials. Dewatering water would be treated prior to discharge. Contaminated materials would be managed and disposed of in accordance with applicable regulations.	None. WSDOT could avoid any adverse effects. There would be a potential for net benefit because encountered contaminated material would be removed from the site.
Aberdeen Log Yard Alternative	Dewatering water could contain contaminants unsuitable for discharge. Contaminated water would be treated before being discharged. Areas of localized upland soil contamination might be encountered. Contaminated sediments could be released into the water during launch channel dredging. Data collected to date suggests that up to 30 percent of the dredged materials might contain low-level contamination.	Potential avoidance, minimization, and compensatory mitigation measures would be the same as described for the Anderson & Middleton Alternative.	None. WSDOT could avoid any adverse effects. There would be a potential for net benefit because encountered contaminated material would be removed from the site.

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	Summary of Potential Effects	Potential Avoidance, Minimization, and Compensatory Mitigation	Unavoidable Adverse Effects
Water Resources			
Anderson & Middleton and Aberdeen Log Yard alternatives	Excavating and grading associated with casting basin facility construction could affect water quality. Erosion of soil stockpiles could affect site stormwater runoff. Operating the facility would produce two types of water—process water and stormwater—which would affect water quality. Dewatering for facility construction and operation could affect groundwater levels.	Implementing the required best management practices, such as temporary erosion and sediment control, stormwater pollution prevention and spill prevention control, and countermeasure plans would be used to avoid or minimize effects. Stormwater and process water would be treated prior to discharge.	There would be a net benefit because stormwater and process water would be treated before discharge, which currently does not occur.
Air Quality			
Anderson & Middleton and Aberdeen Log Yard alternatives	These alternatives would meet regional conformity requirements and, therefore, would not cause substantial regional effects on air quality.	Best management practices, such as reducing vehicle and equipment idling and using newer construction equipment with add-on emission controls, would be implemented to reduce project-related emissions.	None. WSDOT could avoid any adverse effects.
Energy and Climate Change			
Anderson & Middleton Alternative	The energy consumed during construction would be approximately 1,722,000 MBtus. The energy consumed during operation would be approximately 1,060,000 MBtus. Greenhouse gas emissions during construction would be approximately 127,000 MT CO_2e. Greenhouse gas emissions for this alternative during operation would be approximately 118,000 MT CO_2e.	Best management practices that encourage efficient energy use and reduce emissions, such as reducing vehicle and equipment idling and using newer construction equipment with add-on emission controls would be used to reduce project greenhouse gas emissions.	Mitigation would reduce energy consumed and greenhouse gases emitted but would not eliminate them.

EXHIBIT 4-1
Build Alternative Comparison Table

	Summary of Potential Effects	Potential Avoidance, Minimization, and Compensatory Mitigation	Unavoidable Adverse Effects
Aberdeen Log Yard Alternative	The energy consumed during construction would be approximately 1,630,000 MBtus. The energy consumed during operation would be approximately 1,060,000 MBtus. Greenhouse gas emissions during construction would be approximately 120,000 MT CO_2e. Greenhouse gas emissions for this alternative during operation would be approximately 118,000 MT CO_2e.	Mitigation would be the same as for the Anderson & Middleton Alternative.	Mitigation would reduce energy consumed and greenhouse gases emitted but would not eliminate these effects.
Cultural Resources			
Anderson & Middleton Alternative	The potential for effects would include disturbing one NRHP-eligible archaeological site—a precontact fish trap complex.	WSDOT would develop and implement an archaeological treatment plan to mitigate effects to the two known archaeological resources on this site. Mitigation might include, but is not limited to, data recovery (scientific excavation and analysis) of the archaeological sites and archaeological monitoring during construction to ensure that no (previously unknown) cultural resources are affected. WSDOT would implement an unanticipated discovery plan that would be followed if potential archaeological resources are encountered during construction. Mitigation for the identified precontact fish trap complex would require working closely with interested Indian tribes and might require preservation in place.	Constructing the casting basin would disturb and adversely affect one NHRP-eligible archaeological site.
Aberdeen Log Yard Alternative	Adverse effects on cultural resources would not be expected.	WSDOT would implement an unanticipated discovery plan that would be followed if potential archaeological resources are encountered during construction.	None. WSDOT could avoid any adverse effects.

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Build Alternative Comparison Table

	Summary of Potential Effects	Potential Avoidance, Minimization, and Compensatory Mitigation	Unavoidable Adverse Effects
Economics			
Anderson & Middleton and Aberdeen Log Yard alternatives	Up to 250 workers would be needed for casting basin facility construction. Up to 800 workers would be needed to operate the casting basin facility. Economic benefits would be expected due to the new jobs created and the likely increase in spending and tax revenue during construction and operation of the casting basin facility. Noise and traffic congestion experienced during project construction and operation could result in some negative economic effects, such as a slight decrease in sales for some businesses along the haul routes that depend on unimpeded access.	Noise and traffic reduction best management practices would be used and could reduce or eliminate economic effects that are a result of noise or traffic congestion.	A net benefit of increased employment and income in the short term would be expected.
Navigable Waterways			
Anderson & Middleton and Aberdeen Log Yard alternatives	The level of vessel traffic within Grays Harbor is light enough that any use of navigation channels and of Grays Harbor pilots during this project would have only a minor effect, if any.	WSDOT would coordinate with the U.S. Coast Guard and potentially affected Ports to avoid conflicts with arriving or departing vessels. WSDOT would also provide appropriate lighting on moored pontoons, as required by the U.S. Coast Guard, to limit effects of recreational vessel movement outside the navigation channel.	None. WSDOT could avoid any adverse effects.

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Build Alternative Comparison Table

	Summary of Potential Effects	Potential Avoidance, Minimization, and Compensatory Mitigation	Unavoidable Adverse Effects
Noise			
Anderson & Middleton Alternative	Noise levels during casting basin facility construction are predicted to range from 57 to 66 dBA, representing an increase of as much as 24 dBA over existing levels. Noise levels during pontoon-building operations are predicted to range from 40 to 64 dBA, representing an increase of as much as 22 dBA over existing levels. Noise during project operation would exceed the WAC noise regulation limits at four residential locations.	Best management practices for noise abatement could include limiting activities that produce the highest noise levels (such as jackhammering and pile-driving) to between 7 a.m. and 7 p.m, or requiring all engine-powered equipment to have mufflers installed according to the manufacturer's specifications. The project would comply with the applicable WAC noise limits and local jurisdiction noise regulations. A berm or sound wall could be constructed to reduce operational noise levels to below the ordinance limits. Mitigating pile-driving noise could include vibratory hammer rather than driving piles with an impact hammer or limiting the pile-driving activity time. Other methods of reducing pile-driving noise could include coating the piles, using pile pads, or using piston mufflers.	With mitigation, daytime casting basin facility construction noise would still be noticeable. With noise abatement measures, including a berm or sound wall, noise levels during pontoon-building operations would be within WAC limits.

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	Summary of Potential Effects	Potential Avoidance, Minimization, and Compensatory Mitigation	Unavoidable Adverse Effects
Aberdeen Log Yard Alternative	Noise levels during casting basin facility construction are predicted to range from 67 to 72 dBA, representing an increase of as much as 5 dBA over existing levels. Noise levels during pontoon-building operations are predicted to range from 40 to 59 dBA, representing an increase of as much as 1 to 5 dBA over existing levels. Noise during operation would not exceed WAC maximum noise levels.	Best management practices for noise abatement could include limiting activities that produce the highest noise levels (such as jackhammering and pile-driving) to between 7 a.m. and 7 p.m, or requiring all engine-powered equipment to have mufflers installed according to the manufacturer's specifications. The project would comply with the applicable WAC noise limits and local jurisdiction noise regulations. Mitigating pile-driving noise could include using a vibratory hammer rather than driving piles with an impact hammer or limiting the pile-driving activity time. Other methods of reducing pile-driving noise could include coating the piles, using pile pads, or using piston mufflers.	With mitigation, daytime casting basin facility construction noise would still be noticeable. With noise abatement measures, pontoon-building noise levels would be within WAC limits.
Public Services and Utilities			
Anderson & Middleton and Aberdeen Log Yard alternatives	No substantial effects on public services and utilities would be expected. There could be an increase in demand for police and emergency medical services typical of an industrial work site. The haul route is longer for the Anderson & Middleton Alternative, which could provide a greater opportunity for accidents compared to the Aberdeen Log Yard Alternative.	Coordination with public service and utility providers on a continuous basis would ensure that any potential project effects are understood in advance, planned for, and kept to a minimum. Coordination with local public safety agencies, such as the fire department or police, would keep them aware of the project schedule, activities, and haul route locations.	None. WSDOT could avoid any adverse effects.

EXHIBIT 4-1
Build Alternative Comparison Table

	Summary of Potential Effects	Potential Avoidance, Minimization, and Compensatory Mitigation	Unavoidable Adverse Effects
Land Use			
Anderson & Middleton and Aberdeen Log Yard alternatives	The property would be developed into a higher-density industrial use; however, developing a casting basin facility would be compatible with the general plan provisions of the local jurisdiction's comprehensive plan and zoning regulations. State-owned (WDNR) aquatic lands would be used to construct and operate the launch channel and would be used for pontoon moorage in Grays Harbor.	No mitigation would be necessary. WSDOT would obtain a lease to use the state-owned lands.	None. WSDOT could avoid any adverse effects.

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	Summary of Potential Effects	Potential Avoidance, Minimization, and Compensatory Mitigation	Unavoidable Adverse Effects
Social Elements			
Anderson & Middleton Alternative	Some residences north of the project site would experience noise levels that exceed the WAC maximum allowable level during project construction and operation. The project would not exceed transportation LOS or air quality standards. However, residents, transit riders, pedestrians, and bicyclists near the haul routes could be inconvenienced by noise, dust, and traffic from increased truck traffic. Pedestrians and bicyclists could experience delays at crosswalks due to increased traffic congestion. Some activities, such as pontoon floatout and launch channel construction, could temporarily displace tribal fishers from certain in-water Grays Harbor fishing locations. There would be no adverse effects that would cause disproportionately high and adverse effects on minority and/or low-income populations.	WSDOT would use the project Website and newsletters to inform the public of upcoming activities and to provide contact numbers where residents can voice concerns about the project. WSDOT could provide project materials in other languages, as needed, such as Spanish; provide notice to the public about increased congestion in their neighborhood caused by project construction and operation activities; and request that project employees and truck drivers travelling to and from the site yield for pedestrians at unsignalized intersections. WSDOT would work closely with tribes to coordinate timing of pontoon floatouts and other nearshore activities to minimize or avoid conflicts with tribal fishing.	None. WSDOT could avoid any adverse effects.

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	Summary of Potential Effects	Potential Avoidance, Minimization, and Compensatory Mitigation	Unavoidable Adverse Effects
Aberdeen Log Yard Alternative	Operation and construction effects for this alternative would be similar to those for the Anderson & Middleton Alternative, except noise levels are expected to disturb sensitive receptors. There would be no adverse effects that would cause disproportionately high and adverse effects on minority and/or low-income populations.	WSDOT would use the project Website and newsletters to inform the public of upcoming activities and to provide contact numbers where residents can voice concerns about the project. WSDOT could provide project materials in other languages, as needed, such as Spanish; provide notice to the public about increased congestion in their neighborhood caused by project construction and operation activities; and request project employees and truck drivers travelling to and from the site yield for pedestrians at unsignalized intersections. WSDOT would work closely with tribes to coordinate timing of pontoon floatouts and other nearshore activities to minimize or avoid conflicts with tribal fishing.	None. WSDOT could avoid any adverse effects.
Transportation			
Anderson & Middleton Alternative	During project construction, LOS at intersections along the haul routes would remain at LOS D or better. During operation, LOS at intersections along the haul routes would remain at LOS D or better.	Potential transportation effects minimization measures could include best management practices such as, restriping to improve channelization at certain intersections, signal timing adjustments, or using barge or rail to transport materials to and from the site.	None. WSDOT could avoid any adverse effects. There would be the potential for improved traffic conditions in the long-term, depending on mitigation measures used.

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Build Alternative Comparison Table

	Summary of Potential Effects	Potential Avoidance, Minimization, and Compensatory Mitigation	Unavoidable Adverse Effects
Aberdeen Log Yard Alternative	During construction, LOS at intersections along haul routes would remain at LOS D or better, except for the following unsignalized intersections: West Heron Street and South Garfield Street; and West Wishkah Street and Division Street. During operation, LOS at intersections along the haul routes would remain at LOS D or better, except for the following unsignalized intersections (only one or two of these intersections would degrade depending on how workers access the site): ▪ West Wishkah Street at Thornton Street ▪ West Wishkah Street at Williams Street ▪ West Wishkah Street at South Division Street ▪ West Heron Street at Garfield Street	Potential transportation minimization measures could include best management practices to reduce effects, restriping to improve channelization at certain intersections, or using barge or rail to transport materials to and from the site.	None. WSDOT could avoid any adverse effects. Traffic conditions could improve in the long-term, depending on mitigation measures used.
Visual Quality			
Anderson & Middleton and Aberdeen Log Yard alternatives	Construction and operation effects would be similar at both sites, but on different landscape units. Both sites are currently located in industrial areas. Surrounding landscape units would see the project, but the project would not alter the character of its industrial surroundings. Pontoon moorage would have the potential to produce long-term effects on visual quality. The pontoons would be visible above water, and at night, they would be prominently illuminated.	Best management practices, such as shielding temporary construction site lighting or designing facilities to blend with surroundings, would be used to avoid or minimize negative effects.	None. WSDOT could avoid any adverse effects. Construction and operation of the proposed casting basin facility would be consistent with the existing visual context of the surrounding area, which is industrial in character.

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Build Alternative Comparison Table

	Summary of Potential Effects	Potential Avoidance, Minimization, and Compensatory Mitigation	Unavoidable Adverse Effects
Section 4(f)			
Anderson & Middleton and Aberdeen Log Yard alternatives	There would be no use of Section 4(f) resources.	No mitigation measures are necessary.	None. WSDOT could avoid any adverse effects.

dBA decibel on the A-weighted scale
LOS level of service
MBtu million British thermal unit
$MtCO_2e$ metric tons of carbon dioxide equivalent
WAC Washington Administrative Code
WSDOT Washington State Department of Transportation
WDNR Washington Department of Natural Resources