Chapter 8
Avoidance, Minimization, and Mitigation

This chapter provides a summary of the mitigation measures that the City will implement to avoid, minimize, rectify, or compensate for impacts identified in the previous chapters.

The following sections provide examples of each type of mitigation, as defined by the SEPA regulations (WAC 197-11-768), followed by the list of mitigation measures organized by discipline (Table 8-1).

8.1 Avoid

In large part, avoidance of impacts has been accomplished by the design and elements included within the preferred alternative (Alternative C). For example, Alternative C does not include a short-stay boat moorage. This element of the project was eliminated due to feedback from the regulatory agencies related to the potential for adverse effects to habitat and water quality. The wall alignment further avoids impacts by allowing soil stabilization to be constructed behind the existing seawall face and thus avoiding the interaction of grout with the waters of Elliott Bay.

8.2 Minimize

A number of features known as Best Management Practices (BMPs) will be implemented to minimize the potential for adverse effects. For example, the use of a temporary sheet-pile containment wall will isolate the work area from Elliott Bay during the majority of construction activities, including soil stabilization and existing wall demolition. This will prevent the spread of turbid water, contaminants, and grout materials into Elliott Bay during construction to the greatest extent practicable, thus minimizing the potential for violations of State water quality standards. Compliance with all permit conditions will minimize effects on water quality and natural resources (such as the implementation of erosion and pollution control measures, water quality monitoring, and restricting in-water work to during the designated work window). Another measure to minimize effects includes the planned summer shut-down of construction that will reduce effects on waterfront businesses.

8.3 Rectify

Rectifying potential effects will occur largely through the replacement of pre-existing features along the waterfront following construction. For example, Alaskan Way, the sidewalk, and multi-use path will be reconstructed to maintain their existing capacity and function and meet

Mitigation Definition

Mitigation is defined by the State Environmental Policy Act as follows:

"Mitigation includes:

- Avoiding the impact altogether by not taking a certain action or parts of an action.
- Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
- Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
- Compensating for the impact by replacing or providing substitute resources of environments."

all current City standards for use following the completion of construction. Stormwater is not currently treated before it flows into Elliott Bay. As part of the construction, stormwater filters will be installed to treat runoff from the project area per current City standards. Another example is the replacement of street and sidewalk lighting, which have been designed with LED bulbs to provide the required illumination while reducing energy use and positioned to minimize the scatter of light towards Elliott Bay.

8.4 Reduce

Reducing or eliminating effects over time will occur through plans for the long-term operation and maintenance of the seawall. The City will maintain all project components, including the habitat enhancement features, to ensure they continue to function and provide benefits throughout their design life. The City will implement a monitoring and adaptive management plan to evaluate whether habitat features provide the functions proposed and to take further actions, if needed.

8.5 Compensate

In cases where the potential effects are unavoidable and have been minimized as much as possible, but would still have a substantial adverse effect, measures to compensate for these effects will be implemented. For example, bus and taxi layovers and drop-off locations will be removed as a result of the temporary road and use of Alaskan Way as a construction work zone and haul route. To compensate for this unavoidable effect, the City will provide alternate bus layover areas and taxi drop-off points. Another example is the potential for displacement of businesses along the waterfront. In this case, the City will provide relocation assistance via the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, to ensure fair compensation.

Table 8-1. Mitigation Measures by Discipline

Transportation	
Construction	Roadway Operations To minimize impacts on traffic operations during construction, the City will implement a construction traffic management plan that meets current City standards and requirements and addresses the needs of all modes of travel during all phases of construction. The City will implement specific measures to reduce impacts on traffic operations, including the following: • Provide detours that provide drivers with clear directions for routes along alternative roadways, including access to Colman Dock Ferry Terminal. This effort will be coordinated with the Alaskan Way Viaduct Replacement Project and Washington State Ferries' Seattle Multimodal Terminal at Colman Dock Project to ensure that the detour plans are consistent with other construction activities. • Improve traffic operations along Alaskan Way during the summer construction shutdown by reclaiming portions of Alaskan Way to accommodate ferry-queuing space, parking, and/or bicycle and pedestrian travel. • Modify signal timing and phasing, additional turn lanes, and coordinated signals at key intersections along Alaskan Way, including the temporary road. • Provide signing and wayfinding to help travelers access key destinations along the waterfront. This effort will be coordinated with the Alaskan Way Viaduct Replacement Project to ensure that this strategy is consistent with other construction activities. • Provide flaggers and/or uniformed police officers at key intersections when needed to facilitate the movements of freight and general-purpose traffic and expedite emergency vehicles. • Accommodate overlegal vehicles along alternate routes (such as the construction haul route) if they cannot travel along the temporary road. • Identify appropriate haul routes. Timing of travel will be determined in advance to minimize effects on surrounding facilities. Construction vehicles will also be required to adhere to current City weight restrictions. • Accommodate vehicles that require access to loading zones, such as business delivery vehicles, taxis, charter and school buses, and garbage pickup vehicles. Freight and Overlegal Vehicles To minimize impacts on freight traffic, including overlegal vehicles, the following mitigation measure will be implemented: • Overlegal vehicles that are too large to travel on the temporary road will be allowed to use the construction haul route, which will be coordinated with the Contractor through the normal City permitting process. Business Access and Parking To reduce impacts on business access and parking, the City will implement the following mitigation measures: • Maintain property access during construction. • Coordinate with adjacent businesses and property owners during each stage of construction to identify the location and amount of temporary parking that will be put in place, manage temporary and permanent parking supplies during construction, and identify strategies for making parking both convenient and accessible to waterfront businesses and their patrons.

- Perform outreach in cooperation with business owners to provide pedestrian and parking maps in advance of and during construction, and information about parking options by means of e-Park and the Seattle Parking Map website.
- Incorporate new on-street parking along existing Alaskan Way, where it is not used for construction activities.
- During the summer construction shutdown, provide additional temporary on-street parking spaces.
- After Labor Day, begin mobilization and construction gradually to minimize effects during September, which is a busy month for many waterfront businesses, in order to preserve as much parking as possible.
- Provide appropriate off-site parking options for construction workers and prohibit their use of short-term visitor/customer parking near the project area.
- Throughout project construction, coordinate with the Seattle Police Department for enforcement of the short-term parking regulations in the immediate project area (two- to three-block radius).
- Provide curb space for commercial deliveries, taxis, and vehicle loading.

The City will work with surrounding businesses to identify additional mitigation measures and strategies that could include:

- Institute pricing measures that encourage short-term parking.
- Implement e-Park and locate dynamic message signs on key access points to downtown Seattle, Pioneer Square, and the downtown Seattle waterfront.
- Use parking vouchers that businesses can give to customers to park in designated parking lots.

Pedestrian and Bicycle Facilities

To minimize impacts on bicycle and pedestrian travel, the City will implement the following mitigation measures:

- Maintain a continuous sidewalk on the west side of Alaskan Way during the summer construction shutdown.
- Provide bicycle and pedestrian routes during construction with detour signage and other wayfinding elements. Distribute information on construction activity and alternative routes to bicycle and pedestrian organizations and stakeholders.
- Provide temporary sidewalks, as needed for specific construction activities.
- Provide east-west pedestrian access from Western Avenue to the waterfront piers with distances between crossings no larger than those that are currently provided.
- Existing ADA-compliant connections will be maintained and any newly constructed pedestrian paths and connections will be ADA compliant.

Safety

Project construction is not expected to adversely affect safety. However, the City will implement the following measures to maximize traveler safety during construction:

- Reduce speed limits on the temporary road from those currently in place on Alaskan Way.
- Provide pedestrian signals on the temporary road in all locations where they are provided on Alaskan Way.
- Place stop bars (stop lines on the pavement used to indicate the point behind which vehicles are required to stop) at crosswalks on side streets intersecting with the temporary road.
- Provide wayfinding and clear signage to allow drivers to navigate safely through the construction zone.

	Transit To minimize or compensate for impacts on transit operations, the City will implement the following mitigation measures: • Coordinate with Metro to provide alternate transit stop and route locations, as appropriate, for Routes 16, 66, and 99. • Provide clearly marked and ADA-accessible pedestrian connections between any new transit stops and key destinations along Alaskan Way, including Colman Dock Ferry Terminal, the Seattle Aquarium, and the Bell Street Pier Cruise Terminal. • Provide alternate bus layover zones on streets near the existing zones. Water Transit To minimize or compensate for impacts on water transit services, the City will implement following mitigation measures: • In coordination with Washington State Ferries, provide for ferry queuing and access to Colman Dock, with storage provided on Alaskan Way during the summer construction shutdown. • Provide passenger drop-off/pickup and taxi space for Colman Dock on Yesler Way. • In coordination with Washington State Ferries, provide terminal access during each construction traffic stage that addresses construction impacts on parking, drop-off/pick up, and access by bicycles, pedestrians, and transit vehicles. • In coordination with the Port of Seattle, provide cruise terminal access for drop-off/pickup, and access by bicycles, pedestrians, and transit vehicles. • Require the contractor to follow applicable regulations for operating work vessels or barges along the downtown Seattle waterfront, including coordination with the Port of Seattle, Washington State Ferries, other boat operators, and pier owners. Emergency Service To reduce impacts on emergency services, the City will implement the following mitigation measures: • Designate the center lane on the temporary road (including the portions located under the Alaskan Way Viaduct) as a space for emergency vehicles, with the exception of certain intersections that will permit vehicles to turn. • If the use of the center lane does not provide for appropriate response times, implement signal controls (such as signal preemption) at signalized intersections to mitigate the effects on the response times of fire and emergency medical services during construction. In addition, at the intersection of Alaskan Way and Madison Street along the temporary roadway in front of Fire Station No. 5, provide striping and signage to prohibit blockage of the intersection. Event Traffic The strategies described above for detours, signage, and wayfinding measures will also serve to minimize impacts on event traffic. The City will coordinate with event authorities using existing forums as appropriate.
Operation	The City will partner with private and public facilities to implement e-Park (described in Chapter 4) and other measures to ensure adequate short-term parking supply as mitigation for the loss of parking along Alaskan Way.

Cumulative	Because adverse cumulative effects are construction-related, the City will focus mitigation measures on minimizing those temporary impacts. The City will coordinate with Metro, WSDOT, the Port of Seattle, local businesses, and neighborhoods to coordinate construction sequencing between projects. This will minimize potential effects to traffic and parking during construction of the seawall and the Reasonable Foreseeable Future Actions and encourage the use of public transit during construction.
Economics	
Construction	The City will implement the following mitigation for adverse economic effects during construction: • Shut down construction during the peak summer months (Memorial Day weekend through Labor Day weekend) to minimize impacts on visitor-oriented businesses. After Labor Day, begin mobilization and construction gradually to minimize effects during September, which is a busy month for many waterfront businesses, in order to preserve as much parking as possible. • Coordinate with individual businesses and other stakeholders concerning detours, pedestrian and roadway access, utility disruptions, access limitations, and other critical activities. Public information campaigns to encourage people to visit the waterfront during construction could also be implemented. • Maintain access to properties during construction. If access to a business with a single entrance must be blocked for an extended period, coordinate with building owners and tenants to determine appropriate compensation or to provide relocation assistance under the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. • Coordinate with adjacent businesses and property owners during each stage of construction to identify the location and amount of temporary parking that will be put in place, manage temporary and permanent parking supplies during construction, and identify strategies for making parking both convenient and accessible to waterfront businesses and their patrons. • Perform outreach in cooperation with business owners to provide pedestrian and parking maps in advance of and during construction, and information about parking options by means of e-Park and the Seattle Parking Map website. • Locate or direct stationary equipment such as lighting, generators, air compressors, and similar equipment away from sensitive receiving properties. • Prohibit the use of impact tools such as impact pile drivers between the hours of 10 p.m. and 7 a.m. on weekdays and 10 p.m. and 9 a.m. on weekends and legal holidays. • Provide a 24-hour hotline for complaints about noise. • Notify nearby residents and businesses before periods of intense nighttime construction. • As vibration monitoring may be required at nearby historic structures, the City will compare monitoring data to the vibration criteria established for the project to ensure that construction vibration levels do not exceed the damage risk criteria for buildings.
Operation	The City will work with any displaced business to provide relocation assistance under the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended.
Cumulative	SDOT will coordinate with other City departments, WSDOT, and others to minimize the combined construction-related effects of concurrent projects in the vicinity of the seawall. Cumulative traffic and parking issues resulting from concurrent projects that could affect local businesses will be addressed by the various agencies involved, as follows: • During seawall construction, distribute timely information to the public indicating alternate ways of accessing facilities on the downtown Seattle waterfront.

- Coordinate construction detours as necessary with other projects.
- Work with public and private entities that own and operate the various waterfront facilities to encourage local residents and visitors to continue to visit and patronize the waterfront during construction of the concurrent projects.

No long-term cumulative effects to economic resources are anticipated following seawall construction.

Noise and Vibration

Construction

The City will operate under appropriate noise variances. In coordination with the Seattle Department of Planning and Development, construction noise mitigation requirements will be developed and specified in the noise variance(s). The following are examples of mitigation measures that the City will incorporate into the construction plans, specifications, and variance requirements to reduce construction noise at nearby noise receptors:

- SDOT will notify all adjacent residential use properties 72 hours in advance of starting nighttime work.
- All trucks performing export haul during the variance window (10 p.m. to 7 a.m. weekdays and 10 p.m. to 9 a.m. weekends) will have bed lining approved by the engineer such as, but not limited to, soil, gravel, or rubber.
- All backup warning devices used on site will be the least intrusive broadband type, or the contractor will use backup observers as permitted by law.
- Radios will be used for all long-range communication on site; no yelling or honking between trucks will be permitted except in the case of an emergency.
- Impact tools such as jackhammers, chipping hammers, and impact pile drivers will not be used between the hours of 10 p.m. and 7 a.m. on weekdays and 10 p.m. and 9 a.m. on weekends and legal holidays.
- Soil improvement batch plants located within 150 feet of noise-sensitive receivers will not be permitted to operate between 10 p.m. and 7 a.m. on weekdays and 10 p.m. and 9 a.m. on weekends and legal holidays.
- Any material or debris that spills on the pavement will be removed by hand sweeping; no scraping type equipment or activity will be used to clean pavement surfaces during nighttime hours. In addition, no street sweeping machinery will operate between the hours of 10 p.m. and 7 a.m. on weekdays and 10 p.m. and 9 a.m. on weekends and legal holidays.
- Engine idling will be limited to not more than 2 minutes when vehicle or equipment is not directly engaged in work activity, such as on-site pickup trucks and cued export haul trucks.
- Vibratory pile driving methods will be utilized instead of impact pile driving whenever feasible.
- Construction activities associated with this project could generate noise impacts resulting in a noise complaint; the project will assist the Department of Planning and Development (DPD) to resolve it by contacting DPD within 24 hours of receipt of any noise-related complaints.

Impact pile driving will be the most prominent source of vibration during project construction. The City will implement the following measures to reduce ground vibrations when appropriate for the specific pile installation conditions:

- Use jetting techniques – a mixture of air and water pumped through a high-pressure nozzle to erode the soil adjacent to the pile – to facilitate the placement of the pile.
- Predrill a hole for a pile to place the pile at or near its design depth, eliminating most or all impact driving.

	• Place resilient pile cushioning material between the driving hammer and the pile. • Use alternative non-impact, proprietary pile-driving systems to reduce the impact-induced vibration. • Restrict other construction activities to predetermined distances from historic structures or other sensitive receivers, or use alternative equipment or construction methods. • Monitor vibration as needed, at nearby historic structures. The monitoring data will be compared to the vibration criteria established for the project to ensure that the vibration levels do not exceed the damage risk criteria for buildings.
Operation	No mitigation will be required as the project will not generate noise and vibration after construction.
Cumulative	Beyond the measures for mitigating the effects of project construction described in Chapter 4, no mitigation for cumulative noise and vibration effects is anticipated as the project will not generate noise and vibration after construction.
Cultural, Historic, and Archaeological Resources	
Construction	The process for determining adverse effects on archaeological resources is ongoing. If adverse effects on archaeological resources are determined, the City will comply with all measures for adverse effects to historic and archaeological resources stipulated in a memorandum of agreement signed by the City, DAHP, and USACE. The City will also implement the following mitigation measures for potential adverse effects on cultural, historic, and archaeological resources: • Conduct construction under the auspices of an Unanticipated Discovery Plan, including provisions for inadvertent discovery of cultural materials or human remains. • Restore and replace the Washington Street Boat Landing pergola in its existing location on new pilings at the foot of S. Washington Street. The restoration and replacement will be performed in coordination with the Seattle Department of Neighborhoods Historic Preservation Program and will have the required certificates of approval from the Pioneer Square Preservation Board (SMC 23.66.115). • Use best management practices (BMPs) to control noise and vibration, air pollution, dust, and mud. • Ensure continued access to businesses and residences. • Coordinate with property owners and utility providers to minimize disruptions to utility services.
Operation	The operation of the new seawall is not expected to result in any adverse effects on known archaeological sites; therefore, no mitigation is required. The City may implement the following mitigation measures for effects if it is determined they would have an adverse impact on historic resources: • Prepare Historic American Engineering Record-level documentation for the Elliott Bay Seawall. • Replace the existing historical plaques on the seawall (or equivalent interpretive materials) in appropriate locations.
Cumulative	The construction-related mitigation measures described in Chapter 4 will avoid or minimize the cumulative effects of the proposed alternatives that will occur during construction. SDOT will coordinate the construction of the proposed projects with all other applicable agencies to minimize the effects on historic and archaeological resources.

Energy Resources	
Construction	No mitigation will be required.
Operation	The City will use of energy efficient lighting (i.e., LED bulbs) to minimize energy use over the lifetime of the project.
Cumulative	No mitigation measures for cumulative effects on energy use are proposed. Although the cumulative effects of the GHG emissions resulting from the Elliott Bay Seawall Project are not expected to be significant, there are certain elements of the construction plans for the seawall and nearby projects that could be coordinated to ensure that the cumulative GHG emissions are minimized. Traffic plans for overlapping projects could include detours and strategic construction timing to minimize traffic congestion and engine idling in the project area. SDOT will coordinate with other City departments and regional transit agencies to promote ridesharing efforts and transit use for construction workers on the Elliott Bay Seawall Project, as well as the other projects under construction at the same time.
Land Use, Shorelines, and Parks and Recreation	
Construction	Appropriate compensation will be provided for any temporary easements required for project construction. No additional mitigation specific to land use is proposed. The City will implement the following mitigation for adverse effects on parks and recreational facilities: • Shut down construction activity from Memorial Day weekend through Labor Day weekend to minimize effects to parks and recreational facilities. Restore parking along the waterfront during these summer months to minimize the adverse effect during the period of greatest parking demand along the waterfront. • Provide noise attenuation to minimize the effect on pedestrians seeking to enjoy Waterfront Park, artwork along the waterfront, or the views along the waterfront. See the Noise and Vibration measures listed above. • Coordinate with Seattle Aquarium staff to minimize construction-related impacts on the animals in the collection from noise and vibration, airborne dust, and interruption of the water supply due to construction activity. Measures will include noise attenuation, dust suppression measures, and a contingency plan for addressing issues related to water quality or supply issues. • Coordinate with the Aquarium as construction commences to allow for proper preparation of the saltwater intake in order to prevent any uptake of sediment. • Conduct public outreach to let residents and visitors know how to access the waterfront during construction, where parking is available, and how to reach the area by transit. During the active construction season, the City will work with the Seattle Aquarium and other affected recreational sites to provide alternative parking sites and convenient loading zones for school and other charter buses. See the Transportation measures listed earlier in this chapter for additional details on access and parking mitigation. • During construction in the vicinity of the Aquarium, provide a marked detour at all times with appropriate signage at both Pike Place Market and the Seattle Aquarium. Pedestrian links between the waterfront and Western Avenue/First Avenue will be provided at least every two blocks during construction to minimize significant out-of-direction pedestrian movements. • Provide a continuous pedestrian/bicycle corridor along Alaskan Way throughout construction to facilitate linkages among the various waterfront parks and recreational facilities. In addition, provide a continuous pedestrian corridor on the west side of Alaskan Way during the peak summer months. During construction in any given zone, a safe, clean, well-lit pedestrian detour route will be provided to facilitate access to the various facilities along the waterfront.

	• Protect artwork within the construction work zone from damage due to construction activity. The protection could include encapsulation of the artwork in place or its temporary removal and storage.
Operation	No long-term adverse effects on land use and shorelines will result from operation of the new seawall; therefore, no mitigation will be necessary.
Cumulative	The City will coordinate active public information efforts for construction of the Elliott Bay Seawall Project with other projects in the vicinity to provide a consistent and comprehensive approach to informing the public of accessibility to the waterfront, available parking, and transit options. Project staff will work closely with Seattle Parks and Recreation and the Seattle Aquarium to make sure that the project provides flexibility for future redevelopment or expansion of Waterfront Park, Pier 62/63, and the Seattle Aquarium.
Public Services and Utilities	
Construction	The City will implement the following mitigation for adverse effects on public services during construction: • Work closely with the Seattle Police Department and Seattle Fire Department to ensure that reliable access is provided for emergency services during construction and minimize delays in response times due to construction activities and detours. A center emergency-access/left-turn lane will be provided along the temporary road to facilitate the movement of emergency vehicles. • If the use of the center lane does not provide for appropriate response times, SDOT will implement signal controls (such as signal preemption) at signalized intersections to mitigate the effects on the response times of fire and emergency medical services during construction. In addition, provide striping and signage at the intersection of Alaskan Way and Madison Street in front of Fire Station No. 5, to prohibit blockage of the intersection. • Develop safety protocols and provide on-site first aid personnel during active construction phases. Provide 24-hour security if needed to minimize the likelihood that anyone other than an employee will gain access to potentially dangerous areas within the construction work zone. • Provide a temporary secured parking spot for the Fire Station No. 5 fire engine vehicle if the current building bay is inaccessible. Fire department employees who currently park on site during their 24-hour shift will be accommodated with temporary parking at a nearby location during this period. • Coordinate with the Seattle Police Department to ensure that adequate traffic control is provided during construction for pedestrian and vehicle movements and to facilitate emergency access. • Coordinate between the Seattle Fire Department and Seattle Public Utilities on water-line relocations that may affect the availability of water for fire suppression. Alternative water-supply lines would be provided if needed to ensure that no significant disruption of service occurs. • Coordinate with solid waste service providers to minimize effects on solid waste collection and recycling activities. The City and the contractor(s) will properly dispose of construction materials and spoils according to all applicable regulations. Additional details about the disposal of construction materials and spoils are provided in the mitigation measures discussed under Contaminated Materials and Geology and Soils later in this Chapter. • Notify the Seattle School District of construction detours that may affect school bus routings to and through the project area.

	• Notify the U.S. Postal Service of construction detours and access changes that may affect postal deliveries. Access for postal deliveries will be provided to all buildings during construction. • Provide timely communications to waterfront businesses, property owners, and other stakeholders as construction activities proceed, along with details about detours, utility disruptions, and other critical activities. The City will implement the following mitigation for adverse effects on utilities during construction: • Comply with all federal, state, and local utility standards and criteria. The City will work closely with utility owners to coordinate each utility's criteria and coordinate space planning and construction sequencing to reduce overall risks, costs and impacts. The City will work with utility owners to develop acceptable alternatives for protecting utilities in place where possible. Outfall-replacement design will be evaluated for compatibility with proposed habitat elements as details for these features become available. • Coordinate with public and private utilities to schedule and sequence utility work with the overall project construction schedule. This will include relocation of some utilities to a clear corridor in the summer preceding start of seawall construction and will be coordinated with future utility relocations and improvements along the downtown Seattle waterfront. • Coordinate with utility providers to provide continuous service to customers and maintain critical services such as fire protection and emergency communications. • Require standard industry protection measures to reduce direct construction impacts on utilities. Identify construction techniques to limit vibration impacts on utilities. Vibration monitoring will be conducted where required. • Coordinate with utility purveyors to provide maintenance and emergency access to all utilities throughout construction. If any inadvertent damage occurs, the City will immediately contact the utility owner.
Operation	No long-term adverse operational effects on public services have been identified, and part of the purpose and need for the project is to protect public services and utilities from damage that could occur as a result of no action. Therefore, no mitigation measures for public services are necessary. The project design will comply with current City and Washington State code requirements, including utility policies and strategies listed in the Utilities Element in the Seattle Comprehensive Plant. The City will coordinate with customers at service connections and provide overall coordination of design efforts to be provided by each utility owner.
Cumulative	Because multiple projects will have overlapping construction schedules, the City will lead a coordination effort with other projects to minimize the construction effects on public services, public service providers, and utilities.
Social Resources and Environmental Justice	
Construction	The City will implement the following measures to mitigate the construction impacts on social resources and environmental justice populations: • Engage in timely communications with social service agencies and providers as the construction activities proceed. Provide them with details on access, detours, utility disruptions, and other construction activities. • Before construction begins and periodically during construction, hold neighborhood public meetings to advise the public of planned construction activities, road closures, traffic detours, changes in pedestrian walkways, and other construction-related activities.

	• Publish a project newsletter and special news bulletins to alert members of the public of planned construction activities, road closures, traffic detours, changes in transit routes, changes in pedestrian access routes, and other information. Publish the newsletters in different languages. • Provide representatives of social services in the study area with the name(s) of one or more contacts at the City to call with concerns related to construction activities. • Establish a community telephone information line to allow members of the public to directly report problems related to construction activities and have these problems addressed promptly. • Monitor the effectiveness of pedestrian pathways and signage in the construction area to ensure public safety and access. All pedestrian detours shall comply with ADA accessibility guidelines and meet the safety needs of those who have disabilities. • Coordinate with neighborhood groups, including residents close to construction and staging areas, to implement activity-specific mitigation measures for extended durations of 24-hour effects from construction-related noise, vibration, light, glare, and dust. • Coordinate with representatives of religious institutions located close to construction work zones to address potential noise that could adversely affect services, meditation sessions, or other events. • Coordinate with cultural and social institutions to identify specific access needs during construction, and provide transportation and building access. • Coordinate with social service agencies to identify the best means to mitigate construction effects on low-income and homeless populations. • Include government agencies located near the project construction area on distribution lists for general notifications about planned construction activities. • Shut down construction during the peak summer months, thus minimizing impacts on visitor-oriented businesses and eliminating construction noise during the period when businesses and residences are most likely to have their windows open. • Coordinate with and notify Native American tribes of all barging and other vessel use to avoid and minimize interference with tribal fishing.
Operation	Community outreach and communication will continue during the initial months after construction to address restored traffic and access conditions.
Cumulative	Beyond the mitigation proposed above for construction effects on social resources and environmental justice populations, no further mitigation for cumulative effects is needed. The City will coordinate with other project sponsors to minimize construction effects, which in turn will reduce cumulative construction impacts.
Visual Resources	
Construction	The City will include the following mitigation for adverse effects on visual resources during construction: • Construct temporary installations that interpret the site's history, current construction, and future completed state to stimulate public curiosity and provide visual interest. • Provide viewing "windows" and areas to allow the public to safely view the construction. • Remove construction equipment and materials during the summer shutdown to minimize visual impacts during the peak season for visitors.
Operation	The City will install riparian vegetation and replace street trees in select areas to mitigate for effects to street trees during construction. Additional street plantings and landscaping will be installed within the project area.

Cumulative	The project will result in only minor temporary cumulative effects on visual quality, and the majority of the effects will be beneficial. Therefore, no mitigation for cumulative effects on visual resources is proposed.
Fish, Wildlife, and Vegetation	
Construction	The City will implement the following key mitigation measures: • Restrict in-water construction to the approved in-water work window for salmonids to reduce the likelihood of adverse effects on protected (listed) species. Restrict fish removal/handling to low tides. • Install temporary containment west of the existing seawall to protect Elliott Bay from the construction activities. • Develop and follow an approved Construction Stormwater and Erosion Control Plan (CSECP) and Stormwater Pollution Prevention Plan (SWPPP), which include requirements for controlling runoff onto and from the construction site. • Ensure that appropriate protective measures are in place to minimize the potential that wet cement or grout enters Elliott Bay and, if it does, have a plan to remedy the situation. • Maintain a clean construction work zone to reduce the potential for debris to enter surface waters. • Develop and implement a Spill Plan, which will include the requirement for maintaining spill response materials on site for emergency deployment. • Provide on-site training for all construction staff on species and habitats to protect, implementation of BMPs, and on-going maintenance to ensure that the BMPs are properly used and functioning. • Maintain construction equipment and vehicles to prevent them from leaking fuel or lubricants. • Use nonpetroleum lubricants for equipment used in and over water, whenever possible. • Remove immediately and properly dispose of any floating debris within the containment area. • Monitor turbidity and pH to ensure that the water quality standards are achieved. • Deploy turbidity curtains, when necessary, during in-water work to ensure water quality standards are achieved. • Use a vibratory hammer rather than an impact hammer, whenever possible, to minimize disturbance due to the installation and removal of piles and sheet piles. • Gradually place new habitat substrate to minimize the disturbance of existing bottom sediments. • Ensure that all materials placed in the nearshore area will be clean and free of pollutants. • Properly dewater excavated material prior to disposal. • Ensure that fish have been removed prior to closure of the temporary containment wall. • Position construction lighting away from the water to the maximum extent feasible to minimize effects on aquatic species. • Comply with all requirements of the permits and approvals. • Stop pile-driving activities if any listed species enters a specified exclusion zone, as part of the marine mammal monitoring requirements. • Coordinate with the Seattle Aquarium to implement any necessary measures for the protection of the fish and wildlife collection, such as noise/vibration monitoring and, if needed, veterinary services.

Operation	Many of the operational effects of the project will be beneficial to fish, wildlife, and vegetation. • Install LPS to reduce shade produced by the overwater walkways. • Implement a Post-Construction Monitoring and Adaptive Management Plan to evaluate the success of the habitat features in achieving the objectives. If necessary, implement adaptive management actions to improve function. • Orient street lighting away from Elliott Bay. The City will implement the following BMPs to reduce potential adverse effects on biological resources in the study area during maintenance activities: • Use containment wall and/or turbidity curtains. • Use noise/vibration attenuating techniques. • Manage materials to prevent spills. • Limit in-water maintenance to approved in-water work windows.
Cumulative	All other construction projects in the area will need to adhere to permit conditions and regulations that protect fish, wildlife, and vegetation. The City will maintain the habitat features as required by the project's permits and protect the habitat features from future damage via the Shoreline Code and agreements with property owners.
Water Resources	
Construction	The City will require the contractor to implement the following mitigation measures to address the specific impacts of the project on water resources during construction: • Monitor stormwater runoff discharges and water quality in Elliott Bay near the construction work zone to ensure that it meets all permit requirements and water quality standards. If adverse effects are detected, the City will be required to take immediate corrective actions to limit and mitigate the impact. • Install temporary containment west of the existing seawall to protect Elliott Bay from the construction activities. Deploy turbidity curtains during in-water work, when necessary, to ensure water quality standards are met. • During soil improvement activities, the following BMPs could be implemented to reduce a potential release of grout into Elliott Bay: ▪ Filling or plugging voids or holes in the existing seawall prior to beginning soil improvement, as feasible ▪ Directing jets away from the existing seawall during installation of the westernmost row of jet grout columns to reduce the velocity of grout directed towards the wall face, thereby reducing the potential for grout to displace unconsolidated materials and to migrate closer to the existing seawall and Elliott Bay ▪ Visual monitoring of the area between the existing seawall and the temporary sheet-pile containment wall for any releases during soil improvement • Develop and implement a CSECP and SWPPP to comply with NPDES and City permitting requirements. These plans will be continually updated during construction to address evolving site conditions and any water quality problems that are observed in Elliott Bay. The plans will focus on the following: ▪ Erosion and sediment control BMPs tailored to specific site work activities ▪ Measures to collect, treat, and discharge dewatering water ▪ Measures to prevent, contain, and control spills and leaks of toxic materials during construction

- Use one or more of the following methods to control construction dewatering:
  - Install an on-site treatment facility and reinject water into the ground coordinated with Ecology's UIC program
  - Use tanks to temporarily store water coupled with a water treatment collection service to collect and transport it to an off-site certified facility
  - Install an on-site treatment facility and discharge treated water to Elliott Bay and/or the combined sewer system as permitted by King County
- Use appropriate dewatering systems to limit the drawdown of the local groundwater table to limit the potential for ground surface settlement in the areas adjacent to the excavation. Use a recharge/reinjection system as necessary to avoid the potential for drawdown-induced ground surface settlement that could damage nearby buildings and/or infrastructure. This will be coordinated with Ecology's UIC program.
- Contain all excavated material before off-site disposal to prevent seepage of silt-laden runoff back into the water.
- Develop and implement upland construction stormwater BMPs tailored to specific work activities to control erosion and sedimentation during construction. These measures shall include some or all of the following:
  - Silt fencing
  - Temporary sedimentation tanks/ponds/traps
  - Storm drain inlet protection
  - Street sweeping
  - Straw or compost-filled wattles to contain and filter turbid water
  - Temporary mulch covers on areas of exposed soils
  - Temporary plastic or other covering on erodible material stockpiles
  - Active runoff treatment, if needed
- Load excavated soils and demolition debris onto trucks, train cars, or barges to quickly and efficiently remove them from the project area. Within the project area, minimize stockpiling of excavated soils and debris.
- Use biodegradable petroleum products or vegetable-based oil and in construction equipment operating in the water and over the water to prevent the potential release of toxic materials into the water column resulting from minor leaks or accidental ruptures of hydraulic lines.
- Contain, collect, reuse, recycle, and/or dispose of all materials generated during demolition of the existing seawall in a manner that is consistent with the permit requirements. This includes any concrete debris in the construction work zone inside of the containment walls. The containment system shall not allow concrete to fall into Elliott Bay.
- The temporary containment walls used for isolating the shoreline work areas shall be tall enough and constructed tightly enough to prevent fast-moving water from entering the work area where it could result in the sluicing of soil and possible contaminants in the soil and their escape from containment.
- Provide water quality treatment for any temporary or permanent newly constructed pollutant-generating impervious surface area on roadways by means of BMPs approved for use in the City's stormwater regulations. This includes the exposed portion of the temporary road that is not underneath the Alaskan Way Viaduct, north of approximately University Street.

	• Implement pollution source control BMPs during construction, such as the following measures listed in the Seattle Stormwater Manual: ▪ Minimize storage of toxic and hazardous materials on site, store those materials in a designated area when they must be on site, and install secondary containment. ▪ Contain and dispose of concrete wash water off site. ▪ Vacuum slurry and cuttings during pavement saw cutting to prevent off-site migration and make sure they do not remain on permanent concrete or asphalt paving overnight. ▪ Collect and contain all solid waste for off-site disposal. ▪ Provide a wheel wash for all equipment leaving the worksite. ▪ Treat site runoff as necessary to meet all permit requirements for surface water and groundwater protection. ▪ Temporarily isolate in-water work areas for the construction of habitat features using turbidity curtains or silt booms (or similar devices) to contain short-term turbidity plumes. ▪ Implement standard pollution prevention BMPs for construction equipment operating in the water, such as barges and cranes, to minimize the potential for spills and leaks of petroleum products or other toxic materials into Elliott Bay. ▪ Gradually place new habitat substrate to minimize the disturbance of existing bottom sediments.
Operation	The City will implement the following measures, as needed, to reduce future potential adverse effects on water resources: • Use the most appropriate water quality treatment system(s) for the site conditions, taking into account the potential future impacts of sea-level rise. If the sea level in Puget Sound were to rise enough to result in backwater effects in storm drain pipes that compromise the performance of the proposed treatment systems, the City will adaptively manage the roadway drainage system or provide compensatory treatment as needed. • Use appropriate BMPs during in-water work for maintenance of the seawall or habitat features to prevent the release of pollutants into open water.
Cumulative	No long-term adverse cumulative effects to water quality are anticipated that will require additional mitigation.
Contaminated Materials	
Construction	The City will implement the following measures before any demolition and/or dismantling work begins: • Conduct hazardous materials surveys for the presence of PCBs, asbestos-containing materials, or lead-based paint, with follow-up sampling if needed to identify equipment, materials, and structures that require special handling or disposal. • Notify the Puget Sound Clean Air Agency prior to any demolition activities involving removal of any asbestos containing material. • Appropriately handle and segregate any demolition debris that may be a potential contaminant source; remove for disposal as required by the applicable regulations. • Install temporary containment west of the existing seawall to prevent the transport of contaminated materials into Elliott Bay. • Use appropriate procedures to manage and handle contaminated materials including soil, groundwater, and surface water in accordance with applicable regulations. • Provide advanced planning and notification of appropriate authorities for work adjacent to known regulated cleanup sites, both in the upland area and in the water. • Determine sampling, field screening, and monitoring requirements for worker safety and exposure to contaminated soil and groundwater prior to construction.

	• In order not to disturb contaminated sediments, use effective BMPs for in-water placement of habitat substrate materials, in-water removal of riprap if needed, outfall reconstruction, and operation of in-water and overwater construction equipment. • Comply with all regulatory permit requirements, including water quality monitoring requirements for in-water work specified in the 401 Water Quality Certification and the related water quality monitoring and protection plan approved for the project by Ecology. • Continue to coordinate with applicable regulatory and land management agencies, as well as responsible parties, regarding in-water work with the potential to disrupt existing contaminated sediments or existing areas with sediment caps.
Operation	Placement of jet grout will help prevent remaining upland contamination from migrating into the project site.
Cumulative	Appropriate construction BMPs will be implemented to minimize the potential effects associated with the presence and handling of contaminated materials, which will minimize the potential cumulative effects associated with the exposure of multiple contaminated media during concurrent construction. No long-term adverse cumulative effects are anticipated that require additional mitigation.
Geology and Soils	
Construction	The City will implement the following measures for adverse effects on geology and soils during construction: • Comply with stormwater design and treatment procedures in the current version of the Seattle Stormwater Code (SMC 2P2.800). • Obtain an NPDES construction stormwater general permit for the project and list specific BMPs required for the project. • Put erosion and sediment control measures in place before any clearing, grading, or construction. Construction BMPs include construction staging barrier berms, filter fabric fences, temporary sediment detention basins, and use of slope coverings to contain sediment on site. • Route construction traffic onto City-approved haul routes, which include roadways that are capable of handling heavy loads. The contractor shall take measures to reduce dust during hauling, such as covering loads during transport or allowing one foot of freeboard above the transported material. • Establish allowable vibration levels for critical structures and utilities near the construction activities. Preconstruction surveys will be performed to establish a baseline. During construction, vibrations will be monitored to confirm that the allowable vibration levels are not being exceeded. In areas where vibration cannot be tolerated. • Avoid placing fill adjacent to walls or other structures that are sensitive to settlement unless the structures can accommodate the increased pressures due to the placement and compaction of the fill. Suitable structural fill materials will be used to construct the fills, and the material will be compacted to achieve the compaction criteria required by the City. • Adequately support temporary excavations to mitigate potential sloughing of soils and lateral movement or settlement of nearby existing roadways, railways, structures, and utilities. • Minimize the entry of water into excavations to the extent feasible. Minimization measures could include the use of groundwater recharge wells, dewatering in small sections, or the installation of barriers (e.g., sheet piles and diaphragm walls) to isolate the water table within the excavation.

	• Monitor the water table and settlement outside the excavation to confirm that the dewatering system is working as designed. • Install temporary containment west of the existing seawall to protect Elliott Bay from the construction activities. • Include construction BMPs related to the disposal of soils such as cleaning tires and tracks on heavy equipment before they travel along haul routes and covering truck loads to prevent sediment deposition on roadways. • Locate stockpiles to allow access to utilities for maintenance and repairs by the owners. • Cover stockpiles to prevent erosion and sediment transport. Where feasible, the stockpiles will not be placed directly over utilities or pavements that should not be damaged. In areas where this is not possible, the stockpile height will be limited so that excessive settlement or damage of underlying utilities or pavements does not occur. • Monitor adjacent utilities or structures for movement during jet-grouting activities. • Contain and properly handle spoils generated during jet-grouting activities in accordance with permit requirements. • Carefully control jet-grouting pressure near the ground surface, near existing outfalls and other utilities that will be supported in place, and near the face of the existing seawall in order to mitigate excessive pressure on or leakage of jet grout into adjacent utilities or structures. The temporary containment wall will be installed on the water side of the ground improvement area to prevent jet-grout migration into Elliott Bay. Jet grouting will also be performed in a semicircular pattern adjacent to the protective sheet piles to control potential migration of the grout. Utilities will be inspected in advance and any holes observed will be repaired before jet grouting begins. • Avoid using vibratory methods for sheet pile installation areas where vibrations may affect adjacent facilities. Depending on the soil conditions, the sheet piles could be pushed into the ground without vibration. If the soil conditions are too dense, predrilling will be performed to prepare holes for the sheet piles. • Avoid using vibratory methods for removal of deep foundations in areas where adjacent structures or utilities would be substantially affected. Non-vibratory techniques (e.g., excavation of the foundation element) will be used in areas where adjacent utilities or structures cannot tolerate vibration or settlement.
Operation	The project has been designed to function according to all applicable laws and regulations and criteria approved by the City. However, the following measures will be applied to minimize the potential for any future impacts following construction: • Backfill abandoned utilities with cement grout or other suitable backfill materials so that they cannot become conduits for water or gases. • Monitor for ground settlement where utilities and structures are vulnerable. • If ongoing analysis of preconstruction groundwater monitoring data indicates that groundwater mounding behind the new wall could be greater than the range of groundwater depths observed under existing conditions, install a drainage system with backflow prevention in the new seawall to allow groundwater to flow through the seawall to Elliott Bay.
Cumulative	The City will coordinate with other project sponsors to address potential effects to the water table during dewatering activities. No long-term cumulative adverse effects are anticipated that require further mitigation.

Air Quality	
Construction	The City will carry out the following mitigation measures for adverse effects on air quality during construction: • Implement fugitive dust control practices (primarily periodic sprinkling of exposed open areas by water trucks and street sweeping). • Limit construction vehicle idling, requiring the contractor to use well-maintained equipment or newer equipment.
Operation	No mitigation will be required as the seawall will not be a source of emissions once constructed.
Cumulative	The mitigation measures listed above will help offset cumulative effects of construction on air quality and will include coordination with other projects in the project area. The proposed alternatives will result in no long-term adverse cumulative effects on air quality; therefore, no additional mitigation measures are recommended.

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