

# Chapter 7.

## Environmental Assessment

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This chapter describes the environmental impacts that could result from construction and/or operation of the Denny Way/Lake Union CSO Control Project. The environmental assessment process began with the six alternatives identified in Chapter 6, plus a No Action Alternative. Alternatives 2 through 6 are similar in that they all involve a large-diameter tunnel under Mercer Street, one or more pump stations at the Elliott West site, and construction of major conveyance pipelines and regulator structures. As a result, for purposes of the environmental assessment, those five alternatives have been lumped together into a CSO Storage and Treatment Alternative. Alternatives 5 and 6, unlike Alternatives 2, 3, and 4, have no new outfall. However, all five alternatives include an extension to the existing Denny Way CSO outfall, and construction of a new outfall would not qualitatively change the impacts associated with the construction of an outfall extension. Therefore, Alternatives 2 through 6 can all be covered under one CSO Storage and Treatment Alternative. That alternative is here compared with the Partial Separation and Storage Alternative. An additional alternative, the No Action Alternative, is not viable because King County and Seattle are required to achieve specific CSO reductions at a future date, and the No Action Alternative would result in failure to comply with these regulations. As a result, the No Action Alternative is not discussed in this facilities plan. The No Action Alternative is evaluated in the *Denny Way/Lake Union Combined Sewer Overflow Control Project: Phases 2, 3, & 4 - Draft SEPA SEIS/NEPA EA* (King County et. al., 1997) (SEIS) for baseline comparative purposes.

Construction-related impacts of alternatives are short-term in nature and would depend to a great extent on the timing and duration of construction activity associated with the selected alternative. Operational impacts are the long-term impacts associated with the operation of the proposed facilities.

In compliance with 40 CFR Part 5, potential environmental impacts have been analyzed for inclusion in both this chapter and the Draft SEPA EIS/NEPA EA. There are no wetlands, floodplains, important farmlands, wild and scenic rivers, or barrier islands within or adjacent to the project area. Potential impacts to historic, archeological, and cultural sites; air resources; fish and wildlife; and endangered species are discussed where applicable both in this chapter and in the *Denny Way/Lake Union Combined Sewer Overflow Control Project: Phases 2, 3, and 4 - Draft SEPA EIS/NEPA EA*. Consistency of the project with the City of Seattle Shoreline Master Program has also been evaluated and is included both in this chapter and in the SEPA EIS/NEPA EA.

## 7.1. Earth Resources

### 7.1.1. Construction

Excavation of soils during construction could result in erosion of excavated or stock-piled material. The magnitude of the impact is directly related to the amount of material exposed and the duration of construction. A temporary increase in runoff turbidity at construction sites is anticipated, particularly at large-scale excavation sites.

The potential exists for encountering contaminated soils or groundwater during construction, particularly in the south Lake Union area. Dewatering could be required during construction for both alternatives; this water would likely be discharged to the local sanitary sewer.

Conveyance systems would be constructed using open-trench methods and microtunneling methods.

Major dewatering would be necessary during construction of the Denny Way diversion structure located east of Myrtle Edwards Park. Construction activities along the proposed tunnel route could result in ground movements due to unstable soils in the area; retaining walls or other stabilizing structures could be necessary during construction of the tunnel.

Offshore construction of the outfalls associated with the CSO Storage and Treatment Alternative might result in significant disturbance in the intertidal zone of Elliott Bay. Contaminated sediments are likely to be encountered offshore, particularly in the area of the existing sediment cap.

### 7.1.2. Operation

With the Partial Separation and Storage Alternative, some contaminated sediments could be discharged from the stormwater outfalls into Lake Union and Elliott Bay. No on-shore operational impacts to earth resources are associated with the CSO Storage and Treatment Alternative. Offshore, the discharge of CSOs with contaminated sediments would be significantly reduced during operation of the storage and treatment facilities.

## 7.2. Air Resources

### 7.2.1. Construction

Impacts to air resources resulting from construction of either alternative includes temporary impacts such as dust and exhaust fumes from construction vehicles. Some odors associated with paving and construction equipment would be created during resurfacing of the streets. Sensitive receptors would include nearby businesses, restaurants, residents, pedestrians, and motorists. The magnitude of the impacts would be largely related to the duration of construction. Table 7-1 shows the estimated construction durations for the Partial Separation and Storage Alternative.

Estimated construction durations for the Partial Separation and Storage Alternative would be as follows:

- Four months of outfall construction in Lake Union and two months in Elliott Bay.
- Two and a half years of conveyance pipeline construction in the south Lake Union area.
- Five months for the Elliott Avenue Pipeline and 35-months for 14-miles of conveyance pipeline in the Elliott Bay Area.
- Eight months for regulating structure construction and 82-months for the CSO control facilities.

Many of these facilities would be constructed concurrently.

**Table 7-1. Construction Duration of Partial Separation and Storage Alternative**

Type of Facility	Element	Duration of construction (months)
Outfalls	South Lake Union area	Elimination of CSO 125 South Lake Union overflow
	Elliott Bay area	Elliott Bay stormwater outfalls Denny Way CSO outfall extension
Conveyance	South Lake Union area	CSO 175 Phase 1 connection South Lake Union stormwater pipelines Central trunk CSO pipeline
	Elliott Bay area	Elliott Bay stormwater pipelines Elliott Avenue pipeline
Regulating Structures	South Lake Union area	Central trunk diversion structure
	Elliott Bay area	Denny Way diversion structure
CSO Control	South Lake Union area	<u>South Lake Union CSO Storage facility</u> Storage tank (8.6 MG) Influent pump station
	Elliott Bay area	<u>Denny CSO Control Facility</u> Storage tank (8 MG) Influent pump station Effluent pump station

\*\* NOTE: Many facilities would be constructed concurrently.

Approximate construction durations for the CSO Storage and Treatment Alternative are shown in Table 7-2 and would be as follows:

- Seven months for outfall construction in Elliott Bay and one month for outfall construction in Lake Union.
- Four months for conveyance systems in the south Lake Union area and eight months in the Elliott Bay area.
- Fourteen months for the regulating structures.
- Forty-eight months for tunnel and other CSO control facilities.

Many of these facilities would be constructed concurrently.

**Table 7-2. Construction Duration of CSO Storage and Treatment Alternative**

Type of Facility	Element	Duration of construction (months)	
Outfalls	South Lake Union area	Elimination of CSO 125	1
	Elliott Bay area	Elliott West outfall Denny Way CSO outfall extension	7 7
Conveyance	South Lake Union area	CSO 175	3
		Valley connection	4
		South Lake Union CSO pipeline	1
		Lake Union tunnel CSO pipeline	2
		Central trunk CSO pipeline	1
	Elliott Bay area	Elliott West effluent force main Elliott West CSO pipeline	5 5
Regulating Structures	South Lake Union area	Central trunk diversion structure	4
		Lake Union tunnel regulator station	6
	Elliott Bay area	Elliott Bay interceptor control structure	6
		Denny Way diversion structure	4
CSO Control	South Lake Union area	<u>Elliott West CSO control facility</u>	10
		East tunnel portal drop structure	
	Elliott Bay area	<u>Elliott West CSO control facility</u>	23
		Mercer Street tunnel	
		West tunnel portal/Elliott Avenue undercrossing	11
		Influent pump station	12
		Effluent pump station	12
		Tunnel effluent channel	6
		Chemical storage and feed facility	12

\*\* NOTE: Many facilities will be constructed concurrently.

Construction of the west tunnel portal (conveyance system) could encounter methane deposits; specific methods for ensuring the health and safety of workers would be an integral part of air supply and venting for the tunnel. Sensitive receptors, in addition to those listed above, include users of Myrtle Edwards and Elliott Bay Parks.

### 7.2.2. Operation

Potential for odor generation could increase in the existing pipelines in the south Lake Union area, which would convey only sewage following implementation of the Partial Separation and Storage Alternative. The flows would consist of more concentrated sewage at higher temperatures compared to CSO flows and as a result, could generate odors. Periods of objectionable odors could occur at the south Lake Union CSO storage facility during overflow events, where manholes vent the storage facility. With proper design and odor control facilities, operation of the facility is not expected to present significant odor problems.

As described above, odors could occur during overflow events where manholes vent conveyance pipelines associated with the CSO Storage and Treatment Alternative. However, this is not anticipated to be a significant impact. Submerging the existing outfall in Elliott Bay would likely improve existing odor conditions. Operation of the Elliott West CSO control facility and the adjacent Mercer Street tunnel could generate odors objectionable to residents and commercial businesses located in the vicinity; however, odor control facilities are expected to treat the odors.

## 7.3. Water Resources

### 7.3.1. Construction

Construction-related impacts associated with the Partial Separation and Storage Alternative include localized water quality impacts to south Lake Union during abandonment of outfall 125 and in Elliott Bay during construction of four new stormwater outfalls. Contaminated sediments could become resuspended in Elliott Bay as a result of the near shore construction and could also disrupt the Denny Way sediment cap. Of particular concern would be PCBs and PAHs, as well as metals and oxygen-demanding compounds. Several permits would be necessary for the outfall construction in Elliott Bay. Short-term water quality impacts would include: localized increases in turbidity, decreased oxygen levels, and increased sediment deposition in the vicinity of construction. There is a high potential for land-based soil erosion due to the level of in-street construction. Because the construction area for the conveyance system is significantly larger for this alternative than the CSO Storage and Treatment Alternative, the potential magnitude, duration, and geographic distribution of impacts are much greater.

Groundwater would likely be encountered during construction of the conveyance system, the south Lake Union CSO storage facility and the east tunnel portal drop structure associated with the Partial Separation and Storage Alternative. Significant dewatering would be likely for the two CSO control structures. Impacts would include

the potential settlement of existing structures and the disturbance of a known petroleum hydrocarbon plume in the vicinity of Mercer Street and Westlake Avenue North. Disturbance of contaminated groundwater could redistribute contaminants; discharge of untreated groundwater after dewatering could affect receiving water quality. Additional measures would be necessary to avoid co-mingling clean and contaminated groundwater.

During excavation of the outfall trenches associated with the CSO Storage and Treatment Alternative, existing sediments would be disturbed, creating localized increased turbidity that would occur in the vicinity of the trenches throughout the duration of the in-water construction. As described above, there is a potential to re-introduce contaminated sediments in the vicinity of the Denny Way sediment cap associated with outfall construction. Numerous permitting requirements would need to be met for construction of outfall structures. In terms of washoff from land-based construction, the greatest potential impact would be erosion associated with construction of the Mercer Street tunnel. Large volumes of excavated materials would be stockpiled at the Elliott West site. Some sediments could enter the local storm drainage system and add to loading in Elliott Bay during storm events.

Construction of the west tunnel portal/Elliott Avenue undercrossing and Mercer Street tunnel would likely intercept the shallow groundwater system. Withdrawing groundwater could locally reduce groundwater levels and temporarily alter flows. Lowering of groundwater levels could result in settlement of fill soils, potentially impacting buildings and other surface structures. Groundwater withdrawal adjacent to Elliott Bay could also result in local saltwater intrusion.

### 7.3.2. Operation

Eliminating CSO 125 to Lake Union (associated with both alternatives) would result in significant water and sediment quality improvements. Construction of the south Lake Union overflow, associated with the Partial Separation and Storage Alternative, would result in separated stormwater being discharged to Lake Union in accordance with applicable requirements for stormwater quality and quantity. Eliminating the sanitary sewage component from the stormwater discharge would significantly reduce public health risks associated with CSOs. However, stormwater from high vehicular traffic areas typically contains high levels of metals and petroleum products and is not risk-free. Water quality improvements would be expected to result from reduced nutrient loadings to the water column and sediments. The water quality improvements from eliminating CSOs would be similar but generally less in Elliott Bay than Lake Union because this alternative includes the construction of four new stormwater outfalls in Elliott Bay. Although pollutant loadings from CSOs would be substantially reduced, loadings from separated stormwater will continue even with implementation of stormwater management techniques.

The CSO Storage and Treatment Alternative is designed to significantly reduce discharge of untreated CSOs to Lake Union and Elliott Bay with accompanying water quality benefits. This alternative would reduce the number of CSO events in Elliott Bay from approximately 50 events annually to one untreated event; treated discharges (i.e., receiving floatables control and disinfection) would occur approximately 1 to 30 times per year. Disinfection would significantly reduce bacteria concentrations contributed by

CSOs in Elliott Bay; dechlorination of disinfected flows would minimize impacts to biota associated with chlorine toxicity. Fecal coliform levels contributed by CSOs in the zone of dilution would range from approximately 14 to 43 colonies/100 mL, and overall suspended solids loading would be reduced by 50 to 80 percent. The operation of the CSO Storage and Treatment Alternative would reduce or eliminate discharges in the near shore environment and relocate them to an area where effluent transport would be improved. However, the new outfalls would increase potential contaminants of concern in the offshore areas near the new outfall location. Discharging in the offshore environment would contribute to the sediment remediation effort being undertaken with the Denny Way sediment capping project. Floatables and debris would be eliminated from discharges, resulting in aesthetic improvements as well as public health benefits. Disinfection would result in declining bacteria levels.

Operational impacts to groundwater associated with both alternatives would be minimal. There is a minor risk that pipelines or other facilities could break or leak, exposing adjacent groundwater to a dilute concentration of untreated wastewater and/or stormwater. However, such leaks are rare.

## 7.4. Biological Resources

### 7.4.1. Construction

Construction-related impacts associated with the new south Lake Union overflow, a component of the Partial Separation and Storage Alternative, could result in temporary and permanent impacts to plant and wildlife habitat along the southern shore of Lake Union. These impacts include the loss of shoreline vegetation at the location of the new outfall; temporary displacement of migratory and resident waterfowl in the vicinity of the outfall; displacement of resident urban wildlife including waterfowl and other birds, newts, salamanders, frogs, and turtles; and possible impacts to fish, fish habitat, crayfish, crustaceans, and other invertebrate freshwater organisms.

Construction of the new outfall and extension of the existing outfall associated with the CSO Storage and Treatment Alternative would disrupt the shoreline habitat along Myrtle Edwards and Elliott Bay Parks and result in temporary impacts to habitat for marine mammals, waterfowl, and urban wildlife. Construction of the outfalls would likely be limited to a seasonal construction window during which juvenile salmon are not actively migrating. Temporary increases in surface water turbidity during outfall construction and increased noise during pile driving and other activities centered on floating barges would likely result in local disturbance of waterfowl. Occurrences of federally-listed threatened and endangered species such as bald eagle, peregrine falcon, and marbled murrelet have been documented within the Elliott Bay area. Impacts to bald eagle are not anticipated as the closest nests are located three miles away. Peregrine falcon routinely use the Port of Seattle grain terminals and piers for perching sites. Construction activities at the outfall could affect forage behavior or feeding patterns for the falcons. Any marbled murrelets in the vicinity of the Myrtle Edwards shoreline would likely relocate to less disturbed and more productive habitats nearby; however, marbled murrelets are not expected to be in the area. Impacts to plants are anticipated to be minor, affecting mainly non-native, ornamental species.

Under the Partial Separation and Storage Alternative, sediment runoff from construction could have a temporary impact on two small areas of shallow water habitat in Lake Union, depending upon the final location of the south Lake Union overflow. That area may be providing spawning habitat for some fish species. Construction of the four stormwater outfalls in Elliott Bay is not expected to result in significant impacts to fish habitat and species. Through compliance with the Hydraulic Project Approval (HPA) permit requirements, impacts to fish would be minimal and of short duration. No impacts to tribal and recreational fishing activities would occur. Impacts to shellfish in Lake Union are not anticipated.

Construction of the outfalls in Elliott Bay would require an inventory of area shellfish resources and a comprehensive alternatives analysis. Potential impacts include displacement and/or loss of macroinvertebrate species inhabiting the shoreline areas of Myrtle Edwards and Elliott Bay parks. Because four new outfalls would be constructed in the shoreline area, there would be a greater potential for increased near shore habitat disruption than with the CSO Storage and Treatment Alternative.

Construction impacts on Lake Union fish habitat and fish species would be minimal under the CSO Storage and Treatment Alternative. There could be a minor disruption to recreational fishing in the immediate vicinity of CSO 125 during excavation and capping of the outfall. Outfall construction in Elliott Bay would result in temporary impacts to fish habitat and species. Construction of the outfall would be timed to avoid juvenile salmon migration periods. However, benthic organisms along the pipeline trench would be lost, and small finfish would be disturbed due to high turbidity. Outfall construction might also require disturbance of the existing Denny Way sediment cap, with the potential to resuspend toxic substances from the cap. Concerns exist relating to the potential resuspension of toxic substances. Impacts to shellfish in Lake Union are not anticipated. Construction of new or expanded wastewater discharge outfalls in marine waters is regulated by four state agencies. Construction of the outfalls in Elliott Bay would require an inventory of area shellfish resources and a comprehensive alternatives analysis. No significant populations of shellfish have been identified thus far in the vicinity of the proposed outfalls.

#### 7.4.2. Operation

The elimination of CSO 125 (both alternatives) could beneficially affect aquatic vegetation and waterfowl habitat in Lake Union by reducing localized turbidity and lessening inputs of oxygen-demanding constituents as well as toxics and floatables. Reduction of overflow volumes and frequency could contribute to improved overall lake habitat for aquatic plants, especially native plants, by reducing nutrient inputs into the lake. The use of Lake Union by waterfowl, shorebirds, and other water-dependent birds and mammals could be encouraged as water quality improves.

The Partial Separation and Storage Alternative is not anticipated to adversely affect plants or animals within the marine environment; however, it is anticipated to provide less of a potential benefit than would occur with the other alternative.

Once construction is complete, operation of the new Elliott West outfall and the Denny Way CSO outfall extension (CSO Storage and Treatment Alternative) could beneficially affect plants and animals in the marine environment. Discharges would contribute an

average of 50 percent less solids to the water column than under the current situation. Elimination of all but one annual overflow at the Denny Way regulator station (both alternatives) would improve water quality conditions and, consequently, foraging habitat for wildlife and waterfowl dependent upon Elliott Bay. Use of the shoreline by waterfowl, raptors, shorebirds, and other water-dependent birds and marine mammals would be encouraged as water quality improves.

Overall impacts to fish habitat and fish species in Lake Union would be positive under both alternatives. With the Partial Separation and Storage Alternative, an increase in turbidity and delivery of sediments, metals, and organic pollutants associated with stormwater would occur locally in the vicinity of the outfall. Overall loadings would decrease substantially, but there will continue to be a discharge of these substances in stormwater. Fish species and habitat in Elliott Bay would benefit from reducing CSO events to once per year at the Denny Way CSO outfall. Stormwater discharges would occur more frequently with the Partial Separation and Storage Alternative than under existing conditions as all stormwater would be discharged to Elliott Bay (i.e., even during small storms that now discharge to the sanitary sewer). A localized increase in turbidity and discharge of sediments and pollutants associated with stormwater could expose fish inhabiting the near shore environment adjacent to newly-constructed outfalls. However, near shore fish habitat quality in the project area is currently poor, as the shoreline contains little natural habitat and consists mainly of riprap and bulkheads. The reduction of untreated overflows into Lake Union and Elliott Bay would reduce pollutant loading to shellfish and their habitat. The benthic communities in sediments located near outfalls in Lake Union have been characterized as having reduced diversity and abundance. This alternative would contribute to reducing pollutant loads to sediments, and over time would facilitate an improvement sediment quality and potentially increase the diversity and abundance of benthic organisms. Benthic communities in the vicinity of the new outfalls in Elliott Bay could experience a localized shift to the prevalence of species tolerant to higher levels of particulate-associated pollutants. Overall, the net impact to shellfish would be positive, due to significant reductions in CSO flows and pollutants.

Under the CSO Storage and Treatment Alternative, long-term operation of the outfalls would reduce chronic pollutant loadings to fish habitat in inner Elliott Bay. Reductions in the frequency and volumes of CSOs and improvement in CSO water quality would reduce the potential exposure of fish to pathogens and contaminants, reduce the potential for ingestion of or entanglement in floatable material, and reduce the potential for localized oxygen “sags” following CSO events. Although the overall impacts to Elliott Bay’s fishery resources would be positive, minor localized impacts in the vicinity of the new outfall could occur. Most CSOs would pass through the Elliott West CSO control facility and be discharged through the new outfall; only during the largest storms would discharge through the extended existing outfall occur. During overflow events, fish species traveling through the discharge plume would be exposed to increased turbidity, decreased oxygen, and other potential pathogens; however, overall risk to fish would be reduced from existing conditions because these overflows would occur much less frequently. No significant disruption to recreational or tribal fishing activities would occur. Overall, impacts to shellfish would be positive. As described above, this alternative would also contribute to reducing pollutant loads to sediments and over time would promote improved sediment quality and potentially increase the diversity

and abundance of benthic organisms in Lake Union. Both Elliott Bay outfalls would discharge seaward of the existing sediment cap. Reduction of untreated CSO events and relocation of the discharge offshore would improve conditions for macroinvertebrate species in the area of the existing outfall and potentially result in a return to less stressed diversity, abundance, and community structure.

## 7.5. Energy

### 7.5.1. Construction

Impacts to energy would be similar for both alternatives. During construction, electrical energy would be used to operate construction equipment such as generators, dewatering pumps, lighting, etc. Fossil fuels would be used to operate machinery and vehicles. No natural gas is expected to be utilized for the project.

### 7.5.2. Operation

With either alternative, operation of the pump stations and regulators would utilize electrical energy. Maintenance vehicles would use fossil fuels.

## 7.6. Environmental Health

### 7.6.1. Construction

The construction-related environmental health impacts are largely the same for both alternatives. Spills of hazardous materials, fuels, lubricants, solvents, or other chemical products could occur during construction of any project facility as a result of either equipment failure or worker error. Impacts would depend upon the location of the spill, the amount and type of material spilled, whether workers or pedestrians were present, and the timing of emergency response actions. Contaminated soils, sediments, or groundwater could be exposed during excavation in the south Lake Union area.

Construction in the vicinity of the Denny Way CSO outfall would encounter the Denny Way sediment cap, located just offshore from the present outfall. Contaminants confined by the cap include metals and organic compounds such as PCBs. Disruption of contaminated sediments could resuspend the sediments in the bay and increase the risk of exposure for construction workers as well as recreational users. However, construction in this area would be designed and monitored to minimize this risk.

There could be a greater potential for human contact with sewage or other hazardous materials associated with the Partial Separation and Storage Alternative due to the greater amount of in-street construction.

### 7.6.2. Operation

Under the Partial Separation and Storage Alternative, an existing CSO outfall to Lake Union would be eliminated and an additional outfall would be designed to serve as an emergency overflow from the storage facility; CSOs at this outfall would only occur during severe storm events, less than an average of once per year. Benefits would

include a lower potential for direct human contact with fecal coliform bacteria, viruses, petroleum products and metals associated with CSOs. This benefit is somewhat less than with the CSO Storage and Treatment Alternative due to the increased volumes and frequency of stormwater discharge to the lake. Four new stormwater outfalls would be constructed close to the shore of Elliott Bay. However, overall environmental health impacts to inner Elliott Bay would be reduced as flows would not contain sewage. Outfalls would be located to minimize the risk of public exposure to stormwater contaminants.

Upon completion of the CSO Storage and Treatment Alternative, overflows to east and south Lake Union would be reduced to an average of one per year, thereby significantly reducing the potential for public health impacts associated with water contact. Benefits would include a substantially lower potential for direct human contact with fecal coliform bacteria, viruses, petroleum products, and metals associated with CSOs. This alternative would reduce the annual frequency and volume of CSO discharges into Elliott Bay. Extension of the Denny Way CSO outfall and construction of a new offshore outfall would provide a substantial reduction in the environmental health risks compared to existing conditions at the present outfall because human contact near the outfalls would be unlikely. Disinfection would substantially reduce bacterial concentrations in CSO discharges.

There is a minor risk that pipelines could break or leak, exposing adjacent areas to a dilute concentration of untreated wastewater and/or stormwater. However, such leaks or breaks are rare.

## 7.7. Noise

### 7.7.1. Construction

Noise levels would temporarily increase during construction of the facilities proposed for either alternative. Noise associated with construction would include pavement breaking, trench excavation, and materials hauling. Construction noise would typically be more noticeable during the nighttime and in areas where background noise levels are low (i.e., parks, residential areas).

Construction of the four new stormwater outfalls in Elliott Bay associated with the Partial Separation and Storage Alternative would temporarily increase noise levels in Myrtle Edwards Park. Noise levels would generally increase for a period of two weeks along a given portion of the pipeline alignment. Construction of the south Lake Union CSO storage facility would take approximately two years to complete and could involve the use of pile drivers, which produce very high noise levels. Available noise mitigation measures would be employed to reduce the noise impacts to nearby receptors.

Noise impacts associated with the CSO Storage and Treatment Alternative are similar to those described for the Partial Separation and Storage Alternative above. Pile driving would be required in Myrtle Edwards Park during outfall construction in Elliott Bay. Ventilator fans would be utilized during construction of the west tunnel portal, operating between 8 and 18 hours per day.

## 7.7.2. Operation

Emergency generators could be installed at regulators and pump stations and would operate in the event of a power outage. The generators would be installed within a structure with only a minor increase in noise levels.

## 7.8. Parks and Recreation

### 7.8.1. Construction

Construction activities could temporarily affect recreational activities around the active construction sites. Temporary impacts to South Lake Union Park would occur as a result of elimination of CSO 125 (both alternatives). The bicycle trail through Myrtle Edwards Park would be temporarily rerouted during construction; the pedestrian pathway would remain open and a portion would serve as a detour for the bicycle trail.

### 7.8.2. Operation

Operation of the proposed facilities would improve water quality in Lake Union and Elliott Bay. The Partial Separation and Storage Alternative would have a lower potential for long-term improvement to Lake Union because stormwater would continue to flow into the lake. However, water quality would be improved and public health risks from CSOs would be reduced. Improved water quality would significantly increase the recreational potential of the lake and of Myrtle Edwards Park at the existing Denny Way regulator station.

## 7.9. Aesthetics

### 7.9.1. Construction

The predominant visual amenities in the project area include views of Lake Union, Elliott Bay, Mount Rainier, the Cascade and Olympic Mountain Ranges, and the downtown Seattle skyline. Once constructed, all facilities in the south Lake Union area would be underground and out of view. Aesthetic impacts during construction (i.e., dust, construction vehicles, etc.) would be greater for the Partial Separation and Storage Alternative due to the greater length of pipeline associated with this alternative. The Elliott West CSO control facility, associated with the CSO Storage and Treatment Alternative, would be partially above ground.

### 7.9.2. Operation

Most proposed facilities in the south Lake Union area would be constructed entirely underground. Only a few small control boxes would be located above ground and would be constructed of materials to match their surroundings. All disturbed areas would be restored and landscaped with plantings compatible with those existing along pipeline alignments.

In the Elliott Bay area, all facilities except those proposed on the Elliott West site would be constructed underground. As described above, disturbed areas would be restored

and landscaped with plantings compatible with pipeline alignments. The Elliott West site is currently about eight feet below the grade of Elliott Avenue. All facilities on the site would be partially underground with about one and one-half stories above ground, with only one story protruding above Elliott Avenue. The aboveground facilities would be roofed and landscaped to reduce the visual impact from adjacent businesses and roadways. The views of the Elliott West site would not be appreciably different if the site is used for a storage facility (Partial Separation and Storage Alternative) or a treatment facility (CSO Storage and Treatment Alternative).

## 7.10. Historical and Cultural Preservation

### 7.10.1. Construction

There are no impacts to historic structures or archaeological deposits expected from the removal of CSO 125. There are an estimated 13 historic structures, in addition to numerous unevaluated historic structures, hunter-fisher-gatherer deposits, and historic period deposits, that could be impacted during construction of the Partial Separation and Storage Alternative. The number of potential sites impacted is due mainly to the length of pipeline associated with this alternative. A detailed cultural analysis could be necessary prior to construction of the conveyance system, regulating structures, and CSO control facilities.

There are an estimated 10 historic structures, in addition to numerous unevaluated historic structures, hunter-fisher-gatherer deposits, and historic period deposits, that could be impacted during construction of the CSO Storage and Treatment Alternative. There are fewer potentially impacted sites associated with this alternative than the Partial Separation and Storage Alternative; however, there is a significant potential to encounter historic resources during construction of the conveyance system. Detailed cultural analyses would be necessary in the Elliott Bay area associated with this alternative.

### 7.10.2. Operation

No impacts to historic properties or archaeological deposits would be expected during operation of either alternative.

## 7.11. Transportation

### 7.11.1. Construction

Construction-related transportation impacts would include increased traffic congestion due to detours and additional truck and worker trips, temporary lane closures, displaced street parking, and disrupted vehicular access to adjacent properties. Where possible, construction would follow along street shoulders to minimize the disruption of street improvements and traffic. Traffic in the south Lake Union and Elliott Bay areas is typically congested, and construction activity would temporarily but significantly impact traffic on several major arterials at various points throughout construction.

The major roadways that would be impacted as a result of the Partial Separation and Storage Alternative include: Terry Avenue, Dexter Avenue North, Valley Street, Republican Street, and many local and residential streets in the south Lake Union area. Roadways that would be impacted in the Elliott Bay area include Elliott Avenue West and many local and residential streets in the areas being separated, including the densely populated Queen Anne neighborhood. The transportation impacts resulting from this alternative would be greater than the CSO Storage and Treatment Alternative due to the extended construction time associated with the pipeline length.

The major roadways that would be impacted as a result of the CSO Storage and Treatment Alternative include: Valley Street, Westlake Avenue North, Roy Street, Dexter Avenue North, and some local and residential streets in the south Lake Union area. Elliott Avenue West is the main roadway that would be impacted in the Elliott Bay area. The majority of construction would occur at the Elliott West site and in the Alaskan Way right-of-way, which would minimize transportation impacts.

### **7.11.2. Operation**

With either alternative, periodic maintenance at the pump stations, regulator stations, etc., which are constructed in street rights-of-way could temporarily disrupt traffic. Maintenance activities would generate several trips per month on the main arterials of the project area. This additional traffic would represent an insignificant increase on heavily traveled roads.

## **7.12. Public Services and Utilities**

### **7.12.1. Construction**

There are public utilities located throughout the south Lake Union and Elliott Bay areas which could be impacted during construction of either alternative. The potential exists for accidental utility disruptions during construction, and some utility lines could require relocation. There would be a greater likelihood for utility disruption associated with the Partial Separation and Storage Alternative since more streets would be excavated for the conveyance system.

### **7.12.2. Operation**

No impacts to public utilities and services would occur from the operation of the facilities under either alternative.

## **7.13. Sensitive Areas**

### **7.13.1. Construction**

As described in Chapter 3, there are no floodplains or prime and unique farmlands in the project area to be impacted. Significant impacts to shorelands, wetlands, or other sensitive areas are not anticipated.

### **7.13.2. Operation**

Impacts to sensitive areas and/or species would not occur from the operation of the facilities under either alternative.

## **7.14. Land and Shoreline Use**

### **7.14.1. Construction**

All conveyance pipelines, once constructed, would be underground and not visible. Prior to construction, all applicable shoreline, land use, zoning, and construction permits would be obtained. A shoreline permit would be necessary for capping of CSO 125 in the south Lake Union area and for constructing new outfalls in Elliott Bay.

Street vacation of the west end of West Mercer Street would be necessary as part of the Elliott West CSO storage facility associated with the Partial Separation and Storage Alternative and the Elliott West CSO control facility associated with the CSO Storage and Treatment Alternative. Vacation of this public right-of-way would have no adverse impacts on circulation, access, utilities, light, air, open space, or view. The site is currently not used for circulation or access to other circulation systems.

### **7.14.2. Operation**

No facilities in the south Lake Union or Elliott Bay areas would require a change in land use or designation. Operation of the outfalls in Elliott Bay would be within a state shoreline zone. As required by the state Shoreline Management Act, navigational areas would be kept free of obstructions, and outfalls would be located below mean lower low water and be designed to prevent fish entry.